PUNJABI UNIVERSITY

PREVIOUS YEAR QUESTION PAPERS

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Roll No. .....

Total Pages : 4

4019/NR

G–2/2116

OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

Paper–410

Semester–VII

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Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

1. How can you relate Functional model to Object and Dynamic models ? Explain using example. 10

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450

2. (a) Explain the features of Object oriented systems and explain them. 5

(b) Design the DFD for Library Management system. 5

SECTION—B

3. (a) Develop an analysis model for Student Information system. 5

(b) Explain the rules for designing Associations by taking a suitable example. 5

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4. How Concurrency can be controlled during System design ? Explain all the methods. 10

SECTION—C

5. (a) Explain the difference among Bidirectional, Unidirectional and Reflexive Association. 5

(b) Differentiate between Association and Aggregation using example. 5

6. What do you mean by Class diagram ? Where is it used ? Also discuss the steps to draw the class diagram with any one example. 10

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(b) Differ
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9. Answe

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(ii)

(iii)

(iv)

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SECTION—D

7. (a) Draw the activity diagram of ATM Machine system. 5

(b) Difference between Sequence diagram and Collaboration diagram. 5

8. Design the use case diagram, event state diagram and sequence diagram of Online Inventory Control system. 10

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SECTION—E

9. Answer the following questions : 10×1=10

(i) Write the advantages of Unified approach.

(ii) Define Abstraction and Modularity.

(iii) Differentiate between functional and non-functional requirements. Write a note on Physical packaging.

(iv) Differentiate between Static and Dynamic models.

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(v) Give an example of Binary Association with an Association class. Also specify the multiplicity.

(vi) List the building blocks of use case diagrams.

(vii) How the Global resources can be handled during System design ?

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(viii) Write a note on Polymorphism.

(ix) List the name of Modeling techniques for component diagrams.

(x) Write a note on Association and Aggregation.

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CC = D 4.890

Total Pages : 3

PC-2683/NR

C-11/2114

OBJECT-ORIENTED PROGRAMMING – 202

Semester–III

Time : Three Hours] [Maximum Marks : 50

Note : Section E is compulsory. Attempt *one* question each from Section A, B, C and D. All questions carry equal weightage.

SECTION–A

I. (a) What is Procedure Oriented Programming? Discuss its features.

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(b) What are the unique advantages of an Object-oriented programming paradigm?

II. (a) What is Class? How would you create a class in C++? Provide examples to explain your answer.

(b) What is the meaning of Friend class? How would it help programmer in programming?

SECTION–B

III. (a) What do you mean by Constructor? How many types of constructors are used? Explain each.

(b) Design a class having the constructor and destructor

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functions that should display the number of objects being created or destroyed of this class type.

IV. (a) How would you do overloading of unary and binary operators ? Provide examples.

(b) If possible, then write a C++ program to find the sum of Fibonacci series of *n* terms using a constructor and a destructor (generating the message "you have done it").

SECTION–C

V. (a) What is Virtual base class ? When do we make it?

(b) Illustrate the concept of inheritance with the help of an example.

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VI. (a) How does the compiler resolve a call to a virtual function?

(b) Write a program that reads a group of numbers from the user and places them in an array of type ***float***. Once the numbers are stored in the array, the program should average them and print the result. Use pointer notation wherever possible.

SECTION–D

VII. (a) Distinguish between Overloaded functions and Function templates.

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(b) What is Exception handling in C++ programming? Explain the exception handling mechanism.

VIII. (a) Distinguish between the term Class template and Template class.

(b) Write a function template for finding the maximum value contained in an array.

SECTION–E

(Compulsory Question)

IX. Attempt all the following :

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(a) What is the meaning of Nested classes?

(b) What is a User defined data type? Write *one* example.

(c) Describe how data are shared by functions in procedure-oriented programs.

(d) What do you mean by Destructor with static members?

(e) How does Inheritance compare with Containership?

(f) Explain the working of Virtual destructors.

(g) What is Pure virtual function?

(h) When do we use Multiple catch handlers?

(i) What is File streams? Write the hierarchy of file streams.

(j) How would you open a file for input in C++ programming?

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(g) Hygiene Factors. Motivation

(h) Coercive Power.

(i) Decentralisation.

(j) Difference between Leadership and Management.

(1×10=10)

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ECE : CC = D 4.888
Civil : D 3.981

Total Pages : 3

PC-3034/NR

D-14/2113

MANAGEMENT PRACTICES AND ORGANISATIONAL BEHAVIOUR – 201

(Common with ECE and Civil Engg.)

Semester–III

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D. Section E is compulsory. All questions carry equal marks.

SECTION–A

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I. Define Planning. Discuss the Planning process. What purposes does planning serve? Explain. 10

II. Critically evaluate the contributions of Taylor to Scientific management. 10

SECTION–B

III. What is Communication? Discuss the Communication process. What are the various communication barriers ? 10

IV. What do you understand by Organizing? Describe the strengths and weaknesses of traditional organizational design. 10

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SECTION–C

V. Define Motivation. Critically analyse the Mac Clleland theory of Motivation. 10

VI. What do you understand by Personality? Explain the various personality attributes influencing the OB. 10

SECTION–D

VII. What do you understand by Conflict? What is the difference between Functional and Dysfunctional conflict? Explain. 10

VIII. What do you mean by Leadership? Discuss the strengths and weaknesses in the Situational approach to leadership. 10

SECTION–E

(Compulsory Question)

IX. Write short notes on the following :

(a) Classical conditioning.

(b) Group cohesiveness.

(c) Selective perception.

(d) Bounded Rationality.

(e) Ethical Values at Workplace.

(f) Span of control.

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3914/NR

F–20/2116

MANAGEMENT PRACTICES AND ORGANIZATION BEHAVIOUR—201

(Common Paper ECE and Civil Engg.)

(Semester—III)

Time Allowed : 3 Hours] [Maximum Marks : 50

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Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION—A

1. "Management is an art of getting things done through in formally organized groups". Justify the statement.

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Roll No. ..... Total No. of Pages : 3

CC : D 4.888

PC 3434-NR

C–19/2115

MANAGEMENT PRACTICES AND ORGANIZATION BEHAVIOUR–201

(Common Paper ECE & Civil Engg.)

Semester–III

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- Section C is compulsory (carrying 2 marks each). Attempt any *six* questions by selecting *three* questions each from Section A and B (carrying 5 marks each).

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SECTION—A

1. "Management means manage men tactfully." Justify the statement.

2. What do you mean by Planning ? What are the steps to be followed to make planning effective ?

3. Explain the concept of organising and its principles.

4. What do you mean by Communication ? Explain its process and the distortions.

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5. What are the implications of MBO in the present scenario of Indian Business Environment ?

SECTION—B

6. Define Organisational Behaviour. Explain the OB models and their importance.

7. Explain the traditional and modern theories of motivation.

8. Explain the concept of Learning. Discuss its theories.

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9. "Leaders are born, not made or leaders are made, not born. Justify with leadership traits and styles.

10. How power and politics are interrelated to each other ? Is politics favourable or unfavourable for employees ? Justify with reasons.

SECTION—C

11. Write short notes on the following :

(a) Modern School of Management

(b) CSR.

(c) Individual Decision Making.

(d) Gantt

(e) Legiti

(f) Types

(g) Type

(h) Grou

(i) Con

(j) How

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(d) Gantt Chart.

(e) Legitimate authority.

(f) Types of control system.

(g) Types of Values.

(h) Group Dynamics.

(i) Conflict Management.

(j) How are authority and responsibility related to each other ?

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2. Explain the concept of social responsibility of business. Discuss the arguments in favor or disfavor in Indian business environment.

3. "Planning is a feed forward task." Do you agree with the statement? Justify with reasons.

4. What do you mean by delegation of authority? Discuss the ways to make the delegation effective.

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5. What is controlling? Explain the modern techniques of controlling which are used in IT industry.

SECTION—B

6. What do you mean by organizational behaviour? Discuss the challenges and Opportunities emerged in modern business regarding OB.

7. Define attitude. How attitude and values influence the behaviour of an individual?

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8. Discuss the learning theories and its global implications in the organizations.

9. Explain the contemporary theories of leadership and its implications in the present scenario.

10. "Culture differs from organization to organization." Justify the statement and how can we make the organizational culture effective.

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SECTION—C

11. Write short notes on the following :

(a) Classical School of Management

(b) MBO

(c) Types of Plans → formal, informal
strategic, tactical
long term, short term

(d) Mintzberg's role of manager
corporate, functional

(e) Human relation skills Proactive,
reactive

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(f) Perceptual errors

(g) Span of Control

(h) Types of Power

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(i) Reinforcement theory

(j) Self concept.

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MST -II

Subject: - Management principles &Organisation behaviour

Time: - 1 hr Class: Civil & ECE

Section A (All questions are compulsory)

a) What are values?
b) What is autocratic leadership?
c) Why work teams are important.
d) Define organisational effectiveness.
e) What are the features of learning organisation? 1*5=5

Section B (Attempt any two)

2. What can be the causes of organisational conflict? How can conflict be resolved? 5

3. What are the various elements of learning? Can learned behaviour be forgotten? 5

4. Suggest ways to enhance Satisfaction among employees? 5

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Total Pages : 3

PC-9328/MB

G-3/2057

ENVIRONMENTAL AND ROAD SAFETY AWARENESS

(Common for CEL Civil Engg.)

Time : Three Hours] [Maximum Marks : 100

Note : Attempt any *five* questions each from Section-I and Section-II. Each question carries 10 marks. Answer to each question should not exceed 500 words.

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SECTION–I

I. Discuss the scope and importance of Environmental studies. 10

II. What are the effects of modern agriculture on food resources ? 10

III. Write short notes on :

(a) Use of alternate energy resources.

(b) Sustainable develepment. 5,5

IV. Define Ecosystem. Discuss various components of an Ecosystem. 10

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V. What is a food chain ? Write a detailed note on the types of food chains.

VI. Write short notes on :

(a) Food-Web.

(b) Ecological pyramid of Numbers. 5,5

VII. Explain genetic diversity, species diversity and ecosystem diversity. 10

VIII. Discuss the effects of over utilization of surface and ground water.

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IX. Write a detailed note on conservation of Biodiversity. 10

X. Discuss various threats to Biodiversity. 10

SECTION–B

XI. What are the causes, effects and control measures of Noise pollution ? 10

XII. What is Landslide ? Explain its causes, effects and control measures. 10

XIII. Write short notes on :

(a) Marine Pollution

(b) Nuclear hazards. 5,5

XIV. Briefly explain Family Welfare Programme in India. 10

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XV. Describe Forest Conservation Act. 10

XVI. Write short notes on :

(a) Earthquake

(b) Vermicomposting. 5,5

XVII. Discuss the role of First-Aid in road safety. 10

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XVIII. Discuss various problems during resettlement and rehabilitaion of people. 10

XIX. What is Global warming ? Discuss its causes and effects. 10

XX. Discuss various Traffic offences and Penalties. 10

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Total Pages : 4

PC-9321/MB

G-3/2057

NUMERICAL METHODS & APPLICATIONS

Paper : 201

Semester – IV

(Common for B.Tech CE and Civil Engg. Semester-I)

Time : Three Hours] [Maximum Marks : 50

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Note : Section C is compulsory. Attempt any *six* questions selecting atleast *three* questions from each Section A and B.

SECTION – A

I. Use Secant method to solve equation $\cos(x) - xe^x = 0$ upto four decimal places. 5

II. Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to three decimal places. 5

III. Solve by Gauss Elimination Method

$$\begin{bmatrix} 1 & 1 & 1 \\ 4 & 3 & -1 \\ 3 & 5 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 6 \\ 4 \end{bmatrix}.$$ 5

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IV. Determine Eigen values and Eigen vectors for the given Matrix $\begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$. 5

V. Fit a second degree parabola to the following data : 5

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

SECTION – B

VI. Use the Trapezoidal rule to estimate the integral $\int_0^2 e^{x^2} dx$ taking the number 10 intervals. 5

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VII. Evaluate $\int_4^{5.2} \log x \, dx$ by Simpson's 3/8 rule for the given data : 5

x	4.0	4.2	4.4	4.6	4.8	5.0	5.2
log(x)	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

VIII. Find the value of y for $x = 0.1$ by Picard's method, given that $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$. 5

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Dimpi Sharma

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C–19/2115

NUMERICAL METHODS AND APPLICATIONS–201

(Common Paper ECE and ME)

Semester–III

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- Section C is compulsory. Attempt any *six* questions by selecting *three* questions from Section A and *three* questions from Section B. Use of non-programmable scientific calculator is allowed.

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SECTION—A

I. Find the root of the equation $4 \sin x = e^x$, correct to 4 decimal places using Regula-Fálsi method.

II. Using Newton-Raphson method for the system of non-linear equations solve :

$x^3 + 2y^3 = 10, 4y^2 + 3x^2 = 16$ starting with $x = 1.8$ and $y = 0.8$.

III. Discuss the order of convergence of Secant method.

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IV. Solve the following system of equations by using Gauss-Seidal Method :

$5x + 2y + z = 12,\ x + 4y + 2z = 15,\ x + 2y + 5z = 20.$

V. Find all the eigen values and eigen vector of $\begin{bmatrix} 1 & 1 & \sqrt{2} \\ \frac{1}{\sqrt{2}} & \frac{3}{\sqrt{2}} & 1 \\ \sqrt{2} & 1 & \frac{1}{\sqrt{2}} \end{bmatrix}$ using Jacobi's Method. 3×5=15

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SECTION–B

VI. Find first order and second order derivatives of y w.r.t. x at x = 0.2 for the following data :

x :	0.0	0.1	0.2	0.3	0.4
y :	1	0.9975	0.99	0.9776	0.9604

VII. Derive Simpson's 1/3rd formula and hence evaluate $\int_0^{\pi} \sin x \, dx$.

VIII. Given that $\frac{dy}{dx} = \frac{x - y}{x + y}$, $y(2) = 1$, compute y (1.9) using improved Euler's method and y(1.8) using modified Euler's method.

IX. Using Adam's
$dy/dx = x^2(1 +$
$y(1.3) = 1.979.$

X. Solve the equat
given that y(0)

XI. (i) Show
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IX. Using Adam's-Bashforth method to find $y(1.4)$ given $dy/dx = x^2(1 + y)$, $y(1) = 1$, $y(1.1) = 1.233$, $y(1.2) = 1.548$ and $y(1.3) = 1.979$.

X. Solve the equation $y''(x) - xy(x) = 0$ for $y(x_i)$, where $x_i = 0, 1/3, 2/3$, given that $y(0) + y'(0) = 1$ and $y(1) = 1$. 3×5=15

SECTION–C

XI. (i) Show that $x_{n+1} = \frac{1}{2}x_n\left(3 - \frac{x_n^2}{\alpha}\right)$ has second order convergence near $\sqrt{\alpha}$.

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(ii) Give geometrical interpretation of Newton Raphson method.

(iii) Show that eigen values of an Hermitian matrix are real.

(iv) Find the values of p and q so that the rate of convergence of the iterative formula $x_{n+1} = px_n + q(N/x_n^2)$, for computing $N^{1/3}$ becomes as high as possible.

(v) Find the numerically largest eigen value of $\begin{bmatrix} -4 & -5 \\ 1 & 2 \end{bmatrix}$, using Power Method.

(vi) Using Lagrange's interpolation formula express $\frac{x^2 + 6x - 1}{(x-1)(x-4)(x-6)}$ as a sum of partial fractions.

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(vii) Solve $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$ by Picard's Method.

(viii) Using Newton's Divided Difference formula find f(7) given $f(1) = 3$, $f(3) = 31$, $f(6) = 223$, $f(10) = 1011$, $f(11) = 1343$.

(ix) Write Milne's Predictor-Corrector formulas.

(x) Explain Taylor Series's Method.

10×2=20

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2, 3, 4, 7, 8, 10

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IX. Solve the $\frac{dy}{dx} = \log(x+y)$, $y(0)=2$ by Euler's modified method at $x = 1.2$ with $h = 0.2$ 5

X. Using Runge-Kutta method of fourth order, solve

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2} \quad y(0)=1 \text{ at } x = 0.2$$ 5

SECTION – C

(Compulsory Question)

XI. Write short notes on the following :

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(a) What do mean by absolute and relative errors ?

(b) What is the order of convergence for fixed point iteration ?

(c) Write a note on rate of convergence.

(d) State the condition, when Gauss elimination method to solve system of equations AX = B fails.

(e) State two differences between 'Curve Fitting' and 'Interpolation'.

(f) Derive the Newton's forward interpolation formula.

(g) Define Hermitian Matrix.

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(h) What is the order of converges in Newton Raphson's method ?

(i) What is Milne's Method ? Give an example.

(j) How finite differences method leads to forward difference approximation ? (2×10=20)

$x_4 = 2.0813 - 3 - 2.0813 (\cancel{2.0813})$

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$16 + 0.1468 \quad (-0.1468)$

$x_4 = 2.1648 \quad f(x_4) = 0.8154 (+ve)$

$f(2) = -1$

$f(3) = 16$

$x_2 = 2 + \frac{1}{17}$

2.0589

$f'(x_2) = -0.3899$

$\Rightarrow x_3 = 2.0589 - 3 - 2.0589$

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PC-4011/NR

G-2/2116

INTERNET AND WEB TECHNOLOGIES-401

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all. Select *one* question from each section A, B, C, D. Section E is compulsory.

SECTION–A

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I. (a) Write a program to create a web page on the internet.

(b) Differentiate between Internet, intranet and extranet. (5×2=10)

II. What is E-Mail? Explain the use of telnet and IRC for sending E-Mail message? (10)

SECTION–B

III. Define computer networks. Discuss various types of networks topologies in computer network and also discuss the advantages and disadvantages of each topologies? (10)

IV. (a) What is a proxy server? Explain the advantages of using Proxy server.

(b) Differentiate between ATM and PPP. (5×2=10)

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SECTION–C

V. (a) Differentiate between method overloading and overriding.

(b) What is Exception handling? How we can through User defined exceptions like Number is positive. (5×2=10)

VI. (a) Explain the use of DTD in XML document.

(b) Explain various steps of servlet life cycle. (5×2=10)

SECTION–D

VII. (a) Differentiate between JavaScript and Java.

(b) What are the three visibility keywords of a property or method in a PHP class? (5×2=10)

VIII. (a) What are the features of JavaScript?

(b) Write a JavaScript program to find the factorial of a number. (5×2=10)

SECTION–E
(Compulsory Question)

IX. (a) In OSI systems, IP-routing is dealt with .....

(b) Gigabit ethernet uses ..... bit physical addresses.

(c) FDDI stands for .....

(d) For handling user interaction ..... side scripting is useful.

(e) For inline images ..... tag is used in an HTML document.

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(f) Define protocols.

(g) What is the use of this keyword in JavaScript?

(h) What is the difference between class and interface?

(i) Write syntax to get current date in JavaScript?

(j) Write a difference between XML and HTML.

(10×1=10)

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SYSTEM MODELING AND SIMULATION

Paper-403

Semester-VII

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. Explain the concept of System with any one live example. Discuss the various ways of Modeling a system.

2. What is Simulation? What is the difference between Simulation and Modeling? With the aid of flow diagram explain various steps in a simulation study.

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SYSTEM MODELING AND SIMULATION

Paper–403

Semester–VII

Time Allowed : 3 Hours] [Maximum Marks : 50

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Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

1. Explain the concept of System with any one live example. Discuss the various ways of Modeling a system.

2. What is Simulation? What is the difference between Simulation and Modeling? With the aid of flow diagram explain various steps in a simulation study.

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SECTION—B

3. Describe a queuing system with respect to arrival and service mechanisms, system Capacity, queue discipline, flow diagrams of arrival and sevice events.

4. Explain the linear congruential method for generating random numbers and generate three random numbers using above methods with X_0=27, a=17, c=43 and m=100.

SECTION—C

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5. Explain in detail the chi-square goodness of fit test.

6. With illustrative examples, describe the Output analysis for Steady state simulations.

SECTION—D

7. Discuss the concepts of high-level Computer simulations by sketching a simulation model at a Computer system that services requests from the world wide web.

8. What do you mean by Simulation language? How these languages are different from high level languages? Explain the features of any one simulation language you are working with.

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SECTION—D

9. (i) Discuss the general Systems theory in brief.

(ii) Differentiate between Continuous and Discrete systems.

(iii) What are the desirable properties of Random numbers?

(iv) What is acceptance rejection technique?

(v) Explain any two situations where Simulation is not an appropriate tool.

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(vi) Differentiate between Endogenous and Exogenous activity.

(vii) What are the problems or errors in generating pseudo random numbers?

(viii) Enlist the steps involved in development of a useful model of Input data.

(ix) What are the elements of an Inventory system?

(x) Briefly discuss the Stochastic simulation.

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V. Evaluate the integral $\iiint_R \sqrt{1-\frac{x^2}{a^2}-\frac{y^2}{b^2}-\frac{z^2}{c^2}}\,dx\,dy\,dz$

over the boundary of R : $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$. (3×5=15)

SECTION–B

VI. Prove that $\beta(m, n)=\frac{\Gamma(m)\,\Gamma(n)}{\Gamma(m+n)}$, where $m>0$, $n>0$

VII. Express $\int_0^1 x^m(1-x^p)^n\,dx$ in terms of Beta function and hence evaluate the integral $\int_0^1 x^{3/2}\left(1-\sqrt{x}\right)^{1/2}\,dx$.

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VIII. Show that the function $u(x, y)=2x+y^3-3x^2y$ is harmonic. Find its conjugate harmonic function $v(x, y)$ and the corresponding analytic function $f(z)$.

IX. (a) Find real and imaginary parts of Log [(1 + i) Log i].

(b) Show that cos z = cos x cosh y – i sin x sinh y.

X. Using the definition of limits, show that $\lim_{z\to i} z^2=-1$.

(3×5=15)

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SECTION–C
(Compulsory Question)

XI. (a) Give the statement of Euler's Theorem for homogeneous functions.

(b) If $u = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$,

then show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$.

(c) Show that similar matrices have same set of eigen values.

(d) Find a real symmetric matrix C of the quadratic form

$$Q = x_1^2 + 3x_2^2 + 2x_3^2 + 2x_1x_2 + 6x_2x_3.$$

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(e) Evaluate the integral $\iint_R \sqrt{x^2 + y^2}\, dx\, dy$ by changing to polar coordinates, where R is the region in the xy-plane bounded by the circles $x^2 + y^2 = 4$ and $x^2 + y^2 = 9$.

(f) Discuss the convergence of the improper integral

$$\int_a^b \frac{dx}{(x-a)^p}, \quad p > 0.$$

(g) Show that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$, where $\Gamma(\alpha)$ represents a Gamma function.

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(h) Show that the function $f(z) = |z|^2$ is differentiable only at $z = 0$ and nowhere else.

(i) Show that if $f(z)$ is analytic and Re $f(z)$ is constant then $f(z)$ is a constant.

(j) Define Conformal mapping. (2×10=20)

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v^{2n-2}

n^n $2n-2-1$

$(2n-2)v^{2n-3}$

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H-1/2117

APPLIED MATHEMATICS–I

Paper–102

(Semester–I)

Time : Three Hours] [Maximum Marks : 50

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Note : Attempt any *six* questions by selecting *three* questions from each Section A and B. Section C is compulsory.

SECTION–A

I. For the function $f(x, y) = \begin{cases} \dfrac{xy^3}{x + y^2}; & (x, y) \neq (0, 0) \\ 0; & (x, y) = (0, 0) \end{cases}$

Find $f_{xy}(0, 0)$ and $f_{yx}(0, 0)$ and prove that f_{yx}, f_{xy} are discontinuous at (0,0).

II. If $\theta = t^n e^{-\frac{r^2}{4t}}$, what value of n will make

$$\frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2 \frac{\partial \theta}{\partial r}\right) = \frac{\partial \theta}{\partial t}.$$

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III. Change the order of the integration and evaluate the double integral $\int_{y=0}^{1}\int_{x=y}^{\sqrt{2-y^2}} \frac{ydxdy}{\sqrt{x^2+y^2}}$.

IV. Find the values of λ and μ for which the system of equations $x + y + z = 6$, $x + 4y + 3z = 10$, $x + 4y + \lambda z = \mu$ has (i) a unique solution, (ii) infinite number of solutions and (iii) no solution.

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V. Let $T : R^3 \to R^2$ be a linear transformation defined by $T(x, y, z) = (y + z, y - z)$. Determine the matrix of the linear transformation T, with respect to the standard basis $\{(0, 1, 1), (1, 0, 1), (1, 1, 0)\}$ in R^3 and $\{(1, 1), (1, -1)\}$ in R^2. (3×5=15)

SECTION–B

VI. Discuss the convergence of the improper inegral

$$\int_a^b \frac{dx}{(x-a)^p},\ p>0.$$

VII. Using
positive

m

VIII. Show

IX. Show
consta

X. Find

XI. Atten

(a)

(b)

(c)

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VII. Using Beta and Gamma functions, show that for any positive integer

$$m \int_0^{\frac{\pi}{2}} \sin^{2m-1}(\theta) d\theta = \frac{(2m-2)(2m-4)....2}{(2m-1)(2m-3)....3}.$$

VIII. Show that $f(z) = \arg z$ is note differentiable anywhere.

IX. Show that an analytic function with constant modulus is constant.

X. Find all values of z which satisfy $e^z = 1 + i$. (3×5=15)

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SECTION–C

XI. Attempt all the questions :

(a) If $u = \sin^{-1} \frac{x^2 + y^2}{x + y}$, prove that

$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \tan u.$$

(b) State necessary conditions for a continuous function $f(x, y)$ to have an extremum.

(c) Prove that in a Hermitian matrix, all the diagonal elements are real.

(d) Prove that the set of all solutions (a, b, c) of the equation $a - 3b + 4c = 0$ is a subspace of the vector space $V_3(R)$.

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(e) Prove that if two vectors are linearly dependent then one of them is a scalar multiple of the other.

(f) Define improper integral of the first and second kind.

(g) Prove that $\Gamma(\alpha + 1) = \alpha\,\Gamma(\alpha)$, where $\Gamma(\alpha)$ is gamma function.

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(h) Show that the function $\cos 2z$ is analytic function.

(i) Prove that $u = y^3 - 3x^2y$ satisfy Laplace's equation.

(j) Find the general and principal value of $\log(-1)$.

(10×2=20)

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Total Pages : 4

PC-3425/NR

C-18/2115

APPLIED MATHEMATICS–I

Paper–102

(Semester–I)

Time : Three Hours] [Maximum Marks : 50

Note : Section-C is compulsory. Attempt any *six* questions by selecting *three* questions from Section-A and *three* questions from Section-B

SECTION–A

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I. State and prove Taylor's Theorem for the function of two variables.

II. A rectangular box without top is to have given valume. How the box should be made so as to use the least material ?

III. Find the values of λ and μ for which the system of the equation $x + 2y + z = 6$, $x + 4y + 3z = 10$, $x + 4y + \lambda z = \mu$ has a (i) unique solution, (ii) infinite solutions, and (iii) no solution.

IV. Let V and W be two vector spaces in R^3. Let $T : V \to W$ be a linear transformation defined by
$T(x, y, z) = (0, x + y, x + y + z)$.
Find the matrix representation of T with respect to the ordered basis $X = \{(1, 0, 1), (1, 1, 0), (0, 1, 1)\}$ in V and $Y = \{(1, 0, 0), (0, 1, 0), (0, 0, 1)\}$ in W.

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III. (a) Define equivalent and molar conductance. Also write their units. 2

(b) The molar conductance at infinite dilution for sodium acetate, hydrochloric acid and sodium chloride are 91.0, 426.2 and 126.5 ohm^{-1} cm^2 mol^{-1} respectively at 298 K. Calculate the molar conductance of acetic acid at infinite dilution. 2

(c) Differentiate between primary and secondary cells. 1

IV. (a) Define lubricants. Discuss the classification of lubricants with suitable examples. 2

(b) Explain the following properties of lubricants giving their significance : (i) [illegible] (ii) Flash and fire point (iii) Saponification value. 3

V. (a) What is meant by carbonate and non-carbonate hardness of water? 2

(b) Why is calgon conditioning better than phosphate conditioning? 2

(c) Write the expression for Nernst equation for the following cell : 1

$$A/A^{+3}(0.001M)//B^{+2}(0.01M)/B.$$

SECTION—B

VI. (a) Explain $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ transitions of carbonyl compounds. 1

(b) What is a [illegible] butanone

(c) The perce of unkno for a 4.0 the abso

VII. (a) Discuss followi

(i) Ara

(b) Disting polym

VIII. (a) Expla of inf of an

(b) Two C_3H 171 I an

IX. (a) Stat

(b) Th of (H at

(c) C b

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(b) What is a chromophore? Identify the chromophore in butanone and cyclopentene. 2

(c) The percentage transmittance of an aqueous solution of unknown compound is 20% at 298K and 300 nm for a 4.0×10^{-5} M solution in a 2.0 cm cell. Calculate the absorbance of the solution. 2

VII. (a) Discuss the preparation, properties and uses of the following polymers :

(i) Araldite (ii) Silicon rubbers. 3

(b) Distinguish between (i) Thermosetting and Thermoplastic polymers (ii) Isotactic and Atactic polymers. 2

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VIII. (a) Explain the principle of IR spectroscopy. What type of information is obtained by studying the IR spectra of an organic compound? 3

(b) Two isomers I and II of the molecular formula C_3H_6O give IR absorption band near 3350 cm^{-1} and 1717 cm^{-1} respectively. Assign structural formula to I and II consistent with their IR absorption bands. 2

IX. (a) State second and third law of thermodynamics. 2

(b) The enthalpy change (ΔH) during the formation of ammonia gas from nitrogen and hydrogen (Haber's process) is –92.8 kJ at 298K. What is ΔE at 298K? 2

(c) Calculate the maximum efficiency of an engine operating between 100°C and 20°C. 1

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X. (a) Write short notes on (i) Column chromatography (ii) HPLC. 3

(b) Give some important applications of chromatography. 2

SECTION—C
(Compulsory)

XI. Attempt all questions :

1. Differentiate between addition and condensation polymerisation.
2. What is Viscosity index? What is its significance?
3. What is a fuel cell? What are its advantages over the conventional cells?
4. What are the factors which affect corrosion?
5. Why does hard water consumes a lot of soap?
6. State Lambert-Beer law.
7. What is R_f value in chromatography?
8. ΔG for a reaction at 300 K is –16 kcal, ΔH for the reaction is –10 kcal. What is the entropy of the reaction?
9. What is finger print region in IR? What is its importance?
10. What is the principle of conductometric titrations?

2×10=20

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F–24/2058

APPLIED CHEMISTRY–103

(Semester–II)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Sections A & B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION—A

I. (a) What are zeolites? How do they function in removing hardness of water? What are limitations of this process? 3

(b) If 50 mL of a sample of hard water consumed 15 mL of 0.01 M EDTA, what is the hardness of water? 2

II. (a) Explain the mechanism of the following :

(i) Galvanic corrosion

(ii) Pitting corrosion. 2

(b) What is meant by the term Passivity? 1

(c) Explain cathodic and anodic protection for controlling corrosion. 2

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SECTION–B

3. (a) What are reference electrodes ? Describe the construction and working of calomel electrode. 3

(b) The emf of the cell : Zn (s) / Zn^{+2} (0.1M) // Cd^{+2} (z M) / Ag (s) has been found to be 0.3305 V at 298 K. Calculate the value of z. The standard reduction potentials of Zn and Cd electrodes are –0.76 V and –0.40 V respectively. 4

(c) What is a fuel cell ? How is it different from commercial galvanic cells ? Mention the advantages of fuel cells. 3

4. (a) State and explain laws of photochemistry. 3

(b) Write short notes on :
(i) LASERS
(ii) Quantum yield. 4

(c) Will a photon of wavelength 2450 Å be able to dissociate a bond having a bond energy of 95 kcal/mol ?
[Planck's constant = 6.62×10^{-34} Js]. 3

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SECTION—C

5. (a) Discuss the applications of electronic spectroscopy. 4

(b) Explain the principle of IR spectroscopy. What type of information is obtained by studying the IR spectra of an organic compound ? 6

6. (a) In relation of NMR spectra, explain the following terms :
(i) Shielding
(ii) Chemical shift
(iii) Spin-spin coupling. 3

(b) State Lamer-Beer law. Calculate the molar absorptivity of a 1.0×10^{-4}M solution, which has an absorbance of 0.20, when path length is 2.5 cm. 4

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(c) Indicate diagrammatically the splitting of signals in NMR spectra of :

(i) CH_3CH_2Br

(ii) $BrCH_2–CHBr_2$

(iii) CH_3CHBr_2. 3

SECTION—D

7. (a) Distinguish between thermoplastic and thermosetting resins. 3

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(b) Explain conducting and photo chromic polymers giving suitable examples. 4

(c) Differentiate between number average and weight average molecular weights of polymers. 3

8. (a) Define lubricants. Discuss the classification of lubricants with examples. 4

(b) Explain the following properties of lubricating oils giving their significance :

(i) Viscosity

(ii) Flash and fire points. 6

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Total No. of Pages : 3

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O-17/2054
APPLIED CEHMISTRY–103
Semester–II

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt one question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 01 mark each.

SECTION–A

1. (a) Define zeolite. How does zeolite function in removing the hardness of water ? 3

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(b) A sample of water contains following impurities : $Mg(HCO_3)_2$ = 73 mg/L; $CaCl_2$ = 222 mg/L; $MgSO_4$ = 120 mg/L; $Ca(NO_3)_2$ = 164 mg/L. Calculate the quantity of lime (74% pure) and soda (90% pure) needed for softening 5,000 L of water. 4

(c) Explain the priming and foaming formation in boiler-feed water. How do they affect the efficiency of boilers ? 3

2. (a) Explain the mechanism of galvanic and water-line corrosion. 4

(b) How are chromatographic techniques classified ? Mention some applications of chromatography. 3

(c) Mention different methods used for prevention of corrosion of metal and discuss any one method. 3

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III. (a) Write notes on : (i) Electrochemical series and (ii) Reference electrodes. 3

(b) Calculate the emf of Zinc-Silver cell at 25°C when $[Zn^{+2}]$ = 0.10 M and $[Ag^{+}]$ = 10 M. The standard emf of this cell is 1.56 V. 2

IV. (a) Define lubricants. Discuss the classification of lubricants with suitable examples. 2

(b) Explain the following properties of lubricants : (i) Flash and Fire points, (ii) Aniline point and (iii) Cloud and Pour points. 3

V. (a) Describe the construction of Ni-Cd batteries with relevant reactions occurring during the discharge. Mention its applications. 2

(b) Distinguish between softening and demineralisation of water. 2

(c) Define specific conductance. What are its units? 1

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SECTION–B

VI. (a) Explain the following terms in reference to UV-VIS spectroscopy :

(i) Bathochromic shift

(ii) Chromophore

(iii) Hyperchromic effect

(iv) $n \rightarrow \pi^*$ transition. 4

(b) Why a conjugated butadiene requires less energy for $n \rightarrow \pi^*$ transition than an unconjugated ethylene.

VII. (a)

(b)

(c)

VIII. (a)

(b)

(c)

IX. (a)

(b)

X. (a)

(b)

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VII. (a) How can we differentiate between intermolecular and intramolecular hydrogen bonding with the help of IR spectroscopy? Explain by taking suitable examples. 2

(b) An organic compound A with molecular formula C_3H_6O absorbs at 1710 cm^{-1} strongly. When it is reduced with hydrogen, another compound B (C_3H_8O) is formed. In compound B absorption at 1710 cm^{-1} was missing and a band at about 3600 cm^{-1} appeared. What are A and B? 2

(c) Calculate the molar absorptivity of a 1.0×10^{-4} M solution, which has an absorbance of 0.20, when path length is 2.5 cm ? 1

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VIII. (a) Distinguish between number average and weight-average molecular weight of a polymer. 2

(b) Give the preparation and uses of polyesters. 1

(c) Write a short note on conducting polymers. 2

IX. (a) Explain the following: (i) Lambert-Beer's Law and (ii) Finger print region in IR. 2

(b) Write notes on the following: (i) Column chromatography and (ii) HPLC. 3

X. (a) State second and third law of Thermodynamics. 2

(b) A gas expands isothermally against a constant external pressure of 4 atm from a volume of 5 dm^3 to a volume of 25 dm^3. In this process it absorbs 500 J of thermal energy from its surroundings. Calculate ΔE in joules for the process. 2

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(c) What is meant by change in entropy (ΔS) of a system? How is it related to quantity of heat q?

SECTION–C

XI. (a) Calculate the maximum efficiency of an engine operating between 100°C and 20°C.

(b) Which of CH_3OCH_3 and $CH_2=CHCOCH_3$ exhibits higher value of λ_{max} in the visible-UV region and why?

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(c) Comment on the criteria for selection of lubricants for specific purposes.

(d) Differentiate between scale and sludge.

(e) Why are plastics indispensible in everyday life?

(f) What is chromatography?

(g) Why stainless steel, Al and Ni are able to withstand the corrosive action of the atmosphere but Fe undergoes corrosion easily?

(h) What is a fuel cell? How is it different from commercial cells?

(i) What is the condition for a molecule to be an IR active?

(j) State Kohlraush's law of independent migration of ions? (10×2=20)

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H-1/2117

APPLIED CHEMISTRY-103

(Semester–I)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION–A

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I. (a) What is Calgon conditioning? How is it better than phosphate conditioning? 2

(b) A sample of water on analysis was found to contain the following impurities in ppm: $Ca(HCO_3)_2 = 4.86$, $Mg(HCO_3)_2 = 5.84$, $MgSO_4 = 8.40$, $CaSO_4 = 6.80$. Calculate the temporary and permanent hardness of water. [Atomic weights are : Ca = 40, Mg = 24, S = 32, C = 12, O = 16, H = 1.] 2

(c) What is reverse osmosis? What are its applications? 1

II. (a) What are the factors that influence the corrosion? Suggest some methods of corrosion control. 3

(b) How much rust ($Fe_2O_3.3H_2O$) will be formed, when 150 kg of iron has completely rusted away? 2

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Roll No. 21 Total No. of Pages : 3

CC : D 4.788

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D-10-2112

APPLIED CHEMISTRY—103

Semester—I

Time Allowed : Three Hours] [Maximum Marks : 50

Note :— The candidates are required to attempt **ONE** question each from Sections A, B, C and D carrying **10** marks each and the entire Section E consisting of **NINE** short answer type questions carrying 1 mark each.

SECTION—A

1. (a) Explain the priming and foaming formation in boiler feed water. How do they affect the efficiency of boilers ? Discuss the measures for their prevention. 4

   (b) What is potable water ? What are its chief requirements ? 3

   (c) Discuss the process of softening of water by using zeolites. What are the limitations of this process ? 3

2. (a) Define corrosion of metals. What are different types of corrosion ? Explain the electrochemical theory of wet corrosion giving its mechanism. 5

   (b) Write short notes on :

   (i) HPLC

   (ii) Corrosion control. 5

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SECTION—B

3. (a) Define the following terms :

   (i) Specific conductance

   (ii) Equivalent conductance

   (iii) Fuel cells. 3

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(b) The molar conductance at infinite dilution of $Al_2(SO_4)_3$ is 858 ohm $^{-1}$ cm^2 mol $^{-1}$. Calculate the molar ionic conductance of Al^{+3} ion given that $\lambda^\circ(SO_4^{-2}) = 160$ ohm $^{-1}$cm^{2}mol^{-1}. 4

(c) Describe construction and working of lead storage batteries. 3

4. (a) Explain the terms photosensitization and quantum yield. 3

(b) For the photochemical reaction A → B, 1×10^{-5} moles of B were formed on absorption of 6.62×10^7 ergs at 3600 Å. Calculate the quantum yield or efficiency. 4

(c) State and explain laws of photochemistry. 3

SECTION—C

5. (a) Why do molecules absorb in UV-VIS region ? What are the types of electronic transitions occurring in organic molecules ? Discuss giving examples. 5

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(b) Explain the principle of IR spectroscopy. Discuss the factors affecting the frequency of fundamental vibrations. 5

6. (a) Explain shielding and de-shielding of protons in NMR spectroscopy. 3

(b) How many NMR signals are observed in the spectrum of the following molecules ?

(i) Acetone

(ii) Ethyl acetate

(iii) Dimethyl ether

(iv) Propane. 4

(c) Define the following terms :

(i) Chemical shift

(ii) Coupling constant

(iii) Spin-Spin relaxation. 3

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SECTION—D

7. (a) Distinguish between number-average and weight-average molecular weight of a polymer. 2

(b) Give the preparation, structure and uses of the following polymers (i) Teflon (ii) Bakelite (iii) Silicon rubbers. 6

(c) Differentiate between addition and condensation polymerisation. 2

8. (a) What is a lubricant ? Discuss the classification (giving suitable examples) and its basic characteristics with examples. 4

(b) Explain the following properties of lubricants giving their significance (i) Flash point and fire point (ii) Saponification value (iii) Viscosity index (iv) Oiliness. 6

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SECTION—E

9. Explain a very brief note on the following :—

(a) What is the significance of determining the pour point of a lubricant ?

(b) What is meant by the term vulcanization of rubber ?

(c) Why does corrosion of water filled steel tanks occur below the waterline ?

(d) What is the principle applied to remove the hardness of water by lime-soda process ?

(e) How can you distinguish CH_3COCH_3 from CH_3CH_2CHO by proton NMR spectroscopy ?

(f) What is the importance of finger print region in IR spectroscopy ?

(g) What is R_f value in chromatography ?

(h) Distinguish between singlet and triplet states.

(i) Write Nernst equation for the cell, $Al/Al^{+3}//Ni^{+2}/Ni$.

$8 \times 1 = 8$

$1 \times 2 = 2$

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Total Pages : 4

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APPLIED CHEMISTRY–103

(Semester–II)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Sections A & B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION—A

I. (a) What are zeolites? How do they function in removing hardness of water? What are limitations of this process? 3

(b) If 50 mL of a sample of hard water consumed 15 mL of 0.01 M EDTA, what is the hardness of water? 2

II. (a) Explain the mechanism of the following :

(i) Galvanic corrosion

(ii) Pitting corrosion. 2

(b) What is meant by the term Passivity? 1

(c) Explain cathodic and anodic protection for controlling corrosion. 2

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(b) Write short notes on the following :

(i) Gas chromatography.

(ii) Corrosion control. 3

III. (a) Define Standard electrode potential, Specific conductance and Molar conductance. The molar conductance at infinite dilution of $Al_2(SO_4)_3$ is 858 $ohm^{-1}cm^2mol^{-1}$. Calculate the molar ionic conductance of Al^{+3} ion given that $\lambda^{\infty}(SO_4^{-2})$ = 160 $ohm^{-1}cm^2mol^{-1}$. 3

(b) State Kohlrausch's law of independent migration of ions. The molar conductance at infinite dilution for sodium acetate, hydrochloric acid and sodium chloride are 91.0, 426.2 and 126.5 $ohm^{-1}cm^2mol^{-1}$ respectively at 298 K. Calculate the molar conductance of acetic acid at infinite dilution. 2

IV. (a) What is Quantum efficiency? What are the causes of high and low quantum yields? 2

(b) Distinguish between Photochemical and Thermal reactions. 1

(c) Explain the construction and working of H_2–O_2 fuel cell. What are the advantages and limitations of Fuel cell ? 2

SECTION–B

V. (a) Why do molecules absorb in UV-VIS region? What are the types of electronic transitions that can occur in a molecule? Discuss giving examples. 3

(b) A substance when diss
concentration absorbs 10
in a path of 1.0 cm le
concentration of the solu
of the same radiation?

VI. (a) Explain the following
spectroscopy :

(i) Spin-spin coupling

(ii) Chemical shift.

(iii) Shielding of proto

(b) What is Fingerprint r
qualitative applications

VII. (a) What is meant by Nu
polymer? What is Pol
sample?

(b) Give the preparation,
the following :

(i) Polyester resins.

(ii) Silicone rubbers

(iii) High density po

VIII. (a) What is a Lubrican
lubricants with exam

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(b) A substance when dissolved in water at 10^{-3} M concentration absorbs 10% of the incident radiation in a path of 1.0 cm length. What should be the concentration of the solution in order to absorb 90% of the same radiation? 2

VI. (a) Explain the following terms in relation to NMR spectroscopy :

(i) Spin-spin coupling.

(ii) Chemical shift.

(iii) Shielding of protons. 3

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(b) What is Fingerprint region in IR ? Discuss some qualitative applications of IR spectroscopy. 2

VII. (a) What is meant by Number-average molar mass of a polymer? What is Polydispersity index of a polymer sample? 2

(b) Give the preparation, properties and applications of the following :

(i) Polyester resins.

(ii) Silicone rubbers.

(iii) High density polythene (HDPE). 3

VIII. (a) What is a Lubricant? Discuss the classification of lubricants with examples. 2

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(b) Explain clearly the importance of the following in selecting lubricating oil for a particular use :

(i) Viscosity.

(ii) Flash point.

(iii) Carbon residue. 3

SECTION–C

IX. Attempt all the following :

(a) Symmetrical molecules like O_2 and N_2 do not give rise to a NMR spectrum. How do you justify this statement?

(b) Predict the structure of C_5H_{12} and C_2H_6O molecules which give only one NMR signal.

(c) Identify the chromophoric group in the following compounds :

(i) Cyclohexene.

(ii) Butanone.

(iii) Toluene.

(iv) Methanethiol.

(d) Write down the chemical formulae of monomers of the following polymers :

(i) PVC.

(ii) Nylone 66.

(iii) Neoprene.

(iv) Bakelite.

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(e) What is Break-point chlorination ?

(f) What is Pilling-Bedworth rule?

(g) Write the cell reaction and expression for Nernst equation of the following electrochemical cell :

$Al \mid Al^{3+}(aq) \parallel Fe^{+2}(aq) \mid Fe$

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(h) What is the basic principle of chromatographic techniques ?

(i) What is Fluorescence?

(j) What is the significance of determining the pour-point of a lubricant? (2×10=20)

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CC = D 4.843

Total Pages : 5

PC-5943/MR

O-17/2055

APPLIED CHEMISTRY – 103

Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION–A

I. (a) Describe the principle and procedure involved in the Zeolite process for the treatment of water. What are the advantages and disadvantages of the process ? 3

(b) A sample of water on analysis gave the following data :

Ca^{+2} = 30 mg/L; Mg^{+2} = 18 mg/L; CO_2 = 11 mg/L; HCl = 50 mg/L; K^+ = 19.5 mg/L.

Calculate the quantities of lime (90% pure) and soda (94% pure) required for softening one million litres of water sample. [Atomic weight of Ca = 40, K = 39, Mg = 24, Cl = 35.5, C = 12, O = 16, H = 1] 2

II. (a) Explain the mechanism of Pitting corrosion and Differential aeration corrosion. 2

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III. (a) Define equivalent and molar conductance. Also write their units. 2

(b) The molar conductance at infinite dilution for sodium acetate, hydrochloric acid and sodium chloride are 91.0, 426.2 and 126.5 ohm^{-1} cm^2 mol^{-1} respectively at 298 K. Calculate the molar conductance of acetic acid at infinite dilution. 2

(c) Differentiate between primary and secondary cells. 1

IV. (a) Define lubricants. Discuss the classification of lubricants with suitable examples. 2

(b) Explain the following properties of lubricants giving their significance (i) Viscosity (ii) Flash point and fire point (iii) Saponification value. 3

V. (a) What is meant by carbonate and non-carbonate hardness of water? 2

(b) Why is calgon conditioning better than phosphate conditioning? 2

(c) Write the expression for Nernst equation for the following cell : 1

$$A/A^{+3}(0.001M)//B^{+2}(0.01M)/B.$$

SECTION—B

VI. (a) Explain $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ transitions of carbonyl compounds. 1

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(b) Write a short note on HPLC. 1

(c) Describe the mechanism of electrochemical corrosion. 2

3. (a) State Kohlaursch's law of independent mobilities of ions. 1

(b) Calculate the emf of the cell :

$Mg(s)/Mg^{+2}(0.2\ M)//Ag^{-}(1.0 \times 10^{-3} M)/Ag$

Given $E°(Ag^{+}/Ag) = 0.8$ V, $E°(Mg^{+2}/Mg) = -2.37$ V. What will be the effect on emf of this cell if the concentration of Mg^{+2} is decreased to 0.1 M ? 2

(c) Describe construction and working of Ni-Cd alkaline batteries. 2

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4. (a) State and explain :

(i) Stark-Einstein law of photochemical equivalence

(ii) Grothuss-Draper law. 2

(b) Explain the terms photochemical equilibrium and quantum yield. 2

(c) Calculate the energy of an einstein of radiation of wave-length 253.7 nm. 1

SECTION–B

5. (a) What are the types of electronic transitions that can occur in a molecule ? Discuss giving examples. 2

(b) Define the following :

(i) Bathochromic shift

(ii) Hyperchromic effect. 1

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(c) An organic compound **A** with molecular formula C_3H_6O absorbs at 1710 cm^{-1} strongly. When it is reduced with hydrogen, another compound **B** (C_3H_8O) is formed. In compound **B** absorption at 1710 cm^{-1} was missing and a band at about 3600 cm^{-1} appeared. What are **A** and **B** ? 2

6. (a) Define the following terms :

(i) Chemical shift

(ii) Spin-spin coupling. 2

(b) Indicate diagrammatically the splitting of signals in ^1H-NMR spectra of (i) CH_3CHBr_2 (ii) CH_3CH_2OH (iii) $Cl_2CH\text{-}CH_2Cl$. 3

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7. (a) Distinguish between number average and weight average molecular weight of a polymer. 2

(b) Give the preparation and uses of Nylon 66. 1

(c) Write a short note on condensation polymerisation. 2

8. (a) What is a lubricant ? Discuss its basic characteristics with examples. 2

(b) Explain the following properties of lubricants giving their significance : (i) Flash point and fire point (ii) Saponification value (iii) Viscosity index. 3

SECTION–C

9. Write in short :

(a) Why, with dilution, equivalent conductance increases but specific conductance decreases ?

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(b) List all the electronic transitions possible for CH_3Cl and CH_3COCH_3.

(c) What information is provided by multiplicity of peaks in NMR spectrum ?

(d) How will you distinguish between C_2H_5OH and CH_3COCH_3 on the basis of IR Spectroscopy ?

(e) What is hetero chain polymer ? Give one example.

(f) Why [illegible] and lubricant on the surface of moon ?

(g) Impure metal corrodes faster then pure metal under similar conditions. Why ?

(h) What is reverse osmosis ?

(i) Distinguish between thermal and photochemical reactions.

(j) What is *retardation factor* (R_f) in chromatography ?

2×10=20

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Roll No. ..... Total No. of Pages : 4

CC : D 4.788

PC 2657-NR

C-10/2114

APPLIED CHEMISTRY–103

Semester–I

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– The candidates are required to attempt *three* questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION–A

1. (a) Explain the principle of foaming formation in boiler feed water. How can these be avoided ? 2

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(b) A sample of water on analysis was found to contain the following impurities :

$Ca(HCO_3)_2$ = 6.0 mg/L, $Mg(HCO_3)_2$ = 4.0 mg/L,

$MgSO_4$ = 8.0 mg/L, $CaSO_4$ = 10.0 mg/L.

Calculate temporary, permanent and total hardness of water in ppm.

[Atomic weights are : Ca = 40, Mg = 24, S = 32, C = 12, O = 16, H = 1] 2

(c) What is demineralised water ? How is it different from soft water ? 1

2. (a) Mention different methods used for prevention of corrosion of metals and discuss any two methods. 2

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(b) What is a chromophore? Identify the chromophore in butanone and cyclopentene. 2

(c) The percentage transmittance of an aqueous solution of unknown compound is 20% at 298K and 300 nm for a 4.0×10^{-5} M solution in a 2.0 cm cell. Calculate the absorbance of the solution. 2

VII. (a) Discuss the preparation, properties and uses of the following polymers :

(i) Araldite (ii) Silicon rubbers. 3

(b) Distinguish between (i) Thermosetting and Thermoplastic polymers (ii) Isotactic and Atactic polymers. 2

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VIII. (a) Explain the principle of IR spectroscopy. What type of information is obtained by studying the IR spectra of an organic compound? 3

(b) Two isomers I and II of the molecular formula C_3H_6O give IR absorption band near 3350 cm^{-1} and 1717 cm^{-1} respectively. Assign structural formula to I and II consistent with their IR absorption bands. 2

IX. (a) State second and third law of thermodynamics. 2

(b) The enthalpy change (ΔH) during the formation of ammonia gas from nitrogen and hydrogen (Haber's process) is –92.8 kJ at 298K. What is ΔE at 298K? 2

(c) Calculate the maximum efficiency of an engine operating between 100°C and 20°C. 1

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(b) Calculate amount of Lime (84% pure) and Soda (92% pure) required for softening 20,000 litres of water containing $Ca(HCO_3)_2 = 40.5$ ppm, $Mg(HCO_3)_2 = 36.5$ ppm, $MgSO_4 = 30.0$ ppm, $CaSO_4 = 34.0$ ppm, $CaCl_2 = 27.75$ ppm and $NaCl = 10.0$ ppm. Also calculate the temporary and permanent hardness of water sample. 3

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2. (a) Discuss any three factors affecting the rate of corrosion of metals. 3

(b) Explain the following :

(i) Galvanic corrosion.

(ii) Differential aeration corrosion. 2

3. (a) What is Electrochemical series ? How is it useful in predicting whether a particular metal will react with acid to liberate hydrogen gas or not ? 3

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(b) Discuss the application of Kohlrausch's law in determination of equivalent conductance of weak electrolytes at infinite dilution. 2

4. (a) Describe the construction and working of Ni-Cd battery. 2

(b) Write the cell reaction and calculate the emf of the following cell :

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$Zn / Zn^{+2} (0.2\,M) // Ag^{+} / Ag (0.002\,M)$ at 25°C.

The standard emf of the cell is 1.54 V. 3

5. (a) Explain the following properties of lubricants giving their significance :

(i) Flash point and Fire point

(ii) Saponification value

(iii) Viscosity index. 3

(b) What is Lubricant ? Describe various factors involved in the selection of a Lubricant. 2

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SECTION—B

6. (a) Explain the following terms in reference to UV-VIS spectroscopy :

(i) Red shift.

(ii) Hypochromic effect. 2

(b) A Monochromatic radiation is incident on a solution of 0.05 M concentration of an absorbing substance. The intensity of radiation is reduced to one-fourth of the initial value after passing through 10 cm length of solution. Calculate the value of molar extinction coefficient. 3

7. (a) Describe various stretching and bending vibrations in molecule. 3

(b) Discuss the applications of the IR spectroscopy. 2

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8. (a) Write short notes on :

(i) Column chromatography

(ii) HPLC. 3

(b) Give some important applications of Chromatography. 2

9. (a) Explain the addition and the condensation Polymerisation giving suitable examples. 2

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(b) Give important uses of the following polymers :

(i) Teflon

(ii) Silicon rubbers. 1

(c) Distinguish between number-average and weight-average molecular weight of a polymer. 2

10. (a) Show that the work of an Adiabatic reversible expansion of an ideal gas is less than that of an Isothermal reversible expansion. 2

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(b) A Carnot's cycle working between 0°C and 100°C takes up 840 joule from the high temperature reservoir. Calculate the work done, the heat rejected and efficiency. 3

SECTION—C

11. Answer the following questions : 10×2=20

(i) What is Co-polymerisation ? Give an example.

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(ii) What is a Lubricant ? Name any three Solid lubricants.

(iii) How is Cathodic protection of Iron different from its galvanization ?

(iv) What are secondary cells ?

(v) Differentiate between Scale and Sludge.

(vi) State Lambert-Beer's law.

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(vii) What is meant by Thermodynamically reversible and irreversible processes ?

(viii) What is the significance of Finger print region in IR spectroscopy ?

(ix) What is meant by Gas chromatography ?

(x) What is Reverse osmosis ? How can it be used to obtain fresh water from sea water ?

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Roll No. ..

Total Pages : 7

3907/NR

F–19/2116

APPLIED CHEMISTRY

Paper–103

Semester–I

Time Allowed : 3 Hours] [Maximum Marks : 50

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Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION—A

1. (a) Describe the hot lime-soda process for the softening of water. Mention its advantages over cold lime-soda process. 2

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X. (a) Write short notes on (i) Column chromatography (ii) HPLC. 3

(b) Give some important applications of chromatography. 2

SECTION—C
(Compulsory)

XI. Attempt all questions :

1. Differentiate between addition and condensation polymerisation.

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2. What is Viscosity index? What is its significance?
3. What is a fuel cell? What are its advantages over the conventional cells?
4. What are the factors which affect corrosion?
5. Why does hard water consumes a lot of soap?
6. State Lambert-Beer law.
7. What is R_f value in chromatography?
8. ΔG for a reaction at 300 K is –16 kcal, ΔH for the reaction is –10 kcal. What is the entropy of the reaction?
9. What is finger print region in IR? What is its importance?
10. What is the principle of conductometric titrations? 2×10=20

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CC = D 4.788

Total Pages : 3

PC-3027/NR

D-13/2113

APPLIED CHEMISTRY – 103

Semester–I

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

I (a) Explain how hard water is softened.

(b) What are the various trace elements found in water ? Mention their permissible limits.

II. Outline the basic concept of High pressure liquid chromatography. Give its applications. 10

SECTION–B

III. What are the basic principles under which Conductometric titrations work ? Explain. 10

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IV. Explain the kinetics of photochemical reactions. How does the photodegradation of excited states of molecule occur through fluorescence and phosphorescence ? 10

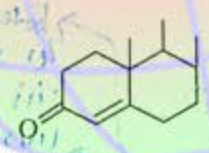
SECTION–C

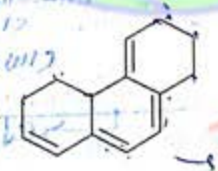
V. (a) Discuss the instrumentation of U.V. and Visible spectrophotometre.

(b) Explain the Lambert-Beer Law. 5+5

VI. (a) Outline the basic theory of Nuclear magnetic resonance spectroscopy.

(b) Calculate λ_{max} of

(i) 

(ii) 

SECTION–D

VII. (a) What are Polymers ? Distinguish between Conducting and Photochromic polymers.

(b) Outline the applications in brief of polymers. 5+5

VIII. What are Lubricants ? How are these classified ? Give their applications in the field of Engineering. 10

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SECTION–E
(Compulsory Question)

IX. Do all the parts in short :

(a) Explain Galvanic corrosion.

(b) What do you mean by Passivity ?

(c) Give only the examples of Anion and Cation exchange resins.

(d) Give *two* factors affecting the conductance of an electrolyte.

(e) Define Quantum yield.

(f) Why does zinc displace H_2 from dilute H_2SO_4 and SO_2 from conc. H_2SO_4 ?

(g) What is Equivalent conductance ? Give its relation with specific conductance.

(h) Where do amino and carboxylic groups show adsorption in IR spectrum of molecules ?

(i) What are Epoxy resins ? Give its *two* uses.

(j) Define Saponification number. (1×10=10)

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2. (a) What are Corrosion inhibitors? Explain with examples, how Anodic and Cathodic inhibitors provide protection against corrosion. 2

(b) Write a short note on column Chromatography. 1

(c) Explain the mechanism of differential aeration corrosion. 2

3. (a) Describe the construction and working of Lead storage batteries. 2

(b) Calculate the emf of the cell; $Mg(s)/Mg^{+2}(0.1M)/Ag^{+}(1.0\times10^{-4}M)/Ag$. Given $E°(Ag^{+}/Ag) = 0.8V$, $E°(Mg^{+2}/Mg) = -2.37V$. What will be the effect on emf of this cell if the concentration of Ag^{+} is increased to 1.0×10^{-3} M? 2

(c) Explain the principle of Conductometric titrations by taking a suitable example. 1

4. (a) Explain the terms Photosensitization and quantum yield. 1

(b) Differentiate between Fluorescence and Phosphorescence. 1

(c) State and explain laws of Photochemistry. 2

5. (a) Discuss the application of Kohlrausch's law in determination of equivalent conductance of weak electrolytes at infinite dilution. 2

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(b) Distinguish between the oftening and demineralisation of Water. 2

(c) Define Specific conductance. What are its units? 1

SECTION—B

6. (a) Explain the following terms in reference to UV-VIS spectroscopy : 2

(i) Bathocromic shift

(ii) Chromophore

(iii) Hyperchromic effect

(iv) $n \rightarrow \pi^*$ transition. 2

(b) How will you differentiate between Alkanes, Alkenes and Alkynes with the help of IR spectroscopy? 1

(c) A monochromatic radiation is incident on a solution of 0.05 molar concentration of an absorbing substance. The intensity of the radiation is reduced to one-fourth of the initial value after passing through 10 cm length of the solution. Calculate the molar extinction coefficient of the substance.

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7. (a) Define the following terms :

(i) Chemical shift

(ii) Coupling constant. 2

(b) Predict the number of signals (with multiplicity) observed in the ^1H NMR spectra of the following molecules : 2

(i) CH_3COCH_3

(ii) $CH_3COOC_2H_5$

(iii) CH_3CH_2OH

(iv) CH_2Cl_2.

(c) An organic compound C_3H_6O contains carbonyl group (C=0). How will its NMR spectrum decide whether it is an aldehyde or ketone? 1

8. (a) Distinguish between number-average and weight-average molecular weight of a polymer. 2

(b) Give the preparation and uses of Polyesters. 1

(c) Write a short note on conducting polymers. 2

9. (a) What is a Lubricant? Discuss the classification and its basic characteristics with examples. 2

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(b) Explain the following properties of Lubricants giving their significance :

(i) Flash point and fire point

(ii) Saponification value

(iii) Viscosity index. 3

10. (a) How UV-VIS spectroscopy is useful in distinguishing between Geometrical isomers? Explain by taking a suitable example. 2

(b) Name two solvents used in NMR spectroscopy. Why are these so expensive? 2

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(c) How can we differentiate between the Intermolecular and Intramolecular hydrogen bonding with the help of IR spectroscopy? 2

SECTION—C

11. (a) Why cannot Thermosetting plastics be reused and reshaped?

(b) Which of CH_3COCH_3 and $CH_2=CHCOCH_3$ exhibits higher value of λ_{max} in the visible-UV region and why?

(c) What is meant by the term 'oiliness' of lubricating oil?

(d) Why do we express hardness of water in terms of Calcium carbonate equivalent?

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(e) State Beer-Lambert law.

(f) Why is TMS used as reference in NMR?

(g) What is Galvanic corrosion?

(h) Why does the equivalent conductivity of a weak electrolyte increase with dilution?

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(i) Why do low-density and high-density polythenes differ in density?

(j) What is *Retention volume* in Chromatography?

2×10

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Roll No. .....

Total Pages : 6

CC : D 4.788

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C-18/2115

APPLIED CHEMISTRY

Paper–103

Sem.–I

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The Candidate are required to attempt **three** questions each from Section-A and B carrying 5 marks each and the entire Section-C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION—A

1. (a) Explain the Zeolite method for removal of hardness of Water. What are its limitations and advantages? 3

(b) A sample of water on analysis was found to contain the following impurities : 2

$Ca(HCO_3)_2$ = 4.0 mg/L, $Mg(HCO_3)_2$ = 6.0 mg/L. $MgSO_4$ = 10.0 mg/L, $CaSO_4$ = 8.0 mg/L. Calculate temporary, permanent and total hardness of water in ppm.

[Atomic weights are; Ca = 40, Mg = 24, S = 32, C = 12, O = 16, H = 1]

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3427/NR/161/W/1,210

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(b) Write short notes on the following :

(i) Gas chromatography.

(ii) Corrosion control. 3

III. (a) Define Standard electrode potential, Specific conductance and Molar conductance. The molar conductance at infinite dilution of $Al_2(SO_4)_3$ is 858 $ohm^{-1}cm^2mol^{-1}$. Calculate the molar ionic conductance of Al^{+3} ion given that $\lambda^{\infty}(SO_4^{-2})$ = 160 $ohm^{-1}cm^2mol^{-1}$. 3

(b) State Kohlrausch's law of independent migration of ions. The molar conductance at infinite dilution for sodium acetate, hydrochloric acid and sodium chloride are 91.0, 426.2 and 126.5 $ohm^{-1}cm^2mol^{-1}$ respectively at 298 K. Calculate the molar conductance of acetic acid at infinite dilution. 2

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IV. (a) What is Quantum efficiency? What are the causes of high and low quantum yields? 2

(b) Distinguish between Photochemical and Thermal reactions. 1

(c) Explain the construction and working of H_2–O_2 fuel cell. What are the advantages and limitations of Fuel cell ? 2

SECTION–B

V. (a) Why do molecules absorb in UV-VIS region? What are the types of electronic transitions that can occur in a molecule? Discuss giving examples. 3

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(b) A substance when dissolved in water at 10^{-3} M concentration absorbs 10% of the incident radiation in a path of 1.0 cm length. What should be the concentration of the solution in order to absorb 90% of the same radiation? 2

VI. (a) Explain the following terms in relation to NMR spectroscopy :

(i) Spin-spin coupling.

(ii) Chemical shift.

(iii) Shielding of protons. 3

(b) What is Fingerprint region in IR ? Discuss some qualitative applications of IR spectroscopy. 2

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VII. (a) What is meant by Number-average molar mass of a polymer? What is Polydispersity index of a polymer sample? 2

(b) Give the preparation, properties and applications of the following :

(i) Polyester resins.

(ii) Silicone rubbers.

(iii) High density polythene (HDPE). 3

VIII. (a) What is a Lubricant? Discuss the classification of lubricants with examples. 2

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(b) Explain clearly the importance of the following in selecting lubricating oil for a particular use :

(i) Viscosity.

(ii) Flash point.

(iii) Carbon residue. 3

SECTION–C

IX. Attempt all the following :

(a) Symmetrical molecules like O_2 and N_2 do not give rise to IR absorption spectra. How do you justify this statement?

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(b) Predict the structure of C_5H_{12} and C_2H_6O molecules which give only one NMR signal.

(c) Identify the chromophoric group in the following compounds :

(i) Cyclohexene.

(ii) Butanone.

(iii) Toluene.

(iv) Methanethiol.

(d) Write down the chemical formulae of monomers of the following polymers :

(i) PVC.

(ii) Nylone 66.

(iii) Neoprene.

(iv) Bakelite.

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(e) What is Break-point chlorination ?

(f) What is Pilling-Bedworth rule?

(g) Write the cell reaction and expression for Nernst equation of the following electrochemical cell :

$Al \mid Al^{+3}(aq) \parallel Fe^{+2}(aq) \mid Fe.$

(h) What is the basic principle of chromatographic techniques ?

(i) What is Fluorescence?

(j) What is the significance of determining the pour-point of a lubricant? (2×10=20)

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CC = D 4.843

Total Pages : 5

PC-5943/MR

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O-17/2055

APPLIED CHEMISTRY – 103

Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION–A

I. (a) Describe the principle and procedure involved in the Zeolite process for the treatment of water. What are the advantages and disadvantages of the process ? 3

(b) A sample of water on analysis gave the following data :

Ca^{+2} = 30 mg/L; Mg^{+2} = 18 mg/L; CO_2 = 11 mg/L; HCl = 50 mg/L; K^+ = 19.5 mg/L.

Calculate the quantities of lime (90% pure) and soda (94% pure) required for softening one million litres of water sample. [Atomic weight of Ca = 40, K = 39, Mg = 24, Cl = 35.5, C = 12, O = 16, H = 1] 2

II. (a) Explain the mechanism of Pitting corrosion and Differential aeration corrosion. 2

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APPLIED MATHEMATICS-II (BAS-105) DATED 3/3/14 (B.TECH-I)

COMMON TO ALL THE GROUPS A&B

Note: Attempt three questions. Q.1 is compulsory. Mention your group on the answersheet.

TIME ALLOWED: 1 HR

MAX. MARKS: 15

Q.1 a) Show that the set $\{e^x, e^{2x}, e^{-3x}\}$ forms a fundamental set of solutions for the equation $y''' - 7y' + 6y = 0$

b) Check the equation for exactness. If it is exact, find its solution $(3x^2 + 2e^y)dx + (2xe^y + 3y^2)dy = 0$

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c) Find the solution of $xy' + y = x^2y^2 \log x$.

d) Find a homogeneous linear differential equation of lowest order whose particular solution is given by $y = sinh3x + xe^{-x}$

e) Discuss the convergence of the real sequence $\{a_n\}$ where

$a_n = \frac{1}{(n+1)^2} + \frac{1}{(n+2)^2} + \ldots\ldots\ldots \frac{1}{(n+n)^2}$ 5 x 1

Q.2. Find a solution of $(x^2D^2 - 3xD + 5)y = 6x^2 \sin(logx)$ 5

Q.3. Find a solution of $(y + x - 2)dy - (y - x + 1)dx = 0$ 5

Q.4. Let z_1 *and* z_2 be any two complex numbers and $z_n = \frac{z_{n-1}+z_{n-2}}{2}, n \geq 3$ show that $\{z_n\}$ is a Cauchy sequence and hence convergent. 5

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Basic and Applied Sciences
B.Tech-2nd Semester
Applied Mathematics(BAS - 105)

Time allowed: 1hr Max.Marks: 15

Note: Section A is compulsory and attempt any two questions from section B. Mention your group on the top of the answer sheet.

SECTION – A

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1. (a) Find the complementary function of $(D^2 - 3D + 2)y = 0$.
   (b) Evaluate $(D^2 - 1)y = 8e^{3x}$.
   (c) Discuss the convergence of $\frac{5^n}{n!}$.
   (d) Find the general solution of $y' - 2y = \cos 3x$.
   (e) Find the general solution of $y = p(x-b) + \frac{a}{p}$. $(5 \times 1 = 5)$

SECTION – B

2. (a) State and prove the necessary and sufficient condition for Cauchy's convergence criterion of a real sequence.
   (b) Find the general solution of $y' = 2e^{-x}y^2 + 3y - 4e^x$, where $y = e^x$ is a particular solution. $(3+2)$

3. (a) Using variation of parameters, find the general solution of $y'' + 16y = 32 \sec 2x$.
   (b) Find the general solution of $2x^2y'' + 3xy' - 3y = x^3$. $(3+2)$

4. (a) Find the I.F. and solve the differential equation $(x^3 + y^3 + 1)dx + xy^2dy = 0$.
   (b) Find the general solution of $(x-2y)dy - (2x-4y-3)dx = 0$. $(2.5+2.5)$

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Basic and Applied Sciences
B.Tech-2nd Semester
Applied Mathematics(BAS - 105)

Time allowed: 1hr Max.Marks: 15

Note: Section A is compulsory and attempt any two questions from section B. Mention your group on the top of the answer sheet.

SECTION – A

1. (a) Find the general solution of $x(e^{4y}-1)y' + (x^2-1)e^{2y} = 0$.
   (b) Evaluate $(D^2-1)y = 8e^{3x}$.
   (c) Discuss the convergence of $\frac{n^n}{n!}$.
   (d) Find the general solution of $y' - 2y = \cos 3x$.
   (e) Find the [illegible] $(5\times1=5)$

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SECTION – B

2. (a) State and prove the necessary and sufficient condition for Cauchy's convergence criterion of a real sequence.
   (b) Find the general solution of $y' = 2e^{-x}y^2 + 3y - 4e^x$, where $y = e^x$ is a particular solution. (3+2)

3. (a) Using variation of parameters, find the general solution of $y'' + 16y = 32\sec 2x$.
   (b) Find the general solution of $2x^2y'' + 3xy' - 3y = x^3$. (3+2)

4. (a) Find the I.F. and solve the differential equation $(x^3+y^3+1)dx + xy^2dy = 0$.
   (b) Find the general solution of $(x-2y)dy - (2x-4y-3)dx = 0$. (2.5+2.5)

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Department of Basic and Applied Sciences
Applied Mathematics-II(Common to all groups)

Max. Marks:15 Time:1 hr

Section A(All questions are compulsory)

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Q.1(i) Examine whether the functions e^x and e^{2x} are linearly independent?.

(ii) Find the solution of $xy' + y = x^2y^2\log x$.

(iii) Check whether the sequence $1 + \frac{1}{4} + \frac{1}{7} \ldots\ldots\ldots \frac{1}{3n-2}$ is a Cauchy sequence?

(iv) Find the radius of convergence of the P.S. $\sum_{n=0}^{\infty} \frac{1}{n!} \left|\frac{iz-1}{2+i}\right|^n$.

(v) State Cauchy's Criterion of convergence. (1*5)

Section B (Attempt any two questions)

Q.2. Find the general solution of the equation $y'' + 4y = cos2x$, using the method of variation of parameters. (5)

Q.3. Find the general solution of the equation $(x+2)^3y''' + (x+2)^2y'' + (x+2)y' - y = 24x^2$. (5)

Q.4. Find the convergence of the series $\sum_{n=1}^{\infty} \frac{n^n x^n}{n!}$. (5)

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U.C.O.E.(PUP)

Applied Mathematics-II .MST-I.(01/04/2013), B.Tech-I (Group A& B)

Note: Mention your group on the answer sheet. All the questions are compulsory & carry equal marks.

Time allowed : 1 hr

max.marks:15

Q.1 a) Is the sequence $a_n = 1 + \frac{1}{4} + \frac{1}{7} + \cdots + \frac{1}{3n-2}$ a Cauchy sequence? Justify.

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b) Formulate the homogeneous linear differential equation of lowest order if the solution is given $y = 3cos2x + 5sinhx$.

c) Define Bernoulli's equation & explain the steps to reduce it to linear equation.

d) Solve the differential equation: $ydx - xdy + e^{\frac{1}{x}}dx = 0$

e) Solve $xy' = (y-x)^3 + y$

5*1=5

Q.2) Solve any two equations

i) $y'' + y = tanx$

ii) $x^3y''' - 3xy' + 3y = 16x + 9x^2 logx$

iii) $(4D^2 + 8D + 3)y = xe^{\frac{-x}{2}}cosx$

2*2.5=5

Q.3) State & prove Cauchy criterion of convergence for real sequences.

1*5=5

$\frac{dy}{dx} + P(x)y = Q(x)y^n$

$y^n \frac{dy}{dx} + P(x)y^{1-n} = Q(x)$

Let $y^{1-n} = z$

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(b) Expand $f(x, y) = 21 + x - 20y + 4x^2 + xy + 6y^2$ in Taylor series of maximum order about the point $(-1, 2)$.

SECTION–B

3. (a) Prove that $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (a+c)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc\,(a+b+c)^3$.

(b) Let T be a linear transformation $T_x = A_x$ from R^2 into R^3, where $A = \begin{bmatrix} 2 & 1 \\ 1 & -1 \\ 3 & 2 \end{bmatrix}$ and $X = \begin{pmatrix} x \\ y \end{pmatrix}$; then find ker (T), ran (T) and their dimensions.

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4. (a) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 0 \\ -1 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$.

Also obtain A^{-1} and A^3.

(b) Obtain the symmetric matrix B for the quadratic form $Q = x_1^2 + 2x_1x_2 - 4x_1x_3 + 6x_2x_3 - 5x_2^2 + 4x_3^2$.

SECTION–C

5. (a) Show that the improper integral $\int_{-\pi/2}^{\pi/2} \tan x\,dx$ is divergent.

(b) Show that the improper integral $\int_{-\infty}^{\infty} \frac{\sin x}{1+x^2}\,dx$ converges.

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6. (a) Using Beta and Gamma functions, evaluate $I = \int_{-1}^{1} (1 - x^2)^n \, dx, \; n > 0.$

(b) Evaluate $\int_0^{\infty} 2^{-9x^2} \, dx$, using Gamma function.

SECTION–D

7. (a) For any two complex numbers z_1 and z_2, prove that

$$|z_1 - z_2| \geq ||z_1| - |z_2||.$$

(b) Find real and imaginary parts of Log [(1 + i) Log i].

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8. (a) Show that $f(z) = |z|^2$ is differentiable only at $z = 0$ and nowhere else.

(b) Find the constants a, b, c such that the function f(z) is analytic, where f(z) = x – 2 ay + i (bx – cy).

SECTION–E

9. Do as directed :

(a) Check the continuity of $f(x, y) = \begin{cases} \dfrac{x - y}{x + y} & ; \; (x, y) \neq (0, 0) \\ 0 & ; \; (x, y) = (0, 0) \end{cases}$

at (0, 0).

(b) Give sufficient conditions for differentiability of f(x, y).

(c) If $f(x, y) = \ell_n (x^2 + y^2) + \tan^{-1}(y/x)$; $(x, y) \neq (0, 0)$, then show that $f_{xy} = f_{yx}$.

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(d) Show that the system $\begin{bmatrix} 4 & 9 & 3 \\ 2 & 3 & 1 \\ 2 & 6 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 2 \\ 7 \end{bmatrix}$ is inconsistent.

(e) Give 4 axioms with respect to vector multiplication.

(f) Is matrix $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ similar to matrix $B = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$?

(g) Evaluate $\int_{-\infty}^{0} e^{x}\, dx$.

(h) Evaluate $\int_{0}^{\pi/2} \sin^2\theta \cos^4\theta\, d\theta$

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(i) Find Arg(z) ; where $z = \dfrac{(3 + 4i)(2 - i)}{(2 + 3i)^2}$.

(j) Find the value of z for which e^z is pure imaginary.

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Total No. of Pages : 4

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D-10/2112

APPLIED MATHEMATICS–I

Paper–102

Semester–I

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt *four* questions, selecting *one* question from each Section A, B, C and D. Section E is compulsory. All questions carry equal weightage.

SECTION–A

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1. (a) Show that the function $f(x, y) = \begin{cases} \dfrac{x^3 + 2y^3}{x^2 + y} & ; (x, y) \neq (0, 0) \\ 0 & ; (x, y) = (0, 0) \end{cases}$

is continuous at (0, 0) and possesses $f_x(0, 0)$ and $f_y(0, 0)$.

(b) If $z = f(x, y)$; $x = r\cos\theta$, $y = r\sin\theta$; then show that

$$\left(\frac{\partial f}{\partial x}\right)^2 + \left(\frac{\partial f}{\partial y}\right)^2 = \left(\frac{\partial f}{\partial r}\right)^2 + \frac{1}{r^2}\left(\frac{\partial f}{\partial \theta}\right)^2.$$

2. (a) If f(x, y) is a homogeneous function of degree n in x and y then prove that $x^2\frac{\partial^2 f}{\partial x^2} + 2xy\frac{\partial^2 f}{\partial x \partial y} + y^2\frac{\partial^2 f}{\partial y^2} = n(n-1)f$.

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Applied Mathematics-I(BAS-102) MST-I (Dated 22/9/14)

Note: attempt three questions,Q.4. is compulsory. Each question carries equal marks. mention your group on the answersheet.

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Time allowed : 1 Hr

Max.Marks:15

Q.1.Show that the function $f(x,y) = \begin{cases} \frac{x^3+2y^3}{x^2+y^2} & (x,y) \neq (0,0) \\ 0 & (x,y) = (0,0) \end{cases}$

(a) is continuous at (0,0)

(b) possesses both partial derivatives at(0,0)

(c) is not differentiable at (0,0)

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Q.2.Find volume of the sphere $x^2 + y^2 + z^2 \leq 1$ in the first octant.

Q.3.Find a point on the plane $Ax + By + Cz = D$ which is nearest to the origin.

Q.4.(a) State Eular's theorem for the function of two variables. (b)Evaluate $\lim_{(x,y)\to(0,0)} \left(y + x\cos\frac{1}{y}\right)$

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(c) Using differentials ,obtain approximate value of $\cos 44^\circ \sin 32^\circ$ (d) find $\frac{dy}{dx}$ when $x^y + y^x = \alpha$

(e) state maximum absolute error in Taylor series using linear approximation and quadratic approximation.

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DEPARTMENT OF APPLIED SCIENCES (FACULTY OF ENGG.), PUNJABI UNIVERSITY PATIALA

MST-1 (B.TECH-1) BAS-101 (APPLIED MATHEMATICS-I) DATED 14/10/2013

COMMON TO ALL THE GROUPS

195

TIME ALLOWED: 1 HOUR MAXIMUM MARKS: 15

NOTE: Attempt all the questions. Mention your group on the top of the answersheet.

-4,7,9

Q.1 a) Using $\varepsilon - \delta$ definition show that $\lim_{(x,y)\to(0,0)} \left(x + y\cos\frac{1}{x}\right) = 0$

b) i) Write the set forming the standard basis of i) set of polynomials of degree $\leq n$

ii) Set of Real matrices of order 2×2

c) If $f(x,y) = tan^{-1}(xy)$, find an approximate value of $f(1.1,0.8)$ using the Taylor series linear approximation.

d) Find $\frac{dy}{dx}$, when $x^y + y^x = \alpha, \alpha$ is any constant, $x > 0, y > 0$

e) Find the values of γ for which the system of equations is consistent

$(\gamma - 1)x + (3\gamma + 1)y + 2\gamma z = 0$

$(\gamma - 1)x + (4\gamma - 2)y + (\gamma + 3)z = 0$

$2x + (3\gamma + 1)y + 3(\gamma - 1)z = 0$

(5×1=5)

Q.2 a) Show that the function $f(x,y) = \begin{cases} \frac{x^2+y^2}{|x|+|y|} & if\ (x,y) \neq 0 \\ 0 & if\ (x,y) = 0 \end{cases}$ is continuous at (0,0), but partial derivatives do not exist at (0,0).

b) State Euler's theorem. Find the triangle whose perimeter is constant and has largest area.

(2×2.5=5)

Q.3 Evaluate $\iiint \sqrt{1 - \frac{x^2}{a^2} - \frac{y^2}{b^2} - \frac{z^2}{c^2}}\, dx\, dy\, dz$ where $T: \frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$

OR Write $T(-4,7,9)$ as a linear combination of the elements of the set S={ (1,2,3), (-1,3,4), (3,1,2) }. Show that S is not a spanning set for R^3. (5)

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Basic & Applied Sciences
B.Tech-1st Semester
MST-1 (September 2017)
Applied Mathematics(BAS-102)

Time allowed:1hr Max Marks 15

Note: Section A is compulsory, attempt two questions from section B. Mention your group on the top of the answersheet.

Section A

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1. (a) Find the rank of the matrix $\begin{bmatrix} 2 & 1 & -2 \\ 3 & 1 & -2 \end{bmatrix}$

(b) State Euler theorem for homogeneous function.

(c) Find $\frac{df}{dt}$ at t=0 where $f=x^3-xz^2+y^3+xyz$ $x=e^t, y=\cos t, z=t^3$

(d) Find the max absolute error in the region $f(x,y)=3x^3+3y^3-4x^2y$ about point (1,2). $|x-1|<0.01, |y-2|<0.1$ corresponding to linear Taylor series approximation.

(e) Find $f_{xy}(0,0)$ where $f(x,y)=\begin{cases} \frac{xy(2x^2-3y^2)}{x^2+y^2}, (x,y)\neq(0,0) \\ 0, (x,y)=(0,0) \end{cases}$ (5*1=5)

Section B

Find the volume of the solid which is bounded by the surfaces $2z=x^2+y^2$ & z=x.

Find the dimensions of right circular cone of fixed lateral area with minimum volume.

Find the values of λ & μ for which system of equations

2Y+Z=6; X+4Y+3Z=10; X+4Y+λZ=μ

(i) unique solution (ii) infinite solution (iii) no so

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Basic and Applied Sciences
B.Tech-1st Semester
Applied Mathematics(BAS - 102)

Time allowed: 1hr Max.Marks: 45

Note: Section A is compulsory and attempt any two questions from section B. Mention your group on the top of the answer sheet.

SECTION – A

1. (a) Check whether $f(z) = \bar{z}$ is analytic?

   (b) Define analytic and harmonic functions.

   (c) Find the general value of $(a+b)^{-1}$.

   (d) Evaluate $\int_0^\infty e^{(-x^2)}dx$

   (e) Show that the improper integral $\int_0^{\frac{\pi}{2}} \frac{\cos^m x dx}{x^n}$ converges when $n < 1$.

(5 × 1 = 5)

SECTION – B

2. (a) Prove that $\beta(m,n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$

   (b) Discuss the convergence or divergence of $\int_{-\infty}^{\infty} \frac{dx}{e^x+e^{-x}}$. Find its value if exists.

3. If $f(z) = u + iv$ is analytic function of $z = x + iy$ and

$$u - v = e^{-x}[(x-y)\sin y - (x+y)\cos y]$$

   then find u, v and the analytic function $f(z)$.

4. (a) Find the values of z such that $\sin z = 2$

   (b) Evaluate the integral $\int_0^\infty \frac{\tan^{-1}(ax)}{x(1+x^2)}dx, a > 0, a \neq 1$.

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Basic and Applied Sciences
B.Tech-1st Semester
Applied Mathematics(BAS - 102)

Time allowed: 1hr Max.Marks: 15
Note: Section A is compulsory and attempt any two questions from section B. Mention your group on the top of the answer sheet.

SECTION – A

1. (a) Discuss the convergence of $\int_a^b \frac{dx}{(x-a)^p}$.
   (b) Evaluate $\int_0^{\pi/2} \sqrt{\sin x}\, dx$.
   (c) Prove that eigen values of a hermitian matrix are always real.
   (d) Find the general and principle value of $i^{\log(1+i)}$.
   (e) Define [illegible] ($5 \times 1 = 5$)

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SECTION – B

2. (a) Find the value of $\Gamma(1/2)$.
   (b) Evaluate $\int_0^\infty \frac{e^{-ax}\sin x}{x} dx$, $\alpha > 0$ and deduce that
   (i) $\int_0^\infty \frac{\sin x}{x} dx = \frac{\pi}{2}$ (ii) $\int_0^\infty \frac{\sin ax}{x} dx = \frac{\pi}{2}$, $a > 0$. (2+3)

3. (a) Evaluate $\int\int_R \sqrt{1 - \frac{x^2}{a^2} - \frac{y^2}{b^2}}\, dx\, dy$. $R: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
   (b) $T: \mathbb{R}^2 \to \mathbb{R}^3$ such that $T(x, y) = (2x + y, y - x, 3x + 4y)$. Find $Ker(T)$, $Ran(T)$ and their dimensions. (2.5+2.5)

4. (a) If $f(z) = u + iv$ is an analytic function of $z = x + iy$ and $u - v = e^{-x}[(x - y)\sin y - (x + y)\cos y]$. Find u, v and $f(z)$.
   (b) Diagonalize the matrix $A = \begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix}$ (3+2)

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IV. Discuss the convergence of the following series :

(a) $\sum_{n=1}^{\infty} \frac{(n!)^2}{(2n)!} x^{2n}$.

(b) $\frac{1}{2\sqrt{1}} + \frac{x^2}{3\sqrt{2}} + \frac{x^4}{4\sqrt{3}} + \frac{x^6}{5\sqrt{4}} + \ldots\ldots\ldots\infty$.

V. Find the Laurent's series expansion of

$f(z) = [(z + 3)(z - 1)]^{-1}$ in the region $1 < |z| < 3$.

SECTION–B

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VI. Solve the equation $x(1-x)\frac{d^2y}{dx^2} - (1+3x)\frac{dy}{dx} - y = 0$ using Frobenius method.

VII. Evaluate Laplace inverse of the following :

(a) $\frac{s}{(s^4 + 4a^4)}$.

(b) $\tan^{-1}\left(\frac{2}{s}\right)$.

VIII. (a) Solve using Laplace transform $ty'' + (1 - 2t)y' - 2y = 0$, given that $y(0) = 1$, $y'(0) = 2$.

(b) State and prove second shifting property of Laplace transform.

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IX. Find Fourier series expansion of $f(x) = \begin{cases} -\pi, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$.

Hence evaluate $\frac{1}{1^2} + \frac{1}{3^2} + \frac{2}{5^2} + \ldots\ldots\ldots\infty$.

X. Expand $x \sin x$ as a cosine series in $(0, \pi)$. Hence show that $\frac{1}{1 \cdot 3} - \frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} - \ldots\ldots\ldots\infty = \frac{\pi - 2}{4}$.

SECTION–C

(Compulsory Question)

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XI. Attempt all the following :

(a) Obtain the differential equation of the coaxial circles of the system $x^2 + y^2 + 2ax + c^2 = 0$.

(b) Solve using variable separable technique

$$dy = (e^{3x-2y} + x^2 e^{-2y})\, dx.$$

(c) Find the particular integral of $(D^2 + D)y = x^2 + 2x + 4$.

(d) Define Series with a suitable example.

(e) Find the Taylor's series expansion of

$f(z) = -1 / [(z - 1)(z - 2)]$ in the region $|z| > 2$.

(f) Define Ordinary point.

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(g) Evaluate Laplace transform of $\left(\sqrt{t} - \frac{1}{\sqrt{t}}\right)^3$.

(h) Evaluate $L\{t^2 e^{-3t} \sin 2t\}$.

(i) State the necessary conditions for the Fourier expansion of $f(x)$.

(j) Can $f(x) = \sin(1/x)$ be expanded in Fourier series in the interval $-\pi \leq x \leq \pi$?

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Total Pages : 4

PC-4265/MB

F-24/2058

APPLIED MATHEMATICS–II

Paper : 105

(Semester–II)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section-A and Section-B. Q. No. XI (Section-C) is compulsory.

SECTION–A

I. Solve the following :

(a) $(\sin x + x \cos y + x)\,dy + (y \cos x + \sin y + y)\,dx = 0.$

(b) $\dfrac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$.

II. (a) Using the method of variations of parameters, solve

$$\frac{d^2y}{dx^2} - y = \frac{2}{1 + e^x}.$$

(b) Solve Cauchy's homogeneous equation

$$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \log x \sin (\log x).$$

III. Solve $y'' + a^2y = \tan ax$.

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Basic and Applied Sciences
B.Tech 1st Semester
Applied Mathematics(BAS - 102)

Time allowed: 1hr Max.Marks: 15

Note: Section A is compulsory and attempt any two questions from section B. Mention your group on the top of the answer sheet.

$SECTION - A$

1. (a) Using $\delta - \epsilon$ approach, show that $\lim_{(x,y)\to(0,0)}(x^2+y^2)\cos\left[\frac{1}{\sqrt{x^2+y^2}}\right] = 0$

(b) Using differentials find approximate value of $\cos 44^\circ \sin 32^\circ$

(c) Find dy/dx when $f(x,y) = \ln(x^2+y^2) + \tan^{-1}(y/x)$

(d) Find df/dt at $t = 0$ where $f(x,y) = x\cos y + e^x \sin y, x = t^3+1, y = t^3+t$

(e) Find whether $f(x,y) = xy + \frac{2}{x} + \frac{3}{y}$ has any relative maxima or minima. (5 * 1 = 5)

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$SECTION - B$

2. (a) Find the shortest distance between the line $y = 10 - 2x$ and the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$

(b) If $u(x,y) = \cos^{-1}\left(\frac{x+y}{\sqrt{x}+\sqrt{y}}\right)$ then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = -\frac{1}{2}\cot u$ (3 + 2 = 5)

3. Show that the function

$$f(x,y) = \begin{cases} \frac{x^3+2y^3}{x^2+y^2} & \text{when } (x,y) \neq (0,0), \\ 0 & \text{when } (x,y) = (0,0). \end{cases}$$

(a) is continous at (0,0)

(b) possesses first order partial derivatives at (0,0)

(c) is not differentiable at (0,0). (5)

4. Expand $f(x,y,z) = e^x sin(yz)$ in Taylor series upto first order terms about the point $(0,1,\pi/2)$. Also find corresponding error in the region $|x| < 0.1, |y-1| < 0.1, |z - \pi/2| < 0.1$

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Basic and Applied Sciences
B.Tech-1st Semester
Applied Mathematics (BAS -102)

Time allowed: 1hr Max.Marks:15

Note: Section A is compulsory and attempt any two questions from section B. Mention your group on the top of the answer sheet.

SECTION - A

1. (a) Check whether $f(z) = z^2$ is analytic.
   (b) Find polar form of CR-equations.
   (c) Find the general and principal value of log(-1).
   (d) Evaluate $\int_0^{\pi/2} \sqrt{\tan x}\, dx$
   (e) Show that the improper integral converges $\int_1^{\infty} \frac{dx}{x^n}$ converges when n > 1.

(5 * 1 = 5)

SECTION - B

2. (a) Prove that $\Gamma(1/2) = \sqrt{\pi}$.
   (b) Discuss the convergence or divergence of $\int_{-\infty}^{\infty} \frac{dx}{e^x + e^{-x}}$
3. If f(z) = u + iv is analytic function of z = x + iy and $u - v = e^{2xy}\cos(x^2 - y^2) + e^{-2xy}\sin(x^2 - y^2)$ then find u, v and the analytic function f(z).
4. (a) Find the values of z such that sinz = 2
   (b) Evaluate the integral $\int_0^3 \frac{dx}{x^2 - 3x + 2}$

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Punjabi University, Patiala
Department of Basic & Applied Sciences
I[st] MST (B.Tech.-1st Year), Applied Physics-I

Time: 1 hr. **Max. Marks: 15**

Note: Students must mention their group on the top of answer sheet.

Q1. (a) Specify the phase difference between two perpendicular superimposing SHO resulting in a circle.

(b) Why soldiers are asked to break their steps while crossing the bridge?

(c) What is the relation between relaxation time and damping constant?

(d) Why thin films look colored in white light?

(e) Specify expression for thickness of the non-reflecting thin films? (1×5=5)

Q2. Express quality factor for a damped harmonic oscillator in terms of energy lost per oscillation. (3)

Q3. When the movable mirror of Michelson's interferometer is shifted through 0.589 mm, a shift of 200 fringes is observed. What is the wavelength of light used? (2)

Q4. Write the equation of motion for the damped harmonic oscillator. Find its solution and examine the case when the system is lightly damped.

OR

Discuss Fraunhofer diffraction at double slit with the help of diagram. Find the position of maxima and minima. (5)

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MST I (APPLIED PHYSICS-I) (BAS-101)

MM: 15

Time Allowed: **one hour**

Please mention your Group at the Top of answer sheet.

NOTE: All questions are compulsory.

Q1. (i) Are all the periodic motions simple harmonic? Is the reverse true?
(ii) What is the theoretical limit of time in which the amplitude of the lightly damped oscillator decays to zero?
(iii) What do you mean by forced oscillator?
(iv) What should be the minimum thickness of a non-reflecting thin film?
(v) Why thin films appear colored in white light? **(1×5)**

Q2. (a). In an oscillatory LCR circuit L=0.2 H, C= 1.2×10^{-3} μF. What should be the maximum value of resistance R so that the circuit may oscillate? **(2)**
(b). What is the physical significance of Quality factor? Drive its expression in terms of damping constant. **(3)**

Q3. What do you mean by simple harmonic motion (S.H.M.)? Show that for a particle executing S.H.M. the average values of kinetic and potential energies are the same and each is equal to half of the total energy.

OR

Discuss principle, construction and working of Michelson Interferometer. Describe the formation of circular fringes. **(5)**

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Department of Applied Sciences, Punjabi University, Patiala.

I[st] MST (B.Tech.-1st Year).

Time: 1 hr. Max. Marks: 15

Note: Students must mention their group on the top of answer sheet.

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Q1.

(a) Compare mechanical and electrical oscillators in terms of corresponding [illegible] of motion.

(b) A simple pendulum has a bob of ice how does its time period change with [illegible] temperature 25 ^{0}C.

(c) When seen by reflected light an excessively thin film appears to be perfect [illegible] Why?

(d) Write an expression for the resolving power of a telescope. (1/2+5)

(e) If a grating has 50000 lines in 5" (five inch), calculate the grating element. (1/2+5)

Q2. The amplitude of an oscillator of frequency 200 per second falls to [illegible] initial value after 2000 cycles. Calculate (i) its relaxation time (ii) its quality factor (2+3)

Q3. Explain how circular fringes are produced in Michelson Interferometer. (5)

Q4. Derive the expression representing the resultant of superposition of two [illegible] SHMs of equal frequencies and discuss all possible cases.

OR

Find the number of secondary minima and maxima in the diffraction pattern formed by a grating of N slits of equal widths. (5)

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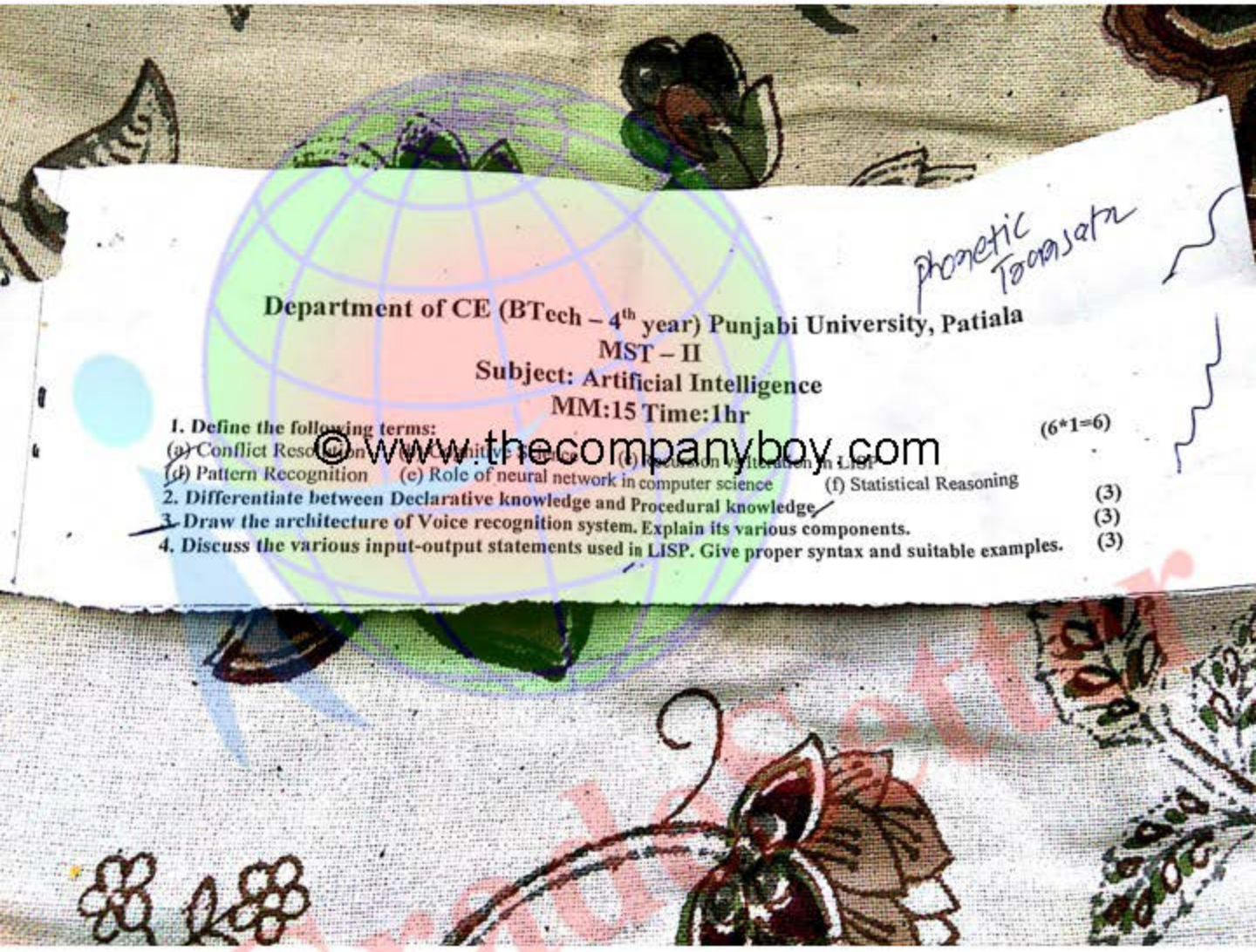

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Department of CE (BTech – 4th year) Punjabi University, Patiala

MST – II

Subject: Artificial Intelligence

MM:15 Time:1hr

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1. Define the following terms: (6*1=6)

(a) Conflict Resolution (b) Cognitive Science (c) Recursion v/s Iteration in LISP

(d) Pattern Recognition (e) Role of neural network in computer science (f) Statistical Reasoning

2. Differentiate between Declarative knowledge and Procedural knowledge. (3)

3. Draw the architecture of Voice recognition system. Explain its various components. (3)

4. Discuss the various input-output statements used in LISP. Give proper syntax and suitable examples. (3)

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Total Pages : 4

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G–2/2116

ARTIFICIAL INTELLIGENCE

Paper–404

Semester–VII

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. (a) What is Artificial Intelligence (AI) ? What is importance of AI ? Also explain the application areas of AI. 5

   (b) What are limitations of AI ? How Intelligent agents work ? 5

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2. (a) What do you mean by Turing Test ? Explain its use in Artificial Intelligence. 5

(b) What is meant by Models in AI ? Explain the levels of models in AI. 5

SECTION—B

3. Find the meaning of the statement for each Interpretation given below :

$$(\neg A \vee B) \& C \rightarrow D \vee (\neg C \& B)$$

(a) 11 : A is true, B is true, C is false, D is true.

(b) 12 : A is true, B is false, C is true, D is true. 10

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4. (a) Explain the Resolution principle. Also discuss the various types of Resolution. 4

(b) Given the following information for a Database :

[1].If x is on top of y, y supports x.

[2].If x is above y and they are touching each other, x is on top of y.

[3].A cup is above a book.

[4].A cup is touching a book.

Translate statements [1] through [4] into clausal form. 6

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SECTION—C

5. (a) Explain the difference between Declarative and Procedural knowledge. 3

(b) What do you mean by non-monolithic reasoning ? Explain with suitable example the role of non-monolithic reasoning in AI problem solving. 7

6. (a) What is Statistical reasoning ? How it helps in knowledge extraction ? Discuss with the help of suitable example. 5

(b) Explain the use of Neural networks in AI decision making with the help of suitable example. 5

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SECTION—D

7. (a) What is the requirements for Artificial Intelligence Languages ? Also explain the features of LISP as a Declarative Programming Language. 6

(b) Explain with the help of suitable example how Recursion is used in LISP. 4

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8. Explain the use of LISP in pattern recognition problems with the help of a suitable example. Also discuss the type of input it will accept and the type of output it will generate. 10

SECTION—E

9. Answer the following in brief : 1×10=10

(i) Heuristic search.

(ii) Production system.

(iii) Predictive logic.

(iv) Conflict resolution.

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(v) Cognitive learning.

(vi) Array-lambda function.

(vii) Semantic sets.

(viii) Frame structure.

(ix) Script representation.

(x) Role of AI in decision making.

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DEPARTMENT OF COMPUTER ENGINEERING, PUNJABI UNIVERSITY, PATIALA

SUBJECT: Artificial Intelligence Class: 4CE
Time: 1 hour Maximum marks: 15

Section- A

1.Define a) Production System (1)
b) State Space Search (1)
c) Heuristic Search (1)
d) Resolution (1)

2. Write advantages and disadvantages of AI. (1)

Section –B (do any two)

3. Discuss five AI techniques with suitable example. (5)
4. Differentiate between various knowledge representation techniques. (5)
5. Define Intelligent Agents and also explain different types of intelligent agents. (5)

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Department of CE (BTech – 4th year) Punjabi University, Patiala

MST – II

Subject: Artificial Intelligence

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MM:15 Time:1hr

1. Define the following terms: **(6*1=6)**

(a) Conflict Resolution (b) Cognitive Science (c) Recursion vs Iteration in LISP

(d) Pattern Recognition (e) Role of neural network in computer science (f) Statistical Reasoning

2. Differentiate between Declarative knowledge and Procedural knowledge. **(3)**

3. Draw the architecture of Voice recognition system. Explain its various components. **(3)**

4. Discuss the various input-output statements used in LISP. Give proper syntax and suitable examples. **(3)**

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2. (a) What do you mean by Turing Test ? Explain its use in Artificial Intelligence. 5

(b) What is meant by Models in AI ? Explain the levels of models in AI. 5

SECTION—B

3. Find the meaning of the statement for each Interpretation given below :

$$(\neg A \vee B) \& C \rightarrow D \vee (\neg C \& B)$$

(a) 11 : A is true, B is true, C is false, D is true.

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4. (a) Explain the Resolution principle. Also discuss the various types of Resolution. 4

(b) Given the following information for a Database :

[1].If x is on top of y, y supports x.

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[3].A cup is above a book.

[4].A cup is touching a book.

Translate statements [1] through [4] into clausal form. 6

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SECTION—C

5. (a) Explain the difference between Declarative and Procedural knowledge. 3

(b) What do you mean by non-monolithic reasoning ? Explain with suitable example the role of non-monolithic reasoning in AI problem solving. 7

6. (a) What is Statistical reasoning ? How it helps in knowledge extraction ? Discuss with the help of suitable example. 5

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(b) Explain the use of Neural networks in AI decision making with the help of suitable example. 5

SECTION—D

7. (a) What is the requirements for Artificial Intelligence Languages ? Also explain the features of LISP as a Declarative Programming Language. 6

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8. Explain the use of LISP in pattern recognition problems with the help of a suitable example. Also discuss the type of input it will accept and the type of output it will generate. 10

SECTION—E

9. Answer the following in brief : 1×10=10

(i) Heuristic search.

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(ii) Production system.

(iii) Predictive logic.

(iv) Conflict resolution.

(v) Cognitive learning.

(vi) Array-lambda function.

(vii) Semantic sets.

(viii) Frame structure.

(ix) Script representation.

(x) Role of AI in decision making.

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G–2/2116

ARTIFICIAL INTELLIGENCE

Paper–404

Semester–VII

Time Allowed : 3 Hours] [Maximum Marks : 50

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Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

1. (a) What is Artificial Intelligence (AI) ? What is importance of AI ? Also explain the application areas of AI. 5

   (b) What are limitations of AI ? How Intelligent agents work ? 5

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2. (a) What do you mean by Turing Test ? Explain its use in Artificial Intelligence. 5

(b) What is meant by Models in AI ? Explain the levels of models in AI. 5

SECTION—B

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$$(\neg A \vee B) \& C \rightarrow D \vee (\neg C \& B)$$

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(a) 11 : A is true, B is true, C is false, D is true.

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SECTION—C

5. (a) Explain the difference between Declarative and Procedural knowledge. 3

   (b) What do you mean by non-monolithic reasoning ? Explain with suitable example the role of non-monolithic reasoning in AI problem solving. 7

6. (a) What is Statistical reasoning ? How it helps in knowledge extraction ? Discuss with the help of suitable example. 5

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   (b) Explain the use of Neural networks in AI decision making with the help of suitable example. 5

SECTION—D

7. (a) What is the requirements for Artificial Intelligence Languages ? Also explain the features of LISP as a Declarative Programming Language. 6

   (b) Explain with the help of suitable example how Recursion is used in LISP. 4

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(v) Cognitive learning.

(vi) Array-lambda function.

(vii) Semantic sets.

(viii) Frame structure.

(ix) Script representation.

(x) Role of AI in decision making.

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ARTIFICIAL INTELLIGENCE

Paper–404

Semester–VII

Time Allowed : 3 Hours] [Maximum Marks : 50

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Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

1. (a) What is Artificial Intelligence (AI) ? What is importance of AI ? Also explain the application areas of AI. 5

   (b) What are limitations of AI ? How Intelligent agents work ? 5

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Computer Engineering Department
MST-2

Subject: Compiler Design **MM: 15** **Time: 1 hour** **Date: 19-04-2016**
Examiners: Ms. Harpreet Kaur, Ms. Brhamleen Kaur and Mr. Gaurav deep

Section A (1*5)

Q1: a) What do you mean by DAG?
b) What are the three functions of back patching?
c) Write two advantages of SLR (1) parser over LR(0) parse?
d) Define Basic Block and write one of its significance.
e) What is re-locatable code?

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Section B (Q2 compulsory)

Q2: Construct action and goto table for LR(0) parser: (5)
(0) S → EE (1) E → e E (2) E → f

Q3: Discuss:
a) Loop Optimization (2.5)
b) What is the significance of quadruples, triples? Write quadruples and triples for the expression: (2.5)
*(A + B) * (C + D) - (A + B + C)*

OR

Q4: a) Discuss Stack and heap memory allocation related to activation record of program with an example (2.5)
c) What are three representations of IR (Intermediate Code)? Discuss SDT for three address code generation with example. (2.5)

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Department of Computer Engineering
Punjabi University Patiala
MST-II

Subject: **Compiler Design (CPE-309)** Date: 19.04.2017 MM: 15
Examiners: Ms. Harpreet Kaur, Ms. Parminder Kaur, Mr. Sidhu, Mr. Gauravdeep

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NOTE: Q2 is compulsory; attempt any one question from Q3 and Q4

SECTION A

Q1.
a) Write one advantage of quadruples over triples and indirect triples over triples to store three address statements.
b) Define 'Canonical Items' and 'LR (1) items' with examples.
c) Define 'Code Motion' and 'Constant Folding' with examples.
d) Define 'Basic Block' and write about its significance.
e) Write at least two differences between LR (0) parsers, SLR (1) parsers, CLR (1) and LALR Parsers. (5*1)

SECTION B

Q2. Write SDT for three address code generation. (5)
Q3. Discuss stack and heap memory allocation related to activation record of procedures. (5)
Q4. Write an algorithm to create DAG and explain with the help of an example. (5)

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Total Pages : 2

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ARTIFICIAL INTELLIGENCE-404

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION–A

I. Discuss various advantages of artificial intelligence. (5)

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II. Explain semantic nets in with example. (5)

III. Discuss various production system characteristics. (5)

IV. Discuss various levels of models. (5)

V. Explain heuristic search. (5)

SECTION–B

VI. Compare procedural knowledge with declarative knowledge. (5)

VII. Discuss the role of neural network in computer science. (5)

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VIII. Discuss various characteristics of AI language. (5)

IX. Define recursion. Explain it with an example. (5)

X. Discuss basic data types and function definition in LISP. (5)

SECTION–C

XI. (a) Define artificial intelligence. (2)

(b) What are frames'? (2)

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(c) What are intelligent agents? (2)

(d) Define facts. (2)

(e) What is conflict resolution? (2)

(f) Name any *two* input and output statements in LISP. (2)

(g) Give two limitations of AI. (2)

(h) What is the role of lambda functions in LISP? (2)

(i) What are scripts? (2)

(j) Name any *four* areas where AI can be used efficiently. (2)

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Department of Computer Engineering
Punjabi University, Patiala
Subject: Computer Graphics
Class: 7th Semester

MM. 15

MST-II

(Section-A) Answer all the questions (5X1)

1. Define clipping and elaborate equation of point clipping.
2. List out various projection techniques. Define oblique projection.
3. What are the limitations of Z-buffer algorithm?
4. Define Shading.
5. Write down homogenous matrix of 3D Scaling.

(Section-B) Answer any two questions (2X5)

6. Write down the steps and explain the working of Cohn-Sutherland Algorithm.
7. What are visible surface detection methods? Explain the working of area sub-division method in detail.
8. Calculate the final vertices of a triangle, after rotating it on an angle of 45 degree around z-axis by using homogenous metrics, where the original vertices of triangle are (2,2,2), (5,3,2), (4,5,2).

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DEPTT OF COMPUTER ENGINEERING

MST-2

CPE-411 **CYBER SECURITY** **M.M. 15**

Note: Attempt any two questions from Section-B. The Section-A is compulsory.

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SECTION –A

Q1: (5)

(i) Explain Section 43 of IT Act.
(ii) Define use of wireshark.
(iii) Explain working of nessus software.
(iv) What is ethical hacking?
(v) Explain Section -65 of IT Act.

SECTION-B

Q2: Explain working of nmap penetration testing tool. (5)
Q3: Write about metasploit software. (5)
Q4: Section 66-A of IT Act is controversial. Discuss. (5)

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MST-I (Numerical Methods-BAS 201) B. Tech.-III Sem. (ECE & ME)
Max. Marks: 15. Time Allowed: 1 hr.
Note: All questions are compulsory.

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Q. I (a) State sufficient condition for the convergence of Newton-Raphson Method.
(b) Give geometrical derivation of Newton-Raphson Method.
(c) Use the Regula-Falsi method to find the root of $\cos x - xe^x$, correct up to four decimal places.
(d) Define Diagonalization of a matrix.
(e) Show that the eigen values of an Hermitian matrix are real numbers. **(1X5)**

Q. II Solve $3x + y + 2z = 3$, $2x - 3y - z = -3$, $x + 2y + z = 4$, using Factorization Method. **(5)**

OR

Q. III Solve $x + 2y + 5z = 20$, $5x + 2y + z = 12$, $x + 4y + 2z = 15$, by using Gauss-Seidal Method. **(5)**

Q. IV (a) By using Power method calculate the dominant eigen values and corresponding eigen value of

$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}.$$

(c) Perform two iterations of the NR-method to solve the system of equations $x^2 + xy + y^2 = 7$ and $x^3 + y^3 = 9$ taking the initial approximation as $x_0 = 1.5$ and $y_0 = 0.5$. **(2+3)**

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M. S.T-II (Numerical Methods-BAS 201)
(For B. Tech ECE and ME III Semester)

Time: 1hrs. *Max. Marks: 15*

Note: All Questions are compulsory and carry equal marks.

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Q. 1 (i) Solve $\frac{dy}{dx} = x + y$, $y(0) = 1$ by Picard's method. (2)

(ii) Write Milne's Predictor- Corrector Formulas. (1)

(iii) Evaluate $\frac{dy}{dx}$ at x = 2 when

X:	0	1	3	6
Y:	18	10	- 18	40

(1)

Q. 2 By dividing the range into ten equal parts, evaluate $\int_0^{\pi} Sinx\,dx$ by Trapezoidal and Simpson's rules. (3)

Q. 3 Find y (0.2) for $\frac{dy}{dx} = x^2 y$, $y(0) = 1$ by using Runge-Kutta method of fourth order. (3)

Q. 4 (i) Find the first derivative of the function tabulated below at x = 0.6 2.4950

X:	0.4	0.5	0.6	0.7	0.8
f(X):	1.5836	1.7974	2.0442	2.3275	2.6511

(3)

(ii) Explain Modified Euler's method. (2)

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MM.15

Subject: Visual Programming

Date: 22/5/14

MST-I

Note: *Section-A is compulsory & attempt any one question from Section-B*

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Section-A (2 mark each)

(5*2=10 marks)

Q1.

a. What are procedures and its types?
b. Briefly list down the properties of scrollbar and slider control?
c. Write down the difference between implicit and explicit declaration.
d. Why VB is called event driven programming language?
e. Differentiate label and caption.

Section-B (5 marks each)

Q2. How to create MDI application in VB? Explain the various steps involved in it. (1*5=5 marks)

Q3. What are the various control structures available in VB language?

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CPE-206: VISUAL PROGRAMMING

MST-I

Time Allowed: 60 Minutes | Max. Marks: 15

Note: All questions carry equal marks. **Q1 is compulsory.**

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SECTION-A

Q1:

i) GUI stands for.....

ii) .....(in number) bytes are required to store a double type data value.

iii) Boolean is a data-type ? (True / False)

iv) Visual Basic IDE stands for.....

v) Variable means.....

SECTION-B

(Do any two)

Q2. Explain '*event-driven programming*' characteristics of VB 6.0 programming language.

Q3 Describe **TextBox, CommandButton, ListBox, ComboBox** controls with their basic properties.

Q4. Explain the step-by-step procedure to load Advanced ActiveX Controls into ToolBox.

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MST-II

Visual Programming: CPE -206

(ECE-11/2014)

Time Allowed: 60 Minutes Max. Marks:15

Note: Question 1 is compulsory. Attempt *any one* from Section A and B each.

Q:1. Write VB procedures for the following:

(a) To draw a line between (100,300) to (100,1000) on any display control.
(b) To draw a circle at any location on the FORM with radius 500 and filled with crossed lines.
(c) To draw a box from (300,500) to (500,300) coordinates filled with black color and with green color edges.
(d) ODBC stands for.....
(e) RDBMS stands for.....

SECTION-A

Q.2: Write a program to instantiates the class to write/read data into/from its data members.
Q3. Write a program procedure to establish a database connection with your GUI.

SECTION-B

Q:4. Describe and differentiate database schemas and database instances.
Q:5. A database contains following two tables:

SUPPLIER

SID	SNAME	CITY

PRODUCT

PID	PNAME	PQTY	PRICE	SID

a) Write a SQL query to display SNAME, CITY, PNAME,PRICE from above tables for SID=S101.
b) Write SQL statements change the PRICE from 500 to 550 for a PRODUCT's PID=P111.

UCoE, Punjabi University, Patiala
Btech (ECE),
Subject: Wireless and Mobile Communication (ECE- 403)

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Time 1 Hr

MM 15

Section A (Compulsory-Each question carry one mark)

1) How much there is increased in spectrum efficiency offered by 2 G as compared to 1 G?
2) What is the data rate of global system for mobile?
3) If the cluster size N is reduced while the cell size is kept constant then what is the effect on capacity.
4) Define dwell time?
5) Which modulation formats are used for high data rate and low data rate in EDGE?

Section B (Attempt any Two -Each question carry five mark)

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1) (a) Consider a cellular system with four cell reuse patterns. Let the Bandwidth allocated is 60 MHz to a FDD cellular telephone system using two 30kHz simplex channels for providing full duplex control of one channel. Calculate the total number of channels available per cell. (2.5)

(b) Explain Bluetooth with advantage over different wireless standard. (2.5)

2) Compare in tabular format HSCSD, GPRS, EDGE, W-CDMA, IS-95B and CDMA-2000 while considering following parameters (1) channel bandwidth (2) duplexing (3) infrastructure change (4) required new spectrum (5) required new handsets. (5)

3) (a) Explain cellular concept in detail. (2.5)

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(b) What is the concept of Frequency Re use? (2.5)

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Department of Computer Engineering, Punjabi University, Patiala 179

M.T-I Wireless/Mobile Communications (ECE-403) B.Tech. IV Year (ECE, 7th Semester Groups (C1-C6)

Time: 1 hour **M. Marks: 15**

Note: ***Question number should be clearly mentioned strictly according to the pattern of the question paper only. Use of calculator is allowed.***

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SECTION-A (Attempt any three questions)

Q. I (a) Name the handoff techniques of 1G, 2G and 3G systems.

(b) Suppose each user in a cellular communication system is allocated 30 KHz of bandwidth. If the total band of frequencies allocated per cell is 40 MHz, determine the total number of users within that cell who can communicate simultaneously.

(c) Discuss the importance of cluster size N in order to decrease the interference of a cellular system.

(d) Explain incremental redundancy in EDGE 2.5G technology.

(e) Write a short note on Bluetooth and also give its standard. (1x5)

SECTION-B (Attempt any two questions)

Q.II (a) What is a handoff? Explain the prioritization techniques for handoff in mobile technology. (2)

(b) Compare and contrast the various 2.5G technology paths that each of the major 2G standards provide. Which path has the highest Internet access speed? Is this speed true user speed, or peak instantaneous throughput speed? (3)

Q. III Discuss fixed and dynamic channel assignment strategies, which is better and why? What is the role of borrowing in fixed channel assignment? Also, give the solution to avoid unnecessary load on the MSC due to handoffs because of the simultaneous high and slow speed traffic? (5)

Q. IV (a) Differentiate between co-channel and adjacent channel interference. Also explain in detail the near far effect in adjacent channel interference and how it can be avoided. (2.5)

(b) What is large scale fading? Explain the three phenomena in large scale fading in detail with examples. (2.5)

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Punjabi University, Patiala.

MST-II Wireless/Mobile Communications (ECE-403), B.Tech. IV Year

Time: 1 hour M. Marks: 15

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SECTION- A (Attempt all)

Q. I (a) Give the difference between pure ALOHA and slotted ALOHA.

(b) What are pseudo-noise sequences? How will you generate them?

(c) Discuss the importance of frequency reuse factor Q in order to decrease the interference of a cellular system.

(d) Define cell dragging

(e) Name the factors which influence small scale fading. (1x5)

SECTION-B (Attempt any two questions)

Q. II Discuss the various types of small scale fading based on various time and frequency dispersion parameters. Out of Rayleigh and Rician fading, which one is more severe and why? (4+1)

Q. III Explain IS -95 Forward CDMA channel with block diagram. (5)

Q. IV Explain IEEE 802.11 a/b/g with their pros and cons. (5)

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...RK SECURITY-315

Department of Computer Engineering

Punjabi University Patiala

Subject: Network Security (CPE-315) Class: 6CE12, 6CE34, 6CE56

Note: Section A is compulsory. Attempt any two questions from section (B).

Section (A) (1*5) = 5 marks

2. Explain the following
   (f) Diffusion/ Confusion
   (g) Stream cipher and block cipher
   (h) Cae[illegible]
   (i) Expansion Permutation box(P-box)
   (j) Triple DES.

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Section (B) (2*5) =10 marks

4. How cryptanalysis of monoalphabetic cipher is done?
5. Differentiate between symmetric and asymmetric key cryptography?
6. How encryption is carried out with the help of AES? Explain its advantages over DES.

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Total Pages : 3

PC-10770/MR

O-19/2056

NETWORK SECURITY-315

Semester-VI

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *four* questions selecting *one* question from each Section A, B, C and D. Section E is compulsory.

SECTION – A

I. (a) Explain the need and objectives of Information security. 5

(b) Write note on Cryptaanalysis of Monolythic Cyphers. 5

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II. (a) Differentiate between Stream and Block cipher. 4

(b) Present a brief description of the classical encryption techniques. 6

SECTION – B

III. What are Advance Encryption Standards ? Discuss the selection process for AES. 5+5

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IV. (a) Illustrate the Merkle-Hellman Knapsacks algorithm by taking a suitable example. 6

(b) Compare public key and symmetric key algorithms in the perspective of their security issues. 4

SECTION – C

V. (a) What is a message digest algorithm ? Exemplify the creation of hash value through MD5 algorithm. 8

(b) How Denial of Service attack originates ? 2

VI. Present a detailed overview of the network security issues. 10

SECTION – D

VII. (a) Comment on different secure mail protocols used to ensure e-mail security. 6

(b) Enlist the objectives of ethical hacking. 4

VIII. Write note on Hactivism, RSA encryption, Web Server. (4+4+2)

SECTION – E

(Compulsory Question)

IX. Write short notes on the following :

(a) Vernam Cipher.

(b) Differentiate signature functions and hash function

(c) Cracker.

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IV. (a) Illustrate the Merkle-Hellman Knapsacks algorithm by taking a suitable example. 6

(b) Compare public key and symmetric key algorithms in the perspective of their security issues. 4

SECTION – C

V. (a) What is a message digest algorithm ? Exemplify the creation of hash value through MD5 algorithm. 8

(b) How Denial of Service attack originates ? 2

VI. Present a detailed overview of the network security issues. 10

SECTION – D

VII. (a) Comment on different secure mail protocols used to ensure e-mail security. 6

(b) [illegible] 4

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VIII. Write note on Hactivism, RSA encryption, Web Server. (4+4+2)

SECTION – E

(Compulsory Question)

IX. Write short notes on the following :

(a) Vernam Cipher.

(b) Differentiate signature functions and hash function

(c) Cracker.

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(d) Information security using RSA.

(e) Importance of data encryption standards.

(f) Virtual private network.

(g) Code integrity.

(h) Message digest.

(i) Need for ethical hacking.

(j) Data integrity.

(10×1=10)

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(g) Stream cipher and block cipher
(h) Caesar Cipher

Department of Computer Engineering
Punjabi University Patiala

Subject: Network Security (CPE-315) Class: 6CE12, 6CE34, 6CE56
Note: Section A is compulsory. Attempt any two questions from section (B).

Section (A) (1*5) = 5 marks

2. Explain the following
   (f) Packet Filtering Firewalls.
   (g) DMZ(De-Militarized Zone)
   (h) Ethical Hacking
   (i) Crackers
   (j) Hactivism

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Section (B) (2*5=10 marks)

4. What do you mean by message integrity? How we can achieve it by the Secure Hash Algorithm?
5. Why the security of email is important? Explain the pretty good Privacy standard in detail?
6. What are the benefits of Virtual private network over private and public networks?

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SECTION–D

7. What are the inbuilt and user defined functions ? How are they implemented ? Explain. 10

8. What are triggers ? What are their types ? Explain their uses. 10

SECTION–E

9. (a) Differentiate between DDL and DML. 1

(b) Discuss problems arising out of bad database design. 1

(c) How you can convert EER diagram to tables ? 1

(d) What are the advantages and disadvantages of database systems ? 1

(e) Why is data replication useful in Distributed Databases ? 1

(f) What are the advantages of distributed database system ? 1

(g) What is client server model ? 1

(h) Is recursion supported in PL/SQL ? IF yes, then how ? 1

(i) Distinguish between integrity and security. 1

(j) What is data dictionary ? 1

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Department of Computer Engineering
Punjabi University, Patiala

MST-1 (B.Tech 3CE_12,34,56)
Subject: Relational Database Management Systems **Paper: CPE 307** **Marks: 15** **Time: 1Hr**
Note: Question 1 and 2 are compulsory. Attempt a total of three questions. Each question carries 5 marks.

Q.1 Write short note on the following:
a) What is Data Dictionary? 1
b) Differentiate between a procedure and a function. 1
c) Explain Package with syntax. 2
d) Differentiate between row and statement triggers. 1

Q.2 What is a join? Explain different types of joins in detail. (5)

Q.3 Write a procedure in PL/SQL that [illegible] of a given department in Employee table by a given amount. Also show how to invoke this procedure. (5)

Q.4 Create a Database Trigger that keeps track of the changes that are made on a table and stores the values that are updated or deleted in another table.(5)

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MST-1 (B.Tech 3CE_12,34,56) **Marks:15**

Subject: Relational Database Management Systems Paper: CPE 303 Time: 1Hr

Note: Question 1 is compulsory. Attempts any three questions. Each question carries 5 marks.

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Q.1 Write short notes on the following:

a) Data Abstraction
b) Embedded SQL
c) DAC
d) PL/SQL %Rowtype and %type
e) Data Allocation

Q.2 Explain with the help of suitable examples how to map EER model constructs into corresponding relations.

Q.3 What is a Distributed Database? Explain the different types of Distributed Databases. Explain the architecture of Distributed Databases with the help of suitable diagrams.

Q4. Explain Pl/SQL block structure. How is it different from SQL? Write a PL/SQL block to find whether the given number is prime or not.

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Roll No. 1130111102

Total No. of Pages : 3

PC 10761-M

O-19/2056

RDBMS USING SQL AND PL/SQL–307

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrrying 1 mark each.

SECTION–A

1. Explain the client-server architecture in detail. 10

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2. Discuss database security control measures. 10

SECTION–B

3. Consider the schema given below:

Branch-schema (Branch-name, asset, Branch-city)

Customer-schema (Customer name, street, customer-city)

Deposit-schema

(Branch-name, account-number, customer-name, balance)

Borrow-schema

(Branch-name, loan-number, customer-name, amount)

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Client-schema (Customer-name, banker-name).

Write the SQL statements for the following :

(i) Find all customers who have a balance of over Rs. 1000.

(ii) Write the query to find the clients of banker Patel and the city they live in.

(iii) Write a statement to find all the customers who have a loan amount of more than Rs. 1200.

(iv) Write a statement to find all the customers whose name starts with "R" and who have a balance of more than Rs. 10,000. 10

4. Explain the following in context of SQL :

(i) Exists

(ii) Having

(iii) Order by

(iv) On delete cascade

(v) Intersect

(vi) Correlated queries. 10

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SECTION–C

5. What are the nested blocks ? Explain with example. 10

6. (a) What are cursors ? Explain their types. 7

(b) Discuss creation and scope of a variable. 3

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Subject: EEI (ECE-202) ELECTRICAL AND ELECTRONICS INSTRUMENTATION

Semester—III MST - I Time: 1hour

Note: Section A is compulsory. Attempt any two questions from section B

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Section A (5x1)

1. Determine the resistor value required to use a 0-1 mA meter with an internal resistance of 125 Ω for a 0-1 V meter.
2. What is the principle of operation of Dynamometer type of Instrument
3. List the different types of DVM
4. How to use PMMC type instruments for AC measurements
5. Why TVM is preferred over VTVM

Section B (2x5)

6. Explain the principle and working of a Ramp-Type DVM with the help of a block schematic.
7. Explain along with the appropriate diagrams that how from Lissajous patterns appearing on screen of a CRO, the Phase and Frequency of an unknown signal can be determined.
8. Describe with suitable diagram the working of Thermocouple Instruments

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Department of ECE

Subject: EEI (ECE-202) MST - II
Class: 2ECE Time: 1hour
Note: Section A is compulsory. Attempt any two questions from section B.

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Section A

1. Explain in detail how to measure power using bolometer bridge.
2. Draw the circuit diagram for the power measurement using 3 wattmeter method.
3. What is difference between induction type and dynamometer wattmeter.
4. Write advantages of bridge measurement method.
5. List the basic components of a Direct Recording System.

Section B (2x5)

6. Explain in detail about Digital Frequency Meter. How will you measure Time Period using the same
7. Describe a Wien bridge to determine the Frequency of Supply.
8. a. Explain in detail about Digital Storage Oscilloscope (DSO)
   b. Calculate the unknown Inductance and Resistance measured by Hay's Bridge. The bridge elements at the balancing condition are $R_1=5.1\ k\Omega$, $C_1=2\ \mu F$, $R_2=7.9\ k\Omega$, $R_3=790\ \Omega$. The supply angular frequency is 1000 rad/sec.

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Roll No. .....

Department of Electronics & Communication Engineering
(Punjabi University, Patiala)
B.Tech (3rd Semester – 2nd Year)
Session – July December 2014
Electromagnetic Field Theory (ECE 203)
MST # 1

Time allowed: 1 Hour

Maximum Marks: 15

Instructions: Question *one* is compulsory. Attempt any *two* questions out of Questions 2, 3 and 4. Each question carries 5 marks. Given: $\varepsilon_0 = 8.854 \times 10^{-7}$ F/m. Assume missing data, if any.

---

1. (a) State Faraday's law for electromagnetic induction.
   (b) Give the mathematical expressions for energy stored in the Magnetic Field and Electric Field.
   (c) Is the relation correct? $\vec{l} = \frac{\vec{j} \times \vec{k}}{\vec{i} \cdot (\vec{j} \times \vec{k})}$. Justify your answer.
   (d) Determine the value of constant m for a vector, $\vec{A} = 3m^2c^2\vec{a}_x - 10my^4\vec{a}_y + 2z\vec{a}_z$ to be solenoidal at a point P $(\frac{1}{2}, \frac{1}{2}, 0)$ located in the vector field.
   (e) Determine the capacitance of the parallel plate capacitor configuration with two different dielectrics between the plates as shown in Figure 1 (a) below. Assume $\varepsilon_{r1} = 4$, $\varepsilon_{r2} = 6$, distance between the plates, d = 2mm and area of each plate, A = 20cm^2.

Figure 1 (a)

Figure 2

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2. (a) State Divergence Theorem & derive the equation for divergence Theorem. Also explain the physical significance of Divergence theorem with the help of examples.
   (b) A single charge +Q is placed at the centre of sphere of free space (radius a) enclosed within dielectric material of dielectric constant, ε_r and permittivity, $\varepsilon = \varepsilon_0 \varepsilon_r$ as shown in figure 2 Calculate the magnitude of Electric field strength, **E** inside and outside the sphere using Gauss's law. Sketch the magnitude of electric field intensity in the region, r < a and r > a.

3. (a) Prove that electric field intensity is equal to negative gradient of the potential in electrostatics.
   (b) Derive the expression for Laplace's equation and Poisson's equation.

4. A boundary exists at z = 0 between two dielectrics, $\varepsilon_{r1} = 4.0$ for region z > 0 and $\varepsilon_{r2} = 2.0$ for region z < 0 as shown in Figure 3. An electric field enters the MEDIUM1 from MEDIUM2. The electric field $\mathbf{E}_2$ of ε_{r2} region is given as:

$$\mathbf{E}_2 = -10\vec{a}_x - 50\vec{a}_y + 20\vec{a}_z$$

Find –
   (a) the angle ($\alpha_2 \leq 90$) between $\mathbf{E}_2$ and normal to the surface
   (b) $\mathbf{E}_1$
   (c) $\mathbf{D}_{N1}$ and $\mathbf{D}_{N2}$
   (d) surface charge density
   (e) the angle ($\alpha_2 \leq 90$) between $\mathbf{E}_1$ and normal to the surface

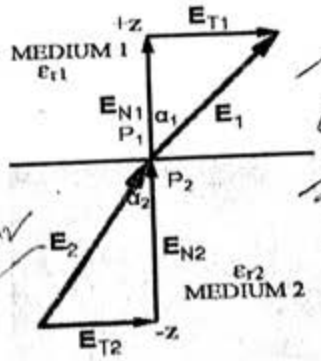

Figure 3

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University College of Engineering
Punjabi University Patiala
Subject: DISTRIBUTED COMPUTING

Time: One Hour **B. Tech. C.E. 5th semester** **MM = 15**

Note: Attempt all questions of Section A and any two questions from Section B

Section A (one marks each) 5

Q I **EXPLAIN BRIEFLY:**
a) Security in Distributed System
b) Cache Coherence
c) Replication
d) Load balancing in Distributed system.
e) Stream Resource Adaptation &Management in Distributed System.

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Section B

QII *Illustrate the conceptof distributed Multimedia System in detail.* 5

QIII **a)Briefly explain about the concept of Fault Tolerance in Distributed Systems.** 2.5
b) List down major differences between Failure Vs Errors Vs Faults 2.5

QIV **What is Security? Explain it in terms of Authentication and access control.** 5

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Total No. of Pages : 4

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P-6/2053

REFRIGERATION AND AIR CONDITIONING–368

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 45

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D each carrying 8 marks each and the entire Section E consisting of 9 short answer type questions carrying 1 mark each.

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SECTION—A

1. (a) State the limitations due to which it has not been possible to build a Carnot refrigeration system. 3

(b) An air refrigeration open system operating between 1 MPa and 100 KPa is required to produce a cooling effect of 200 KJ/min. The temperature of air leaving the cold chamber is –5°C and at leaving the cooler is 30°C. Neglecting losses and clearance in the compressor and expander, determine :

(i) Mass of air circulated per hour,

(ii) Compressor work, expander work and the cycle work,

(iii) Coefficient of performance and the power required to run the machine. 6

2. (a) List the advantages and disadvantages of using air as refrigerant. 3

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(b) Draw the schematic arrangement of the various components of the basic refrigeration system used for the air conditioning of an aircraft. Explain the working of the system with reference to the T-S plot of the process involved. 6

SECTION—B

3. (a) Describe with a neat schematic diagram, the vapour compression refrigeration cycle. Represent the cycle on the T-s and p-h plots.

(b) For a vapour compression machine, explain the effect of under cooling [illegible] on COP. 4

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4. (a) List the advantages of using multistage vapour compression system over the single stage vapour compression system. 3

(b) A two stage refrigeration system operates with refrigerant ammonia flowing at the rate of 15 kg/min through the evaporator. The saturation temperature in the condenser and evaporator units has been noted to be 40°C and 15°C respectively. If the system has intercooling by liquid refrigerant at 4.25 bar, determine the capacity and COP of the system. How these parameters would be affected if the compression is carried out in single stage unit, the operating temperature limits remaining same ? Use the p-h chart and property tables for saturated ammonia refrigerant. 6

SECTION—C

5. (a) State the principle of steam jet refrigeration system. 2

(b) State the purpose of refrigerant flow control device and name the different types of flow control devices. 3

(c) Distinguish
(i) Capil
(ii) Natu
towe

6. (a) Define fro
(b) Mention t
affect the
(c) Can wate
(d) How are

7. (a) Define
psychron
(i) Dr
(ii) Re
(b) Air at 1
humidif
humidit
moistur

8. (a) State t
conditi
(b) What
be ma
(c) Expla
(i)
(ii)

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(c) Distinguish between :

(i) Capillary tube and thermostatic expansion valve

(ii) Natural draft cooling tower and mechanical draft cooling tower. 4

6. (a) Define frost and state the reason of frost formation. 2

(b) Mention the effect of CFCs on the environment. How do they affect the ozone layer ? 3

(c) Can water be used as a refrigerant ? 2

(d) How are refrigerants numbered ? Illustrate with an example. 2

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SECTION—C

7. (a) Define and explain the following terms in relation to psychrometry :

(i) Dry bulb, wet bulb and dew point temperatures

(ii) Relative humidity and specific humidity. 4

(b) Air at 15°C dry bulb and 25% relative humidity is heated and humidified at 30°C dry bulb temperature and 50% relative humidity. Using psychometric chart, calculate the heat and moisture added to air and the sensible heat factor for the process. 5

8. (a) State the importance of the cooling loading case of an air conditioning system. 2

(b) What is meant by the term infiltration ? How an estimate can be made of air leakage through window and door cracks. 3

(c) Explain the following terms :

(i) RSHF and RSHF line

(ii) GSHF and GSHF line. 4

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SECTION—E

9. Write briefly :

(a) Distinguish between the open air and dense air refrigeration cycles. 1

(b) State the function of an evaporator cooler in an aircraft refrigeration system. 1

(c) Why air refrigeration system is preferred in aircraft despite having low COP ? 1

(d) Why in practice a throttle value is used in vapour compression refrigerator rather than an expansion cylinder ? 1

(e) What are hermetically sealed compressors ? 1

(f) What is the role of solenoid valve in the refrigeration system ? 1

(g) What is the importance of cooling load in case of an air conditioning system ? 1

(h) What do you mean by cascade refrigeration ? 1

(i) Why the centrifugal compressors are normally used in large capacity refrigeration systems ? 1

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MST – 2

Class: B.Tech CE 5th (C1 to C6)
Max.Marks: 15

Sub: DBMS(CPE-302)
Max. Time: 1 hr

Section - A

1. Attempt All Questions.

a) What are Checkpoints? (1 mark)
b) What is cascadless rollback? (1 marks)
c) Define Steal/No-Steal. (1 mark)
d) Define multivalued dependency with example (2 marks)

Section –B (Attempt any two questions) (5 marks each)

2 Explain the Time stamp ordering technique.
3 Explain the concept of query optimization and also discuss that why SQL queries are converted into relational algebra before optimization?
4 Explain the similarities and differences between 3NF and BCNF with suitable example.

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phonetic Translator

Department of CE (BTech – 4th year) Punjabi University, Patiala

MST – II

Subject: Artificial Intelligence

MM:15 Time:1hr

1. Define the following terms: (6*1=6)

(a) Conflict Resolution (b) Cognitive Science (c) Recursion vs Iteration in LISP

(d) Pattern Recognition (e) Role of neural network in computer science (f) Statistical Reasoning

2. Differentiate between Declarative knowledge and Procedural knowledge. (3)

3. Draw the architecture of Voice recognition system. Explain its various components. (3)

4. Discuss the various input-output statements used in LISP. Give proper syntax and suitable examples. (3)

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Department of CE (B.Tech – 4th year) Punjabi University, Patiala

MST – II

Subject: Artificial Intelligence

MM:15 Time:1hr

1. Define the following terms: **(6*1=6)**

(a) Conflict Resolution (b) Cognitive Science (c) Recursion vs Iteration in LISP

(d) Pattern Recognition (e) Role of neural network in computer science (f) Statistical Reasoning

2. Differentiate between Declarative knowledge and Procedural knowledge. **(3)**

3. Draw the architecture of Voice recognition system. Explain its various components. **(3)**

4. Discuss the various input-output statements used in LISP. Give proper syntax and suitable examples. **(3)**

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Section-C

5. Discuss the voltage drop and phasor diagram of transformer on load. Also draw and explain its equivalent circuit.

6. Explain the open circuit and short circuit test on single phase transformer.

Section-D

7. Discuss in detail the working principal and construction of electrical machines. Also write down the characteristics of DC motors.

8. Explain various methods forstarting single phaseinduction motors.

Section-E

9. Explain in brief:-

i) Discuss [illegible]
ii) What do you mean by dependent sources?
iii) Explain Norton's Theorem.
iv) Write down the steps to solve a network using Norton theorem.
v) What is power factor?
vi) Why we use sinusoidal form of Alternating voltage in network analysis?
vii) Draw the phasor diagram of purely inductive circuit for current and voltage.
viii) Write down the characteristics of Ideal transformer.
ix) Draw the series equivalent of a parallel circuit.
x) Write down the function of commutator in electric machines.

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B-13/2113

Electrical Science-101

Semester-I

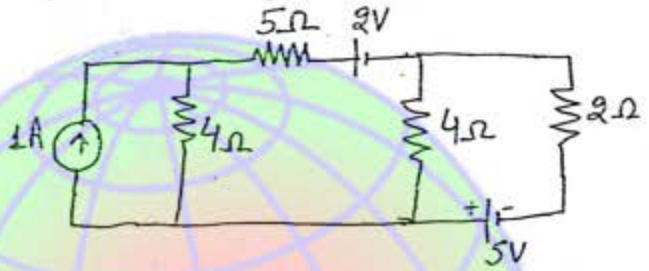
CC:B4,783

Time allowed: 3 Hours. Max.Marks:50

Note: Attempt four questions selecting one question each from Sections A,B,C and D. Section E iscompulsory. All questions carry equal marks.

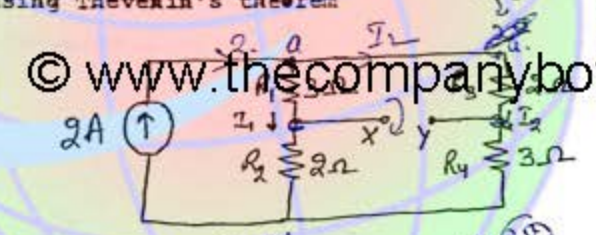
Section-A

1. a) Find current and voltage across 2Ω resistor in following circuit using Kirchhoff's law.



b) Discuss the delta to star conversion with suitable example.

2. a) In the network shown below, find V_{x-y} and R_{int} (across X-Y) using Thevenin's theorem



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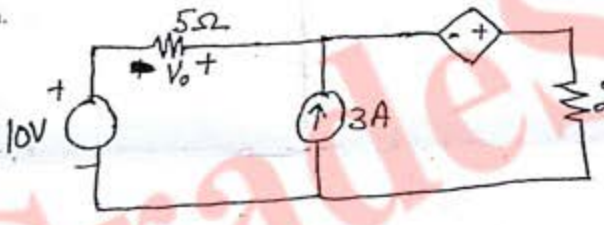
b) Find the current in 2Ω resistance in the network shown below using Norton theorem



Section-B

3. a) Calculate the impedance and power factor of R-C circuit
   b) How to calculate resonant frequency in RLC circuit? Explain.

4. Discuss three wattmeter method and two wattmeter method of balanced load for measuring power in 3-Phase Circuits.

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Roll No. .....

Total No. of Pages : 2

PC 10708-AR

O-18/2056

ENVIRONMENTAL AND ROAD SAFETY AWARENESS

(Common Paper CE and Civil Engg.)

Semester–IV

Time Allowed : Three Hours] [Maximum Marks : 70

Note : The candidates are required to attempt one question each from Sections A and B carrying 10 marks each and the entire Section C consisting of 15 short answer type questions carrying 2 marks each.

SECTION–A

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I. Discuss the need for Public Awareness in Environment. 10

II. Discuss the effects of overutilization of surface and ground water. 10

III. Define Ecosystem. Discuss the structure and functions of an Ecosystem. 10

IV. Describe the value of Biodiversity. 10

SECTION–B

V. What is Noise pollution ? Describe the causes, effects and control measures of Noise pollution. 10

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VI. Describe Wild life Protection Act. 10

VII. What is Acid Rain ? Discuss its causes and effects. 10

VIII. How a driving license can be obtained ? Describe it. 10

SECTION–C

IX. Write short answers to all the parts :

(i) What is Lithosphere ?

(ii) What is Global Warming ?

(iii) Name four Natural Disasters.

(iv) What is Food Chain ?

(v) What is Modern Agriculture ?

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(vi) Define Producers and Decomposers.

(vii) What is an Ecological Pyramid ?

(viii) What is Vermicomposting ?

(ix) What do you mean by Consumerism ?

(x) What are Traffic Signs ?

(xi) What is Sustainable Development ?

(xii) What is In-situ and Ex-situ Conservation of Biodiversity ?

(xiii) Define Endangered Species.

(xiv) Name only different level of Biodiversity.

(xv) What do you understand from Nuclear hazards ?

15×2=30

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Roll No.

Total Pages : 4

9369/MB

G–4/2057

GRID COMPUTING

Paper–317

Semester–VI

Time Allowed : 3 Hours] [Maximum Marks : 50

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Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION—A

1. What do you man by Virtual Organizations in Grid Computing ? Give some examples of Virtual Organizations. 5

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2. What are the key distinctions between Cluster and Grid Computing ? 5

3. Write about the scope of Grid Computing in Business areas. 5

4. Explain the architecture of Second generation grids with neat diagram. 5

5. What are the OGSA basic services ? Explain each of them with necessary diagrams. 5

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SECTION—B

6. What do you mean by Data Intensive Computing ? Discuss various data intensive Grid applications. 5

7. Discuss the difference between Grid computing and P2P computing. 5

8. Discuss various classifications of Grid Computing Environments. 5

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9. Explain various Security problems present in Grid Environment. 5

10. Discuss any one of the following approaches to achieve efficient grid resource allocation :

(a) Advanced reservation.

(b) Resource matching. 5

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SECTION—C

11. Answer the following questions : 10×2=20

(i) What is Grid computing ?

(ii) List out the advantages of Second Generation grids.

(iii) What are benefits of Building a Grid ?

(iv) List the three components made by OGSA.

(v) How is grid computing used in Engineering and Design ?

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(vi) What are the major goals of OGSA ?

(vii) How Cloud Computing helps to create centralized E mail Communication ?

(viii) Mention some major business areas of Grid computing.

(ix) What is Semantic grid ?

(x) What are the more specific goals of OGSA ?

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DEPARTMENT OF COMPUTER ENGINEERING

SUBJECT: GRID COMPUTING M.M.15

Exam duration: 1hour Date: 2.03.2017

Answer all questions from section A. Attempt any 2 questions from section B

Section- A

Explain the following (each question carries 1 mark):

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1. Grid FTP protocol
2. Resource Discovery
3. Resource Virtualisation
4. Recent trends in grid computing
5. UNICORE

Section –B (each question carries 5 marks)

Q6. Describe in detail the architecture of GT3. Write the core services supported by the same.

Q7. What is gLITE? Describe its architecture with the functionalities of various components.

Q8. Discuss the layered architecture of grid computing and its applications.

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Roll No. .

Total No. of Pages : 4

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PC 3436-NR

C–19/2115

NUMERICAL METHODS AND APPLICATIONS–201

(Common Paper ECE and ME)

Semester–III

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- Section 'C' is compulsory. Attempt any six questions by selecting *three* questions from Section A and *three* questions from Section B. Use of non-programmable scientific calculator is allowed.

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SECTION—A

I. Find the root of the equation $4 \sin x = e^x$, correct to 4 decimal places using Regula-Falsi method.

II. Using Newton-Raphson method for the system of non-linear equations solve :

$x^3 + 2y^3 = 10, 4y^2 + 3x^2 = 16$ starting with $x = 1.8$ and $y = 0.8$.

III. Discuss the order of convergence of Secant method.

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IV. Solve the following system of equations by using Gauss-Seidal Method :

$5x + 2y + z = 12,\ x + 4y + 2z = 15,\ x + 2y + 5z = 20.$

V. Find all the eigen values and eigen vector of $\begin{bmatrix} 1 & 1 & \sqrt{2} \\ \frac{1}{\sqrt{2}} & \frac{3}{\sqrt{2}} & 1 \\ \sqrt{2} & 1 & \frac{1}{\sqrt{2}} \end{bmatrix}$

using Jacobi's Method. 3×5=15

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SECTION–B

VI. Find first order and second order derivatives of y w.r.t. x at x = 0.2 for the following data :

x :	0.0	0.1	0.2	0.3	0.4
y :	1	0.9975	0.99	0.9776	0.9604

VII. Derive Simpson's 1/3rd formula and hence evaluate $\int_0^{\pi} \sin x\, dx$.

VIII. Given that $\frac{dy}{dx} = \frac{x - y}{x + y}$, $y(2) = 1$, compute y (1.9) using improved Euler's method and y(1.8) using modified Euler's method.

IX. Using Ada
$dy/dx = x^2(1$
$y(1.3) = 1.9$

X. Solve the e
given that y

XI. (i) Sho
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(ii) Gi
(iii) Sh
(iv) Fi
th
b
(v) F
(vi)

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IX. Using Adam's-Bashforth method to find y(1.4) given $dy/dx = x^2(1 + y)$, y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548 and y (1.3) = 1.979.

X. Solve the equation $y''(x) - xy(x) = 0$ for $y(x_i)$, where x_i =0, 1/3, 2/3, given that $y(0) + y'(0) = 1$ and $y(1) = 1$. 3×5=15

SECTION–C

XI. (i) Show that $x_{n+1} = \frac{1}{2}x_n\left(3 - \frac{x_n^2}{\alpha}\right)$ has second order convergence near $\sqrt{\alpha}$.

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(ii) Give geometrical interpretation of Newton Raphson method.

(iii) Show that eigen values of an Hermitian matrix are real.

(iv) Find the values of p and q so that the rate of convergence of the iterative formula $x_{n+1} = px_n + q(N/x_n^2)$, for computing $N^{1/3}$ becomes as high as possible.

(v) Find the numerically largest eigen value of $\begin{bmatrix} -4 & -5 \\ 1 & 2 \end{bmatrix}$, using Power Method.

(vi) Using Lagrange's interpolation formula express $\frac{x^2 + 6x - 1}{(x-1)(x-4)(x-6)}$ as a sum of partial fractions.

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(vii) Solve $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$ by Picard's Method.

(viii) Using Newton's Divided Difference formula find f(7) given f(1) = 3, f(3) = 31, f(6) = 223, f(10) = 1011, f(11) = 1343.

(ix) Write Milne's Predictor-Corrector formulas.

(x) Explain Taylor Series's Method.

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10×2=20

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MST-I

Subject: System Modeling & Simulation (CPE-403) 4th year/ 7th semester

Section-A is compulsory. Attempt any two questions from Section-B

Section-A

Note:

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1. Differentiate between [illegible]
2. Write the equations for pdf, cdf, mean and variance for exponential distribution.
3. List any two limitations of simulation.

Section-B (5 marks each)

4. Consider the experiment of tossing a single die. X is defined as the number of spots on the upper face of the die after toss. Then $R_X = \{1, 2, 3, 4, 5, 6\}$. The discrete probability distribution for this random experiment is given by following table. Calculate the mean and variance of the die-tossing experiment.

x_i	1	2	3	4	5	6
$P(x_i)$	1/21	2/21	3/21	4/21	5/21	6/21

5. Show that exponential distribution is memory-less.
6. Write down the techniques to generate random numbers. Use the linear congruential method to generate a sequence of random numbers R_1, R_2, R_3 with $X_0 = 37$, $a = 27$, $c = 33$, and $m = 100$.

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Roll No. .....59..... Total No. of Pages : 2

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PC 3491-NR

C-20/2115
SYSTEM PROGRAMMING—301
Semester—V

Time Allowed : Three Hours] [Maximum Marks : 50

Note :– The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. An assembly program can be divided into three sections : The data section, the bss section, the text section. Discuss each of these sections and their respective role in Assembly program. 10

2. Discuss structure of Assembly program, use of mnemonics and various types of instructions by citing appropriate examples. 10

SECTION—B

3. (a) Discuss role of Macro pre-processor with help of suitable example.

   (b) Discuss Macro language and its features. 5,5

4. What do you mean by single pass assembler ? Explain opcode table and symbol table generation in detail. 10

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SECTION—C

5. What do you mean by code optimization ? Discuss various techniques used to optimize code by citing suitable examples. 10

6. (a) Differentiate between interpreter and compiler.

   (b) Discuss each phase of compiler construction by taking suitable example. 5,5

SECTION—D

7. How operating system manages memory and processor ? Explain in detail by citing suitable examples. 10

8. Elaborate relocation and linking concepts : highlight linked and load time address translation by citing suitable examples. 10

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SECTION—E

9. Write very brief notes on the following :

   (i) Symbol Table

   (ii) Forward Reference

   (iii) Macro

   (iv) Loader

   (v) Linker

   (vi) Device Driver

   (vii) Interrupt

   (viii) Syntax analysis

   (ix) Instruction Pointer

   (x) Code section. 10×1=10

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DEPARTMENT OF COMPUTER ENGINEERING, PUNJABI UNIVERSITY, PATIALA

SUBJECT: System Programming Class: 3CE
Time: 1 hour Maximum marks: 15

Section- A

1. Difference between USING and BALR instruction. (1)
2. Difference between system programming and application programming. (2)
3. Define macro instruction. (1)
4. Write various advantages and disadvantages of Assembly language. (1)

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Section –B (do any two)

5. Explain general machine structure with diagram and also write its features. (5)
6. Draw flow chart for pass 1 and pass 2 assembler and explain them. (5)
7. Draw flow chart for pass 1 and pass 2 macros and explain them. (5)

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SECTION–D

7. What is heap storage allocation ? Explain in detail. 1×10=10

8. What is Code Optimization ? What are different techniques used for Code Optimization ? Support your answer with the help of examples. 1×10=10

SECTION–E

9. (a) What is input buffering ?

(b) Name and define the cousins of compiler.

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(c) Write any two problems associated with top down parser .

(d) What types of conflicts that may occur during shift reduce parsing ?

(e) Define Context Free Grammar.

(f) What is Short Circuit Code ?

(g) Write any two applications of DAG.

(h) Define Code Optimization.

(i) What do you mean by machine independent optimization ?

(j) Define Token. 10×1=10

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Roll No

Total No. of Pages : 3

PC 10763-MR

O-19/2056

COMPILER DESIGN–309

Semester–VI

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Time Allowed : Three Hours [Maximum Marks : 50

Note: Attempt *four* questions selecting *one* question each from Sections A, B, C and D. Section E is compulsory.

SECTION-A

1. (a) Define a compiler. Discuss the basic structure of complier.

   (b) Explain the tool based approach to Compiler Construction. 2×5=10

2. (a) Write regular expressions for the following patterns. Use auxiliary definitions wherever convenient.

   (i) The set of words having a, e, i, o, u appearing in that order, although not necessarily consecutively.

   (ii) Comments in C.

   (b) List the various error recovery strategies for a lexical analysis. Explain each with the help of suitable examples. 2×5=10

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SECTION–B

3. What is Context Free Grammar ? Consider the following context free grammar:

S-> S S +

S-> S S *

S-> a

For the string aa+a* answer the below mentioned questions.

(i) Give a leftmost derivation for the string.

(ii) Give a rightmost derivation for the string.

(iii) Give a parse tree for the string.

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(iv) Is the Grammar ambiguous or unambiguous ? Justify your answer.

(v) Describe the language generated by this grammar.

1×10=10

4. Write an algorithm for Predictive Parsing. Explain it with help of an example. 1×10=10

SECTION–C

5. What is 3-address code ? What are the various methods to implement 3-address code ? Explain with help of an example.

1×10=10

6. (a) What is intermediate code generation ? What are the benefits of generating intermediate code ?

(b) What is Back patching ? What are the functions used for manipulating the list of labels in Back patching ?

2×5=10

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MST – 1
ANALOG ELECTRONIC CIRCUITS (ECE 210)
2nd YEAR – SEMESTER - 4
PUNJABI UNIVERSITY, PATIALA

MARKS: 15 **TIME: 1 HOUR**

SECTION – A (5 Marks)
(Attempt all questions)

1. (a) Write down applications of positive feedback amplifier.
   (b) Define Desensitivity in feedback amplifiers.
   (c) What do you mean by β in current shunt topology?
   (d) Discuss the properties of ideal transconductance amplifier with the help of circuit diagram.
   (e)Draw the circuit diagram of current series feedback Amplifier?

SECTION – B (10 Marks)
(Attempt ant 2 Questions)

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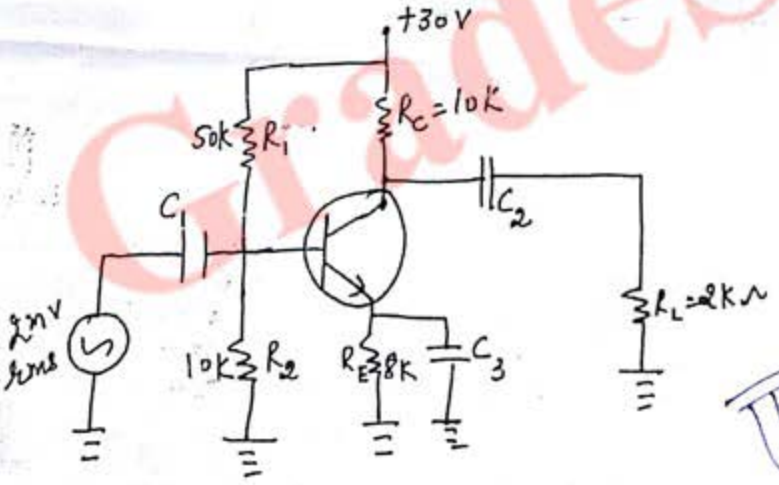
2. Explain weather R_{if} is increased or increased for each topology in case of feedback amplifiers with the help of detailed block diagrams.

3. If an amplifier has a bandwidth of 200KHz and a voltage gain of 100,What will be the new bandwidth and gain if 5%negative feedback is introduced ? What is the product of gain and bandwidth before and after adding negative feedback? What should be the amount of feedback if bandwidth is restricted to 1MHz.

4. For the circuit shown in figure below
   a) Draw it's AC and DC equivalent circuit (2)
   b) Drive the voltage gain and input impedance for the given circuit in terms of R_1, R_2 R_L and R_E. Also compute numerical value of gain, input impedance, considering given numerical value of components with h_{fe}=150, V_{BE}= 0.7V. (3)



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Department of ECE, Punjabi University Patiala
MST-II Analog Electronic Circuit (ECE-210)
B. Tech. II Year (ECE, 4Th Semester, 2EC1 to 2EC6)

Time:1 hour **M. Marks : 15**

Note : *Question number should be clearly mentioned strictly according to as pattern of question paper only.*

SECTION- A (Attempt all)

Q.I (a)What do you mean by f_t parameter?
(b) What is the amount of phase shift provided by RC phase shift oscillator?
(c) Define tuned circuits.
(d) Explain the basic principle of oscillators.
(e) How does Schmitt trigger work? (1×5)

SECTION-B (Attempt any two questions)

Q.II (a) Explain Hartley oscillator and Colpitts oscillator in detail.
(b) Find the gain of high frequency T-model in common base configuration. (3+2)

Q.III (a) A Power transistor is to be used as a Class A transformer coupled amplifier and is to deliver a maximum of 5W to a 4Ω load. Operating point is adjusted for symmetrical clipping with collector supply voltage of 20V. Assume ideal characteristics with V_{min}=0 V. Calculate
i. Operating point values of I_{ceq} and V_{ceq}.
ii. Power dissipation rating of transistor
(b) Define multivibrators. Explain its types with the help of circuit diagrams and mathematical expressions. (2+3)

Q.IV (a) Draw hybrid π model for high frequency. Also derive the formula for output conductance.
(b) In a transistorized Hartley oscillator, the tank circuit has capacitance of 100pF. The value of inductance between the collector and tapping point is 30mH and the value of inductance between the tapping point and the transistor base is 10^{-8} H. Determine the frequency of oscillations. Neglect the mutual inductance. (3+2)

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Department of ECE, Punjabi University Patiala
MST-II Analog Electronic Circuit (ECE-210)
B. Tech. II Year (ECE, 4Th Semester, 2EC1 to 2EC6)

Time:1 hour **M. Marks : 15**

Note : *Question number should be clearly mentioned strictly according to as pattern of question paper only.*

SECTION- A (Attempt all)

Q.I (a)What do you mean by f_t parameter?
(b) What is the amount of phase shift provided by RC phase shift oscillator?
(c) Define tuned circuits.
(d) Explain the basic principle of oscillators.
(e) How does Schmitt trigger work? (1×5)

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511 P10 (29)

Total Pages : 3

PC-10684/MR

O-18/2056

ANTENNA AND WAVE PROPAGATION – *208*

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Question No. XI (Section-C) is compulsory.

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SECTION – A

I. Derive the expression for current distribution on thin wire antenna.

II. Define current and vector potential of a Hertzian dipole.

III. Define the following parameters and their dependence on antenna :
(a) Antenna gain.
(b) Radiation pattern.

IV. What is Loop antenna ? Discuss its radiation pattern.

V. Derive the expression for the field produced by an End fire array. (3×5=15)

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SECTION – B

VI. Describe the radiation patterns and field on the axis of an E-plane sectoral horns.

VII. Explain the construction and radiation characteristics of Frequency independent antenna.

VIII. Find the diameter of a dish antenna that will form a beam having 0.5 degree, half power beam width (HPBW) at a frequency of 8.2 GHz. Assuming an efficiency constant of 0.6, calculate the antenna gain and effective aperture.

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IX. Explain in detail Space wave propagation and importance of line of sight propagation.

X. Explain the following terms :

(a) MUF.

(b) Multihop propagation. (3×5=15)

SECTION – C

(Compulsory Question)

XI. Attempt all the following :

(a) What is the effective area of a half wave dipole operating at 1 GHz ?

(b) What is an elementary dipole and how does it differ from the infinitesimal dipole ?

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(c) Stage Hugen's principle.

(d) Design a 3-element Yagi-Uda antenna to operate at a frequency of 200 MHz.

(e) List the factors that affect Radio wave propagation.

(f) Differentiate between V antenna and Rhombic antenna.

(g) Draw the radiation pattern of a vertical dipole.

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(h) Distinguish between Power gain and Directive gain.

(i) Mention the types of feeding structures used for microstrip patch antennas.

(j) Differentiate between Virtual height and Actual height.

(10×2=20)

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Total Pages : 4

PC-10682/MR

O-18/2056

CIRCUIT THEORY – 206

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and Section B. Q. No. XI (Section C) is compulsory.

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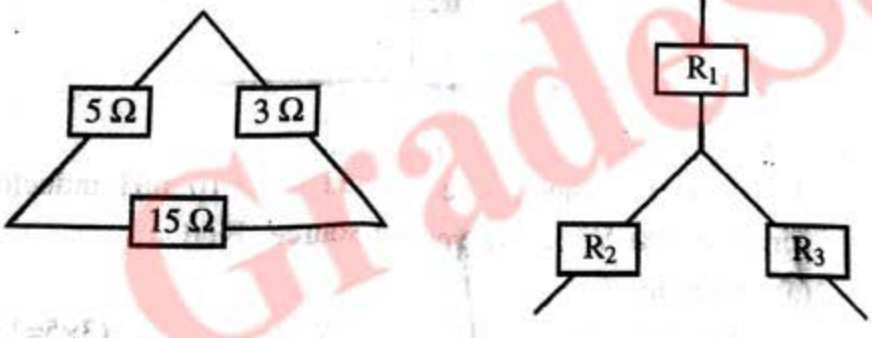
SECTION – A

1. A Delta connected network is converted into wye equivalent shown in figure. Find the resistance R_1, R_2, R_3 in Y network.



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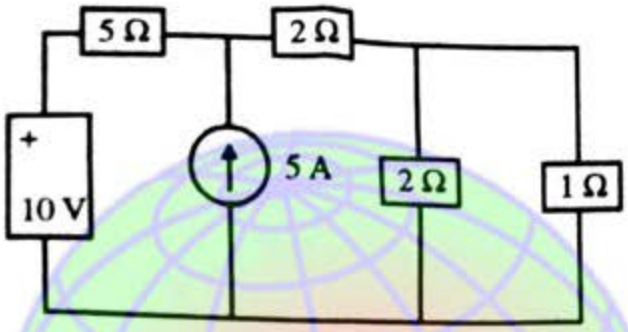
II. In the given Fig, find the power loss in 1 ohm resistance using Norton theorem :



III. For an ideal transformation, show that $\frac{V_1}{V_2} = \frac{\sqrt{L_1}}{\sqrt{L_2}}$ where L_1 and L_2 are the self-inductance of primary and secondary windings.

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IV. Calculate the Y-parameter from Z-parameter as network shown in below :

V. A 4 ohm resistance is connected to a 10 mH inductor across a 100 V, 50 Hz voltage source. Find

(a) Current

(b) Total power.

(3×5=15)

VI. A unit step
at $t = 0$ wh
initial con

VII. Find the fi
point of i

$z(s)$

VIII. The dri

given by

Cauer n

IX. Test wh

X. Find in
functio

XI. Answ
(a)

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SECTION – B

VI. A unit step voltage $u(t-2)$ is applied to a series L–R circuit at $t = 0$ when L = 1 H, R = 2 Ω. Find $i(t)$ assuming zero initial condition.

VII. Find the first and second Foster from of the following driving point of impedance function :

$$z(s) = \frac{2(s^2+1)(s^2+9)}{s(s^2+4)}.$$

VIII. The driving point impedance of a reactive network is given by $z(s) = \frac{8s^4 + 32^4 + 24}{(s^5 + 6s^3 + 8s)}$. Realize the second form of Cauer network.

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IX. Test whether the polynomial $s^5 + s^3 + s$ is Hurwitz or not.

X. Find inverse Laplace transform of the following transfer function :

$$F(s) = \frac{48}{s^2(s+2)(s+4)}.$$

(3×5=15)

SECTION – C

(Compulsory Question)

XI. Answer all questions :

(a) A function in Laplace domain is given by $F(s) = \frac{2(s+4)}{(s+3)(s+8)}$. Find the initial and final value by Initial and final value theorem.

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(b) A 10 V step signal is applied across a series RC circuit at $t = 0$. Find $i(t)$ at $t \approx 0$ and obtain value of $\frac{di}{dt}$ at $t = 0$. Assume R = 100 Ω, C = 100 μF.

(c) Check the stability of following polynomial by applying RH criterion :

$$P(s) = s^4 + 2s^3 + 4s^2 + 12s + 10.$$

(d) A polynomial is given by $P(s) = s^3 + 2s^2 + 4s + M$. Find the value of M for stable system.

(e) Define the coefficient of coupling of coupled network.

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(f) Show that in ideal transformation, the input impedance looking through the primary terminal is in square of turns ratio times the secondary impedance.

(g) State the maximum power transfer theorem in electrical network, and show that its maximum efficiency is 50%.

(h) An impedance of ZΩ draws a current of $(-2 + j10)$A from a 50 Hz $(100 + j50)$ supply. What is the value of impedance, power factor and real power consumed ?

(i) Write down the properties of Positive real function.

(j) Define RMS value and show that RMS value of sine wave is $\frac{V_{max}}{\sqrt{2}}$. (10×2=20)

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DEPARTMENT OF ECE,PUP

MST-special (05/05/16)

CIRCUIT THEORY (ECE-206)

M.M: 12 **time: 1hr**

NOTE: SEC-A IS COMPULSORY. DO ANY TWO QUESTIONS FROM SEC-B

SEC-A

Q.1 a Differentiate between network analysis and network synthesis giving example of the methods used for them. 0.5

b Draw the dual of circuit shown in Fig.1 1

Fig.1

c Define Transmission parameters. 0.5

d What are Hurwitz polynomials. 1

e If two circuits 'a' and 'b' have to be connected in series and cascade, find the two port parameters of the combination with diagram of series and cascade combination. 1

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SEC-B

Q.2 Synthesize a network using foster-I and Foster –II forms for the impedance function : 4

$$Z(s) = \frac{(S+1)(S+4)}{(S)(S+2)}$$

Q.3 Find Y-parameters of the network of Fig.2. 4

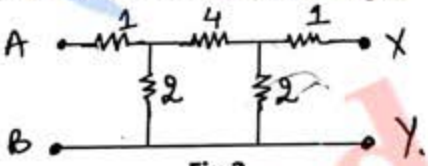

Fig.2

Q.4 Find the value of Z_L in Fig.3 so that maximum power is transferred to it. Also find the value of maximum power transferred 4

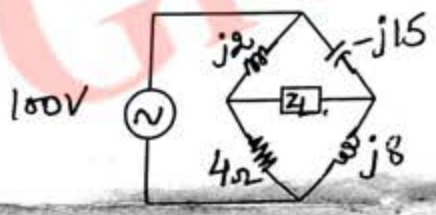

Fig.3

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Department of Computer Engineering
Punjabi University, Patiala
Subject: Computer GraphicsClass: 6th Semester

MM. 15 MST-I

(Section-A) Answer all the questions (1X5)

1. Define Following:
   a. Pixel and Resolution
   b. TFT
   c. Shear Transformation
   d. Difference between Trackball & Spaceball
   e. Reflection

(Section-B) Answer any two questions (5X2)

2. List down the differences between DDA and Breshenham's Line Drawing Algorithm alongwith their merits and demeits.
3. What are various flat panel displays? Explain in detail.
4. A) Perform 45degrees rotation of a triangle A(0,0), B(1,1),C(5,2) a) about the origin b) about the point P(-1,-1)*(4M)*
   B) Write the general form of scaling matrix w.r.t fixed point P(h,k). *(1M)*

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Department of Computer Engineering
Punjabi University, Patiala
Subject: Computer Graphics Class: 6th Semester

MM. 15 MST-I

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(Section-A) Answer all questions

1. Define Following: (1X5)
   a. Projection
   b. Viewing Pipeline
   c. Clipping
   d. Flood Fill versus Boundary Filling
   e. Shading

(Section-B) Answer any two questions

2. Explain Cohn Sutherland line clipping algorithm with suitable example. (5X2)
3. How A-Buffer algorithm is better than depth buffer algorithm. Explain its steps.
4. Elaborate the concept of transformations in 3D space by mentioning their types and ma

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Roll No. .....

Total No. of Pages : 2

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PC 5975-MR

O-18/2055

COMPUTER PERIPHERAL AND INTERFACES—209

Semester—IV

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. What are the various types of Printers ? Explain the printing mechanism of the Inkjet and the Laser Printers. 10

2. What is a Motherboard ? Why is it so called ? What are the cards/components mounted on the motherboard ? Explain the BIOS functions in detail. 10

SECTION—B

3. What are the various types and the generations of the processors ? What are their features and inherent characteristics ? 10

4. Explain the functioning of a typical HDD in detail. 10

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CC-D 4925

Total Pages : 2

PC-10815/MR

O-18/2054

COMPUTER PERIPHERALS AND INTERFACES–209

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION–A

I. (a) What are the factors affecting the display quality of the CRT screen? 5

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(b) What are the various voltages given by the power supply of a Computer system? Explain the characteristics of the typical power supply of a Computer system? 5

II. (a) Explain the functioning of a keyboard in detail. 10

(b) What is BIOS? What are its different types? What are its various sections and their functionality?

SECTION–B

III. (a) Explain the booting process in detail. 5

(b) What is ROM? What are its types? 5

IV. Compare and explain the various types of memories. 10

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SECTION–C

V. (a) How the recovery software is useful ? Explain. 5

(b) What is disk formatting ? Explain. 5

VI. Explain the design and working of ISA and ElSa buses. 10

SECTION–D

VII. (a) What is current loop interface? Explain. 5

(b) Explain IDE origin and interface. 5

VIII. Explain various ATA standards. 10

SECTION–E

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IX. Write brief note on the following :

(a) What do you mean by RAID? 1

(b) What is boot sector? 1

(c) Explain the concept of partition table. 1

(d) What is Cache memory? Why is it so called? 1

(e) What is the difference between IDE and EIDE? 1

(f) What are floppy disk tracks and sectors? 1

(g) What is a TFT monitor? 1

(h) What is the purpose of three buttons of a mouse? 1

(i) What is boot strapping? 1

(j) Why a keyboard is organized like a matrix? 1

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SECTION—C

5. What is the purpose of FAT ? How many copies of FAT exist ? Distinguish between FAT 16 and FAT 32. 10

6. Compare the performance and the capabilities of PCI and VESA buses in detail. 10

SECTION—D

7. What are the differences between SCSI and PCI buses ? Compare advantages and limitations. 10

8. (a) What are the serial and the parallel interfaces ? Compare them. 5

   (b) Explain SCSI RAID in detail. 5

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SECTION—E

9. Write brief notes on the following :

   (a) Define the term resouce conflict. 1

   (b) Why do we need expansion slots ? Name the expansion slots available on the motherboard. 1

   (c) What is Video Ram ? What is its need ? 1

   (d) What do you mean by the term ATA-RAID ? What is its significance ? 1

   (e) What are the benefits of using USB ? 1

   (f) What is AGP ? 1

   (g) Can we use multiple monitors with a single system ? Justify you answer. 1

   (h) What is a video driver ? What is its function ? 1

   (i) What do you mean by system bus, explain ? 1

   (j) What are the advantages of using DMA for I/O ? 1

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PUNJABI UNIVERSITY, PATIALA
DEPARTMENT OF COMPUTER ENGINEERING
MST 1

TIME: 1hour **Marks: 15**

Computer Peripheral and Interfaces (CPE-209)

***Attempt any 2 from section B. Section A is compulsory.**

SECTION A (1 mark each)

Write in brief about following:

1. CMOS and BIOS
2. Video card and its interfaces
3. Motherboard and its components
4. Cache Memory and its types.
5. Power supply and its standards

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SECTION B

1. Explain different types and working mechanism of printers? (5)
2. What are the types and generation of processors? (5)
3. Explain different types of RAM and ROM? (5)

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Department of Computer Engineering
Punjabi University, Patiala

MM.15 **Sub: Computer Graphics** TIME: 60 Minutes
8th Sem. (CE)

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Section –A (Attempt all questions) **5*1=5**

Q.1 a) Define persistence and refreshing? How they are related.
b) Calculate the aspect ratio of a raster system having 800x600 resolution.
c) Define region filling? What is difference between boundary fill and flood-fill method.
d) Give notations of 2-D homogeneous transform matrix of rotation and x-direction shear transformation operations?
e) What is rigid bogy transformation? List some non-rigid body transformation operations,

Section –B (Attempt any two) **2*5=10**

Q.2 Drive the equations for calculation of successive decision parameters in Bresenham's line drawing method. Also write down its algorithm.
Q.3 Calculate co-ordinate values of pixels lying on the boundary of circle having center (15,15) and radius (10) using Mid Point circle algorithm.
Q.4 Magnify the triangle with vertices A(0,0) , B(1,1) ,C(5,2) to twice its size while keeping C(5,2) fixed.

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Roll No. ..... Total Pages : 4

CC : D 4.888 **3431/NR**

C–19/2115

ELECTRONIC DEVICES

Paper–201

Sem.–III

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : Attempt **three** questions each from Section A and B. Each question carries 5 marks. Section C is compulsory having 10 short answer type questions carrying 2 marks each.

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SECTION—A

1. What will happen, when two regions of type p and n are combined? Draw and discuss the V-I characteristics of p-n junction with the help of diagram.

2. A full-wave rectifier has a peak output voltage of 20 volts at 50 Hz and feeds a resistive load of 1.2 kΩ. The filter used is shunt capacitor one with C = 20 μF. Determine d.c. load current, d.c. output current, ripple voltage and ripple factor.

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3. Why does the CE configuration provide large current amplification while the CB configuration does not? Explain the input and output characteristics of transistor in CB configuration.

4. Define h-parameters. Find h_{re} and h_{ie} in terms of CB h parameters.

5. Describe the working principle of Varactor diode with the help of proper diagrams. 3×5=15

SECTION—B

6. In a common emitter collector-to-base bias circuit, an NPN transistor having a value of $\beta = 49$ is used with $V_{CC} = 10$ V and $R_C = 2.2$ kΩ. If a 100 kΩ resistor is connected between collector and base and $V_{BE} = 0$, determine (i) the position of Q-point, (ii) stability factor S and (iii) maximum and minimum collector current if β vary from 49 of to 180.

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7. For an n-channel silicon FET with a = 3.1×10^{-4} cm and $N_D = 10^{15}$ electronics/cm^3, find :

   (a) the pinch-off voltage, and

   (b) the channel half-width for $V_{GS} = V_P/2$ and $I_D = 0$.

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8. Why a Field effect transistor is called so? How does the FET behave for small and large value of V_{DS}.

9. What is meant by Integrated circuit? Why is it prefrerred over discrete circuits? Compare the features of Monolithic and Hybrid technology.

10. Differentiate Junction capacitor and Thin-film capacitor. Write design rules for monolithic layout. 3×5=15

SECTION—C

11. (a) How is Tunnel diode differing from Ordinary diode?

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(b) What is Regulation?

(c) What is Early effect? Write its consequences.

(d) Define Miller theorem.

(e) What is the need of Biasing a transistor?

(f) What is channel length modulation in MOSFET?

(g) Write the steps to form the monolithic circuit.

(h) What is the effect of temperature on p-n junction?

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(i) What is Thermal run-away? How is thermal stability realized?

(j) Draw two biasing circuits of an enhancement type MOSFET. 10×2=20

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10

DEPARTMENT OF ECE
PUNJABI UNIVERSITY, PATIALA
B.TECH 2nd year (3rd Semester)
EMFT (ECE-203)
MST-1(Centre -II)

Date of exam: 15.9.15 **Time: 1hr**

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Note: Section A is compulsory and attempt only TWO questions from Section -B

Section –A

1. Write the **Maxwell Equations in Differential Form** For the static field
2. Transform the following in to the **spherical** coordinate

$$A = ya_x - xa_y + za_z$$

3. Write down the expression for Laplacian operator in cylindrical coordinate
4. Discuss the effect of dielectric on the capacitance.
5. What is the physical significance of divergence of a vector field

Section –B

6. Explain in detail the boundary condition at the electric interface
7. State and prove Gauss law and Ampere's law.
8. a. Discuss the energy stored in the magnetic field.
   b. Two homogenous linear and dielectric media have an interface at x=0. x<0 describe medium 1with $\mu_{r1} = 2$ and $H_1 = 150a_x - 400a_y + 350\,a_z\ A/m$ and x>0 describe medium 2 with $\mu_{r2} = 5$
   Find B_1, H_2, B_2

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Roll No. .

Total No. of Pages : 3

CC : D 3. 979

PC 3486-NR

C-20/2115
INDUSTRIAL ENGINEERING—305
Semester–V

Time Allowed : Three Hours] [Maximum Marks : 50

Note :– Attempt *one* question each from Sections A, B, C and D. Section E is compulsory.

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SECTION—A

1. What is the relevance of industrial engineering in achieving performance excellence in an engineering enterprise ? Discuss the role and functions to be performed by an industrial engineer. 10

2. Why selecting an appropriate plant location is very critical to the success of a new manufacturing enterprise ? Discuss the factors to be considered while selecting site for a new manufacturing facility. 10

SECTION—B

3. How do you define the term, plant layout ? Describe the SLP technique for designing a product layout. 10

4. Under what conditions, does a batch type production system make use of a cellular layout instead of a process type layout. Discuss the broad steps involved in developing a cellular layout. 10

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SECTION—C

5. What is meant by the following terms in the context of inventory control :

   (i) Ordering Cost

   (ii) Shrinkage Cost/Insurance Cost

   (iii) Interest/Opportunity Cost

   Deduce an expression for the economic order quantity to minimize inventory costs. Assumptions are that supply is instantaneous and arrives when past stock is zero. 10

6. What is a Job shop production system ? Which type of companies make use of this production system ? Discuss the type of labour, equipment, layout and other details, for this production system. 10

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SECTION—D

7. How are the concepts of method study and work measurement interrelated ? Briefly describe the various principles of motion economy. 10

8. (a) Discuss the effect of various environment considerations especially light and humidity on human performance.

   (b) In the context of anthropometry, what is meant by designing for extreme individuals ? 7,3

SECTION—E

9. (a) Define the term, "value" in the context of industrial engineering (value engineering).

   (b) How does industrial engineering enhance the productivity of firms ?

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(c) What is the principle of median model used for plant location decisions ?

(d) What are anticipation inventories ?

(e) Name a few industries which make use of fixed position type layout.

(f) In the plant location decisions, what benefits do rural locations offer over urban locations ?

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(g) What is the use of Rank Order Cluster technique ?

(h) Inventory based systems are not Pull systems. They are rather push system. Comment.

(i) In PPC, what is dispatching function.

(j) What is the use of therbligs ? 10

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5 Y 9

Department of Computer Engineering
Punjabi University, Patiala

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Java Programming (CPE-402)

SECTION-A (1 mark each) (Do all)

Q1) Why Java does not support multiple inheritance?

Q2) What is the need of super and this keywords?

Q3) To prevent any method from overriding we declare the method as_____.

Q4) What is an abstract class?

Q5) An interface can implement another interface. True/ False.

SECTION-B (5 Marks each)

Q1) Discuss in detail the salient features of JAVA language.

OR

Give the syntax of Applet tag. Explain its constituents.

Q2) Explain how to define, extend, implement and access an interface.

OR

Explain Exception Handling Mechanism in detail.

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Total Pages : 3

PC–10681/MR

O-18/2056

MEASUREMENT SCIENCE AND TECHNIQUES – 205
(Common Paper ECE and ME Semester – IV)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Question No. XI (Section C) is compulsory.

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SECTION – A

I. Draw and explain the block diagram representation of a generalized measurement system and its functional elements.

II. A pressure indicator showed a reading as 89 bar on a scale range of 0-100 bar. If the true value was 88.5 bar then determine the following :

(i) Static error.
(ii) Static correction.
(iii) Relative static error.

III. Discuss the Chi-square test requirements.

IV. Explain the Transient response and Steady state periodic types of Dynamic inputs.

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V. Explain the different types of errors in a measurement system. (3×5=15)

SECTION – B

VI. What is Piezo-electric effect ? How it can be used to measure the force ? Explain with neat diagram.

VII. Draw the block schematic of CRT, and explain its working. What are the possibilities and limitations of improving the sensitivity of CRT ?

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VIII. Explain with neat diagram the working of the Instrumentation amplifier.

IX. Draw and explain the working of dual slope integrating type Digital voltmeter (DVM).

X. Explain the method for measurement of phase difference between two signals using CRO. (3×5=15)

SECTION – C

XI. Write short answers of the following :

(a) What is Sensor ?

(b) Give the applications of Inductive transducer.

(c) What is Load cell ?

(d) Draw the diagram of LVDT.

(e) How gr

(f) State the

(g) Different measure

(h) Draw t

(i) What i

(j) What i

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(e) How gross errors can be avoided ?

(f) State the factors which give rise to observational errors.

(g) Differentiate between Direct and Indirect methods of measurement.

(h) Draw the diagram of POT.

(i) What is Tertiary measurement ?

(j) What is PMMC ?

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Third MST
(Measurement Science & Techniques)
EC6205

Dated
29/4/2016

Q 1 Define following.

(1.) Block diagram of telemetry.
(2.) Transducer and Inverse transducer.
(3.) Block diagram of CRO.
(4) Block diagram of digital frequency meter
(5) Different characteristics (static & dynamic) 1×5 = 5

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Q. 2. Explain LED & LCD in details. (5)

Q.3. Explain the methods of corrections for interfering and modifying inputs. (5)

Q 4. Explain the different errors in the measurement systems. (5)

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Department of Mechanical Engineering

2nd Sessional, B.Tech ME 3rd Year (6th Semester), 20th April 2015 (2.00-3.00 pm)

MACHINING SCIENCE, MCE-307

Time: 1 hr **Max. Marks:** 15

Note: Section-A is compulsory and attempt any two questions from section-B

Q.1 **Section A (1 mark each)**

(i) Using the Taylor equation $VT^n = C$, calculate the percentage increase in tool life when the cutting speed is reduced by 50% (n = 0·5 and C = 400)

(a) 300% (b) 400%

(c) 100% (d) 50%

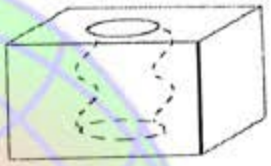
(ii) A zig-zag cavity in a block of high strength alloy is to be finish machined. This can be carried out by using

(a) Electric discharge machining

(b) Electro-chemical machining

(c) Laser beam machining

(d) Abrasive flow machining



(iii) Commercial ECM is carried out at a combination of

(a) low voltage high current

(b) low current low voltage

(c) high current high voltage

(d) low current low voltage

(iv) Match List I with List II and select the correct answer using the codes given below the lists:

List - I (Cutting tool Material)	List - II (Major characteristic constituent)
A. High speed steel	1. Carbon
B. Stellite	2. Molybdenum
C. Diamond	3. Nitride
D. Coated carbide tool	4. Columbium
	5. Cobalt

Codes:	A	B	C	D
(a)	2	1	3	5
(c)	5	2	4	3

	A	B	C	D
(b)	2	5	1	3
(d)	5	4	2	3

(v) Flank wear occurs on the

a) Relief face of the tool

b) Rake face

c) Nose of the tool

d) Cutting edge

Section B (5 marks each)

Q.2 Explain with a neat sketch the construction, working and applications of Electro Chemical Machining process.

Q.3 Explain different mechanisms of tool wear. State the differences between flank and crater wear.

Q.4 Define Tool Life and give its mathematical expression? Explain in brief various factors affecting the Tool life.

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Roll No. ..... 535 Total No. of Pages : 3

CC : D 4.888 **PC 2666-NR**

C-11/2114

NUMERICAL METHODS AND APPLICATIONS–201

(Common Paper ECE & ME Semester–III)

Time Allowed : Three Hours] [Maximum Marks : 50

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Note:– Attempt *four* questions, selecting *one* question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal weightage.

SECTION–A

1. (a) Explain Newton-Raphson method and prove that it converges quadratically. 5

   (b) Determine a solution correct to four decimal places for $xe^x - \cos x = 0$ using Secant method. 5

2. Perform two iterations of Newton-Raphson method to solve the system of equations $x^2 + xy + y^2 = 7$, $x^3 + y^3 = 9$. Take the initial approximation $x_0 = 1.5$, $y_0 = 0.5$. 10

SECTION–B

3. (a) Solve the following system of equations $Ax = b$, using Gauss elimination method with partial pivoting :

$$2x + y + z - 2w = -10$$
$$4x + 2z + w = 8$$
$$3x + 2y + 2z = 7$$
$$x + 3y + 2z - w = -5$$ 5

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Roll No. .....

Total No. of Pages : 4

CC : D 4. 925

PC 5971-MR

O-18/2055

NUMERICAL METHODS AND APPLICATIONS—201

(Common Paper CE and Civil Engg., Sem.—IV)

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 5 short answer type questions carrying 2 marks each.

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SECTION—A

1. (a) Explain geometrical interpretation of Newton-Raphson method and show that this method converges quadratically for simple root. 5

(b) Find an interval of unit length which contains the negative root of smallest magnitude of the equation :

$$f(x) = 3x^3 + 10x^2 + 10x + 7 = 0$$

Also perform two iterations of bisection method to find this root. 5

2. (a) Perform two iterations of Newton-Raphson method to solve the following nonlinear system of equations which has one solution close to $x = 1, y = 2$.

$$y \cos(xy) + 1 = 0$$

$$\sin(xy) + x - y = 0.$$

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(b) Find the root of the equation $\cos x = xe^x$, using Regula-Falsi method correct to three decimal places. 4

SECTION—B

3. (a) Solve the following system of equations $Ax = b$, using LU decomposition method. Take all the diagonal elements of lower triangular matrix as 1.

$$2x + y + z - 2w = -10$$
$$4x + 2z + w = 8$$
$$3x + 2y + 2z = 7$$
$$x + 3y + 2z - w = -5$$

6

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(b) Perform only three iterations of Gauss-Seidal method to solve the following system of equations taking zero initial vector

$2x - y = 7$; $-x + 2y - z = 1$; $-y + 2z = 1$. 4

4. (a) Using the Jacobi's method, to find the largest eigenvalues and corresponding eigen vector of the matrix

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & 2 \\ -1 & 2 & 1 \end{bmatrix}$$

to three correct decimal places. 5

(b) Find the least squares approximation of second degree for the following data :

x	:	–2	–1	0	1	2
f(x)	:	15	1	1	3	19

5

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SECTION—C

5. Derive the formula for the first derivative of $y = f(x)$ of order $O(h^2)$ using central difference approximation and hence use it for $f(x) = \sin x$ to estimate $f'(\pi/4)$ with $h = \pi/12$. Also obtain the bounds on truncation error and compare with exact solution. 10

6. Derive composite Simpons's 1/3 formula and hence use it to evaluate $\int_0^1 \frac{dx}{1+x}$, with 6 subintervals. Also find the minimum number of intervals required to evaluate this integral with accuracy 10^{-6}, by using the same method. Compare your result with exact solution. 10

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SECTION—D

7. (a) Apply Runge-Kutta method of order four to solve the initial value problem $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, $y(0) = 1$, for $[0, 0.4]$ with $h = 0.2$. 5

(b) Solve the following boundary value problem using finite difference method :

$y'' - y = x$, $y(0) = 0$ and $y(1) = 1$, $h = 0.25$. 5

8. Use Milne's predictor–corrector method to find $y(0.4)$ for the equation $\frac{dy}{dx} = x - y^2$, $y(0) = 1$. Find the starting values, using modified Euler method. 10

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SECTION—E

9. Answer in brief :-

(a) Define absolute and relative error. Explain them with an example.

(b) Write the conditions of Newton Raphson method for nonlinear equations so that the method converges to a unique solution for any choice in [a, b].

(c) Compute the maximum error in the integration $\int_0^1 \frac{1}{1+x}\,dx$ by Simpson's 3/8 rule.

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(d) Explain partial and scaled pivoting strategies in Gauss elimination method and why we use these pivoting.

(e) Find the first three non-zero terms of Taylor Series for the initial value problem $y''' + yy'' = 0$, $y(0) = 0$, $y'(0) = 0$, $y''(0) = 1$ and hence find $y(0.1)$. 5×2=10

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(b) Using the Jacobi's method, to find all the eigenvalues and corresponding eigen vectors of the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & 2 \\ -1 & 2 & 1 \end{bmatrix}$. 5

4. (a) Find the least squares straight line $y = Ax + B$ for the following data and also find the least squares error :

x	:	50	70	100	120
y	:	12	15	21	25

5

(b) Solve the linear system $3x + 2y + 7z = 4$, $2x + 3y + z = 5$, $3x + 4y + z = 7$ using LU decomposition with u 's = 1. 5

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SECTION–C

5. Derive Simpson's 1/3rd formula for the integration and hence evaluate $\int_0^6 \frac{1}{1+x^2}\,dx$, by dividing the interval into six parts each of width h = 1 and compare the results with exact solution. 10

6. Derive the formula for the first derivative of $y = f(x)$ of $O(h^2)$ using forward difference and hence estimate $f'\left(\frac{\pi}{4}\right)$ if $f(x) = \cos x$. Also obtain the bounds on truncation error and compare with exact solution. 10

SECTION–D

7. Solve the following boundary value problem using finite difference method $y'' + y = 0$, $y(0) = 0$, $y(1) = 1$, $h = 0.25$. Solve the resulting system of equation generated by finite differences using Gauss Seidal method taking initial approximation as zero vector. 10

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8. Compare y(2) by Milne's predictor-corrector method for the differential equation $\frac{dy}{dx} = \frac{1}{2}(x + y)$, $y(0) = 2$, $h = 0.5$, by finding initial values with modified Euler method. 10

SECTION–E

9. Do as directed :

(i) Find the root of $f(x) = x^3 - x - 1 = 0$ using bisection method lying in the interval [1, 2]. (Perform only two iterations).

(ii) Define truncation and relative error. Explain them with an example.

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(iii) Differentiate between direct and iterative method for linear system of equation and also define the rate of convergence of an iterative method.

(iv) Compute the maximum error in the integration $\int_0^1 \frac{1}{1+x}\,dx$ by Trapezoidal rule.

(v) Use Picard's method to find first approximation y_1 for $x = 0.1$.

Given that $\frac{dy}{dx} = 3x + y^2$; $y(0) = 1$. 2×5=10

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M.S.T.I (Numerical Methods)

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Department of C.E & Civil Engg. Division

Time: 1hrs. *Max. Marks: 15*

Note: All Questions are compulsory.

Q. No. 1. (i) Using Newton Raphson method, find general formula n-root of inverse of number N.

(ii) State sufficient condition for convergence of Iteration method.

(iii) Give geometrical interpretation of NR method.

(iv) Discuss Gauss Seidal Method.

(v) Define Partial Pivoting with example. **(5X1 = 5)**

Q. No. 2. Discuss NR-method for the system of non-liner equations and solve $x^3 + 2y^3 = 10$, $4y^2 + 3x^2 = 16$ starting with $x = 1.8$ and $y = 0.8$. **(5)**

Q. No. 3. Discuss the order of convergence of **Secant method.** **(5)**

Q. No. 4. Using **Factorization** method solve $x + y + z = 3$; $2x - y + 3z = 16$; $3x + y - z = -3$. **(5)**

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M. S.T-II (Numerical Methods-BAS 201)
(For B. Tech ECE and ME III Semester)

Time: 1hrs. *Max. Marks: 15*

Note: All Questions are compulsory and carry equal marks.

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Q. 1 (i) Solve $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$ by Picard's method. (2)

(ii) Write Milne's Predictor- Corrector Formulas. (1)

(iii) Evaluate $\frac{dy}{dx}$ at x = 2 when

X:	0	1	3	6
Y:	18	10	- 18	40

(1)

Q. 2 By dividing the range into ten equal parts, evaluate $\int_0^{\pi} Sinx\,dx$ by Trapezoidal and Simpson's rules. (3)

Q. 3 Find v (0.2) for $\frac{dy}{dx} = x^2 y$, $y(0) = 1$ by using Runge-Kutta method of fourth order. (3)

Q. 4 (i) Find the first derivative of the function tabulated below at x = 0.6

X:	0.4	0.5	0.6	0.7	0.8
f(X):	1.5836	1.7974	2.0442	2.3275	2.6511

(3)

(ii) Explain Modified Euler's method. (2)

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Total Pages : 3

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C-11/2114

OPERATING SYSTEMS–203

Semester–III

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

I. (a) Discuss in detail the various services provided by the OS. (5)

(b) Why distributed operating systems are more reliable ? Discuss in brief. (5)

II. (a) Explain the layered structure of operating system with the help of a diagram. (5)

(b) What are the key features and applications of Parallel, Time Sharing and Real time systems ? (5)

SECTION–B

III. State and explain the necessary condition that lead to deadlock situation. Explain the working of banker's algorithm for deadlock avoidance with suitable examples. (10)

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IV. (a) What is PCB and its role in job scheduling? Describe in brief the various types of schedulers used by any operating system. (5)

(b) Consider the set of process <pl, p2, p3, p4, p5> with the length of the cpu burst <10, l, 2, l, 5> and they arrive in the same order at same time. Find out the turn around and waiting time for each process using FCFS and SJF. (5)

SECTION–C

V. (a) What is demand paging? Describe any two page replacement policies. (5)

(b) What are the major advantages of partitioned allocation? (5)

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VI. Elaborate the basic concepts about paging and segmentation. Compare the pure segmentation, and pure paging with respect to the following issues : (10)

(a) External and Internal fragmentation.

(b) Ability to share code across processes.

SECTION–D

VII. Define the term file, directory and the various operations performed on them. Explain in detail the various file allocation methods along with their merits and demerits. (10)

VIII. Discuss various disk management policies. Explain the use of swap space management ? (10)

IX. Writ
(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)
(j)

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SECTION–E

IX. Write on the following briefly :

(a) What is batch processing?

(b) Define turn-around time.

(c) What is virtual memory and its need?

(d) List the techniques used for process synchronization.

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(e) Under what circumstances, it is better using time-sharing system rather than a personal computer or single-user workstations.

(f) What do you mean by external fragmentation?

(g) Define the term: process and program.

(h) What is starvation and its solution?

(i) What is thrashing and how it is handled?

(j) What are the main parts of the UNIX Operating system?

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Department of Electronics and Communication, *Punjabi University, Patiala.*

MST-Retest Signals and Systems *(ECE-207)*

B.Tech. IInd Year (ECE, 4th Semester, *Groups EC1-EC6)*

Time: 1 hour **M. Marks: 15**

Note: ***Question number should be clearly mentioned strictly according to the pattern of the question paper only. Use of calculator is allowed.***

SECTION- A (Attempt all) (1x5)

Q. I (a) State the importance of Central Limit Theorem in probability and statistics.

(b) What is advantage of convolution sum w.r.t LTI systems? Give its equation.

(c) Draw and explain the autocorrelation of a rectangular pulse.

(d) What is the difference between ensemble and time average? What is the condition when they become equal?

(e) What is the problem with continuous unit step function? How can it be interpreted mathematically?

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SECTION-B (Attempt any two questions)

Q.II Determine the impulse response *h(t)* of the system given by the differential equation $\frac{d^2y(t)}{dt^2}+3\frac{dy(t)}{dt}+2y(t)=x(t)$ with all initial conditions set to be zero. (5)

Q. III (a) State and prove the Parseval's Theorem.

(b) Differentiate between strict sense stationary and weakly stationary random processes.

(c) Discuss Noise Figure (2+2+1)

Q.IV The pdf of Rayleigh distribution is given as: $f_R(r)=\frac{r}{\sigma^2}\exp\left(-r^2/2\sigma^2\right), \quad r\geq 0$

Find the CDF and mean of this distribution. Discuss the shape of this pdf and its significance. (5)

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Department of Electronics and Communication, Punjabi University, Patiala.

MST-I Signals and Systems (ECE-207)

B.Tech. IInd Year (ECE, 4th Semester, Groups EC1-EC6)

Time: 1 hour **M. Marks: 15**

Note: ***Question number should be clearly mentioned strictly according to the pattern of the question paper only. Use of calculator is allowed.***

SECTION- A (Attempt all) (1x5)

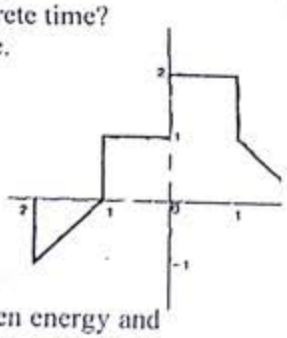
Q. I (a) Are all discrete time sinusoidal signals periodic? Explain the reason.

(b) What is the difference of unit impulse signal in continuous and discrete time?

(c) Discuss the properties of convolution and their physical significance.

(d) Define the convolutional integral and give its significance.

(e) Given a continuous time signal x (t) in the figure, sketch $x(1-\frac{t}{3})$



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SECTION-B (Attempt any two questions)

Q.II (a) Discuss the various continuous time signals. Also differentiate between energy and power signals.

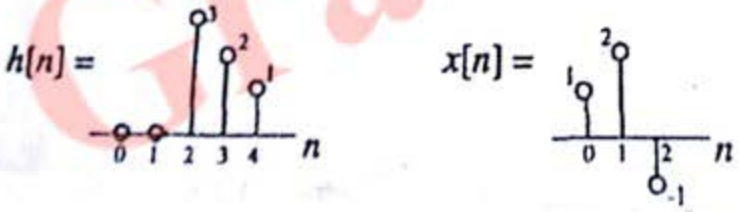
(b) Determine whether $x(n)=\left(\frac{1}{2}\right)^n u(n)$ is an energy signal or power signal and calculate its power/energy. (3+2)

Q..III (a) List the properties of systems and explain any two of them in detail.

(b) Determine the fundamental frequency and period of the following waveform:

$$x(t)=\sin\left(\frac{5\pi t}{6}\right)+\cos\left(\frac{3\pi t}{4}\right)+\sin\left(\frac{\pi t}{3}\right)$$ (2.5+2.5)

Q.IV Discuss the representation of a signal in terms of impulses. Find the convolution x[n]*h[n] from the waveforms given below: (2+3)



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Department of Electronics and Communication, Punjabi University, Patiala.

MST-I Signals and Systems (ECE-207)

B.Tech. IInd Year (ECE, 4th Semester, Groups EC1-EC6)

Time: 1 hour **M. Marks: 15**

Note: ***Question number should be clearly mentioned strictly according to the pattern of the question paper only. Use of calculator is allowed.***

SECTION- A (Attempt all) (1x5)

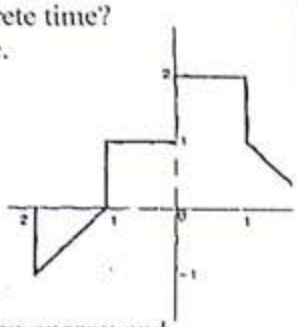
Q. I (a) Are all discrete time sinusoidal signals periodic? Explain the reason.

(b) What is the difference of unit impulse signal in continuous and discrete time?

(c) Discuss the properties of convolution and their physical significance.

(d) Define the convolutional integral and give its significance.

(e) Given a continuous time signal x (t) in the figure, sketch $x(1-\frac{t}{3})$



SECTION-B (Attempt any two questions)

Q.II (a) Discuss the basic continuous time signals. Also differentiate between energy and power signals.

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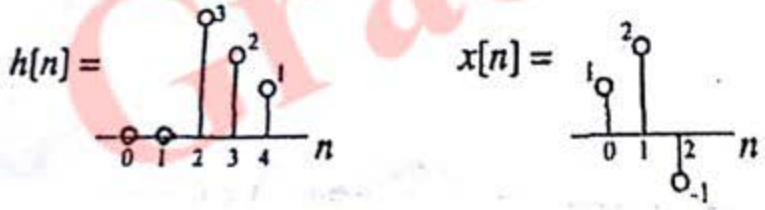
(b) Determine whether $x(n)=\left(\frac{1}{2}\right)^n u(n)$ is an energy signal or power signal and calculate its power/energy. (3+2)

Q..III (a) List the properties of systems and explain any two of them in detail.

(b) Determine the fundamental frequency and period of the following waveform:

$$x(t)=\sin\left(\frac{5\pi t}{6}\right)+\cos\left(\frac{3\pi t}{4}\right)+\sin\left(\frac{\pi t}{3}\right)$$ (2.5+2.5)

Q.IV Discuss the representation of a signal in terms of impulses. Find the convolution x[n]*h[n] from the waveforms given below: (2+3)



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506 P17 (20)

Total Pages : 3

PC–10683/MR

O-18/2056

SIGNALS AND SYSTEMS–207

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Question No. XI (Section-C) is compulsory.

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SECTION – A

I. Sketch the following signal :

$x(t) = A[u(t + a) - u(t - a)]$ for $a > 0$.

Also determine whether the given signal is a power signal or an energy signal or neither.

II. Discuss the representation of a signal in terms of impulses for continuous time system ?

III. Define Signal. Differentiate between Discrete time signals and Continuous time signals.

IV. What is the significance of Fourier Transform ? Explain the properties for continue Fourier transform.

V. Explain convolution integral for continuous time Linear time invariant systems. (3×5=15)

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SECTION – B

VI. Define Random variables, and differentiate betweem Discrete random variable and Continue random variable with suitable example.

VII. Explain the effect of noise in reactive circuits.

VIII. Calculate the RMS noise voltage at the input of a video amplifier using a device having 300 Ω equivalent noise resistance and 400 Ω input resistor. It is given that the bandwidth of the amplifier is 7 MHz and the ambient temperature is 27°C.

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IX. Write short notes on the following :

(a) Conditional probability.

(b) Ergodicity.

(c) Power spectral density.

X. Define Noise voltage. Calculate noise voltage when noise is generated due to several sources in series or parallel.

(3×5=15)

SECTION – C

(Compulsory Question)

XI. Attempt all the following :

(a) Define Noise figure.

(b) What is LTI system ?

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(c) What is Signal to noise ratio ?

(d) What do you mean by Fourier and Inverse Fourier transforms ?

(e) Define Thermal Noise.

(f) Differentiate between Auto-correlation and Cross-correlation function.

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(g) What do you mean by Stable system ?

(h) Write a short note on AWGN.

(i) Distinguish between Periodic and Aperiodic signals.

(j) Differentiate between Energy and Power signal.

(10×2=20)

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P1 (30) 414

CC = D 4.890

Total Pages : 3

PC-2685/NR

C-11/2114
SYSTEM ANALYSIS AND DESIGN–204
Semester–III

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *four* questions selecting *one* question from each Section. Section E is compulsory. All questions carry equal weightage.

SECTION–A

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I. (a) What do you mean by System? Discuss various characteristics of a system with the help of suitable example. (5)

(b) Why System Analyst is called Agent of change? Explain the role of System analyst in System development. (5)

II. Explain System development life-cycle with the help of suitable example. (10)

SECTION–B

III. (a) What is meant by Feasibility study? Why Operational feasibility is important to consider? (5)

(b) What is Information gathering? Explain various techniques for collecting information. (5)

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IV. Explain the following with the help of suitable example : (5×2=10)

(a) Cost Benefit Analysis.

(b) Structured Analysis.

SECTION–C

V. (a) Explain the difference between Logical design and Physical design with the help of suitable example. (5)

(b) Why design of User interface is very important ? Discuss with the help of suitable example. (5)

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VI. Explain the following with the help of suitable example : (5×2=10)

(a) Output Design.

(b) System Testing.

SECTION–D

VII. Explain various automated tools for System development with the help of block diagram. (10)

VIII. (a) What do you mean by System disaster? How does system recovery take place? (5)

(b) What is meant by Project scheduling? How does it help in developing a system? (5)

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SECTION–E
(Compulsory Question)

IX. Explain the following in brief :

(a) Elements of a System.

(b) System environment.

(c) Problem investigation.

(d) File organization.

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(e) Quality assurance.

(f) Software maintenance.

(g) Ethics in System development.

(h) System analysis.

(i) Implementation of Software.

(j) Jackson structured development. (1×10=10)

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MST – 2

Class: B.Tech CE 5th (C1 to C6)
Max.Marks: 15

Sub: DBMS(CPE-302)
Max. Time: 1 hr

Section - A

1. Attempt All Questions.

a) What are Checkpoints? (1 mark)
b) What is cascadless rollback? (1 marks)
c) Define [illegible] (1 mark)
d) Define multivalued dependency with example. (2 marks)

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Section –B (Attempt any two questions) (5 marks each)

2 Explain the Time stamp ordering technique.
3 Explain the concept of query optimization and also discuss that why SQL queries are converted into relational algebra before optimization?
4 Explain the similarities and differences between 3NF and BCNF with suitable example.

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Roll No. .....

Total No. of Pages : 6

CC : D 3.980

PC 3492-NR

C-20/2115
DATABASE MANAGEMENT SYSTEM–302
Semester–V

Time Allowed : Three Hours] [Maximum Marks : 50

Note :– Attempt *four* questions selecting *one* question from each Section A, B, C and D. Section E is compulsory.

SECTION–A

1. (a) What are the problems of Hierarchical Model ? Explain with examples. 5

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(b) What are the problems of File Based Systems ? 5

2. (a) A university registrar's office maintains data about the following entities :

(i) Courses, including number, title, credits, syllabus and prerequisites.

(ii) course offerings, including course number, year, semester, section number, instructor(s), timings and classroom.

(iii) students, including student-id, name and program.

(iv) instructors, including identification number, name, department and title.

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Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. 5

(b) Explain rules to convert E-R diagram to tables with example. 5

SECTION–B

3. (a) Study the following database carefully and normalize the database :

Name	License	Offense	Fine	Date	Challan_No
Ajay	L100	Parking	50	10.10.05	1000
Raj	L101	Red Light	100	12.10.05	1001
Ajay	L102	Red Light	100	13.10.05	1002
Rahat	L103	Backing-in	75	14.10.04	900
Raj	L101	Splitting	50	15.10.05	1003

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(i) Identify the functional dependence in the above database.

(ii) Indicate the final tables after 1NF, 2NF, 3NF and so on if applicable. Clearly indicate all the intermediate steps followed during process of normalization. 6

(b) What are objectives of normalization ? 4

4. (a) Explain referential and entity intergrity rules with examples. 4

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(b) The relation below provides some sample data for an agency called Hotel Services that supplies part-time/ temporary staff to hotels within the Strathclyde region. The relation lists the number of hours worked by each staff at various hotels. The relation is first normal form (1NF). Assuming that a contract is for one hotel only but a staff may work in more than one hotel on different contracts.

Normalize the database by indicating all intermediate steps :

Contracts

NIN	Contract No.	Hours	eName	hNo.	hLoc
1135	C1024	16	Smith.J	H25	East Kilbride
1057	C1025	16	Green.D	H4	Glasgow
1088	C1026	25	Green.D	H25	East Kilbride
1135	C1025	16	Smith.J	H4	Glasgow
1057	C1026	25	Green.D	H15	Glasgow
1088	C1027	25	Crowe.M	H25	East Kilbride

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6

SECTION–C

5. (a) Consider the following relational schema :

Staff (staffNo, name, dept, skillCode)

Skill (skillCode, description, chargeOutRate)

Project (projectNo, startDate, endDate, budget, projectManagerStaffNo)

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Booking (staffNo, projectNo, dateWorkedOn, timeWorkedOn)

where : Staff contains staff details and staffNo is the key.

Skill contains descriptions of skill codes (e.g. Programmer, Analyst, Manager, etc,) and the charge out rate per hour for that skill; the key is skillCode.

Project contains project details and projectNo is the key.

Booking contains details of the date and the number of hours that a member of staff worked on a project and the key is staffNo/projectNo.

Formulate the following queries using SQL :

(i) For all projects that were active in July 1995. list the staff name, project number and the date and number of hours worked on the project, ordered by staff name, within staff name by the project number and within project number by date.

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(ii) How many staff have the skill 'Programmer' ?

(iii) List all projects that have at least two staff booking to it.

(iv) Write Syntax for creation of table for Booking table.

(v) Delete the records where chargeOutRate > 100.

(vi) Drop primary key constraint from staff table. 6

(b) What are relational algebra operators ? Explain with examples. 4

7.

6. (a) Consider the following database :

Emp(empno, ename, job, sal, deptno)

Dept(Deptno, dname)

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Write SQL queries to perform the following :

(i) Find the name of employees whose salary is greater than the average salary of department number 10.

(ii) Find the name of employee getting highest salary.

(iii) Find the name of employees having two "s" in their name.

(iv) Find the ename and corresponding dname.

(v) Create table Dept with appropriate constraints

(vi) To display all constraint names applied on table dept. 6

(b) Consider the following relations :

First(A, B, C) Second(B, C)

(i) Write the equivalent expression of First Join Second in relational algebra.

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(ii) Can Union operation be performed between First and Second.

(iii) What are the resulted columns for First Divide Second ?

4

SECTION–D

7. (a) Explain in detail the internal action performed by DBMS for the following transaction :

Read(A,a)

a:=a-1000

Write(A,a)

Read(B,b)

b:=b+1000

Write(B,b) 5

(b) What are the problems of binary lock ? 5

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8. (a) Compare the deferred and immediate-modification versions of the log-based recovery scheme in terms of ease of implementation and overhead cost. 5

(b) What is meant by locking point ? Explain with example. 5

SECTION–E

9. (i) What are advantages of RDBMS ? 1

(ii) What is meant by foreign key ? How it is implemented ? 1

(iii) What do you mean by serializabilty ? 1

(iv) What is the use of having clause ? Give its syntax. 1

(v) What is meant by outer join ? Give example. 1

(vi) What is the need of checkpoint ? 1

(vii) Write short note on integrity constraints and consistency of data. 1

(viii) What is third normal form ? 1

(ix) Differentiate between functional dependence and fully functional dependence. 1

(x) Write short note on DCL. 1

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Marks:15

Department of Computer Engineering
B.Tech CE MST-1(Group 12,34,56)

Paper: CPE 302(*Database Management Systems*)

Time: 1Hr

Q.1 Note: Question 1 is compulsory. Attempt total three question each carries 5 marks.

a) What are the integrity rules of the relational discuss different constraints in brief.
b) What is the schema, Mapping and instance in database?
c) How do you represent a category/union type using EER diagram with the help of an example?
d) Write SQL DDL to implement domain integrity.
e) Explain different constraints applicable on Specialization/Generalization.

Q.2 Let us consider a banking business scenario for developing the ER model. Assume in a city
· There are multiple banks and each bank has many branches. Each branch has multiple customers
· Customers have various types of accounts
· Some customers also had taken different types of loans from these bank branches
· One customer can have multiple accounts and loans

Q.3 What do you means by data model Explain all with suitable Example

Q.4 Consider the following Relations:
Department(DNo, Dname, Loc)
Sales(Order_no, Client_No, Order_date)
Client(Client_no, name, Balance)

a) Create a table employee with attributes EID, EName, Salary, DNo . Apply primary Key on EID attribute. Apply Foreign Key on Ename attribute at table level based upon dname attribute of department table.
b) Display Maximum salaries of Employees department number wise where salary is greater than 16000
c) Retrieve all orders placed by a client named Arun from the sales table.
d) Retrive the name of employees who work in 'Delhi' and 'Chandigarh' and earn more than Rs. 5000.
e) Retrive the name of department whose total salaries paid are more than Rs. 100000.

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Organizational Behaviour BAS 201

B-Tech Computer Engg 3rd Semester

TIME ALLOWED: 1 HOUR

Maximum Marks: 15

Section A: Attempt all (1*5)

1. Define Projection Error.
2. What do you mean by transformational leadership?
3. Define Social loafing
4. Explain Weak [illegible]
5. Explain Operant conditioning.

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Section B: Attempt any two (2*5)

1. Define motivation. Name any three extrinsic motivational factors and also explain two factor theory.
2. Explain Path goal theory. Do you feel that Path Goal theory can be applied in the organization?
3. Who do you Type A or Type B person would be suited to run a health care facility? (Assume that the size of the hospital to be small, with 50-60 beds and 15 doctor's)

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MST-I

HSS-201 Management Practices & Organizational Behaviour

Class: B.Tech 2nd year (Civil)

Time: 1hour Max. Marks: 15

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1) Span of Control
2) Centralization
3) Formal and Informal Organizations
4) Planning Premises
5) Difference between Power & Authority 1*5= 5

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Section B (Attempt any two)

Q-2 "Management is regarded as art by some, science by others & in exact science by many. The truth seems to be somewhere in between". Explain

Q-3 Explain Social Responsibility with example.

Q-4 Explain decision-making process in detail. 2*5= 10

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MPOB- H 33-201

MST 1 (CE 2nd year)

Sec A (Attempt All questions) MAX MARKS: 15

Q-1 Write a short notes on:

a) Social responsibility of business
b) Scalar chain
c) Differentiate between policy and strategy.
d) Staffing
e) Difference be[illegible] 1*5=5

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Sec B (Attempt any two)

Q-2 Explain scientific management in detail? 5

Q-3 Delegation and Decentralization of authority are sisters to each other. Explain the statement with appropriate examples? 5

Q-4 Existence of an informal organisation within a formal organization, is the base of a competitive business, Explain the statement. 5

5

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Time: 1 Hour Max. Marks: 1

-201 Management Practices & Organization Behaviour Class: B.Tech 2nd year (Civi

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1) Formal Organization
2) Semantic Ba
3) Programmed and Non- Programmed Decision making
4) MBO
5) Difference between Delegation & Decentralization.

1*5=

Section B (Attempt any two)

Q-2 What is Social Responsibility and explain it with example.
Q-3 Define Communication. Explain in detail the process of communication.
Q-4 State the contributions of Administrative Management .

2*5= 10

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Department of Basic & Applied Sciences

IInd MST (B.Tech.-1st Year), Applied Physics-II (BAS-104)

Time: 1 hr. **Max. Marks: 15**

Note: Students must mention their group on the top of answer sheet.

Q1. (a) What do you mean by thermodynamic probability of a macrostate?
(b) What is the difference between Fermions and Bosons?
(c) What are ferroelectric materials?
(d) Draw (101) plane.
(e) What do you mean by nanoparticles? **(1×5=5)**

Q2. Derive Clausius Mossotti relation. **(3)**

Q3. For O_2 gas at room temperature, calculate the most probable and rms velocities. Given $k = 1.38\times10^{-16}$ ergs/K and $N = 6.02 \times 10^{23}$ mole^{-1}. **(2)**

Q4. What do you mean by black body radiations? Derive the energy distribution function for a photon gas using Bose-Einstein distribution function?

OR

What is Meissner effect? Derive the London's equations for superconductors. **(5)**

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Punjabi University, Patiala

Department of Civil Engineering

B.Tech-Civil (4Semester) CED, April, 2016

Time: 1 hours. MM: 15

Sub:Solid Mechanics

Faculty: Ravinder Sandhu /Bikramjit Singh

Section –A (Attempt all Questions)

Ques: 1 (a) Define point of contra flexure and maximum bending moment? (1)

(b) In a simply supported beam carrying a uniformly distributed load of 'w' per unit run over the whole span, the maximum B.M will be? (1)

(c) The strength of the beam mainly depends on _____ (1)

(d) Find section modulus for hollow rectangular section and hollow circular section? (2)

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Section –B (Attempt any two questions)

Ques: 2 A simply supported beam of 16 m effective span carries the concentrated loads of 4kN, 5 kN, and 3 kN at distances 3,7,and 11 m resptively from left support. Calulate maximum shear force and bending moment. Draw S.F and B.M diagrams. (5)

Ques: 3 2 wooden planks 150 mm x 50mm each are connected to form a T-section of a beam. If a moment of 3.4 kNm is applied around the horizontal neutral axis, inducing tension below the neutral axis. Find the stresses at the extreme fibers of the cross section. Also calculate the total tensile force on the cross section. (5)

Ques: 4 A girder of uniform section and constant depth is freely supported over a span of 3 m. If the point load at the mid span is 30kN and $I_{xx}=15.614 \times 10^{-6}$ m^4. Calculate:

1. The central deflection
2. The slopes at the ends of the beams

Take E=200GN/m^2. (5)

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A 604

Punjabi University, Patiala

Department of Civil Engineering

B.Tech-Civil (4Semester) C.E.D. Feb. 2016 Sub:Solid Mechanics

Time: 1 hours. MM: 15 Faculty: Ravinder Sandhu Bikramjit Singh

Section –A (Attempt all Questions)

Ques: 1 (a) Explain Stress –strain curve for ductile materials with neat diagram. (2)

(b) Explain poisson's ratio.(1)

(c) What is a composite section. Explain the procedure for finding the stresses developed when a composite section is subjected to an axial load.(1)

(d) Give the expression for elongation due to self weight of tapering sections (Circular and Rectangular).(1)

Section –B (Attempt any two questions) **[2x5]**

Ques: 2 (a) Determine the Poisson's ratio and bulk modulus of a material ,for which Young's Modulus is 1.2×10^5 N/mm^2 and modulus of rigidity is 4.8×10^4 N/mm^2. (2.5)

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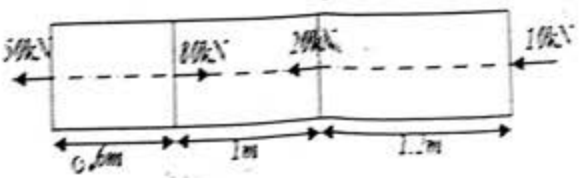
(b) A metallic bar 300mm x 100mm x 40mm is subjected to a force of 5 kN (tensile), 6 kN (tensile), 4 kN (tensile), along x, y and z directions respectively. Determine the change in volume of the block. Take E = 2×10^5 N/mm^2 and Poisson's ratio =0.25. (2.5)

Ques:3 Three bars made of copper ,zinc and aluminium are of equal length and have cross section 500, 750 and 1000 square mm respectively. They are rigidly connected at their ends. If this compound member is subjected to a longitudinal pull of 250 kN, estimate the proportional of the load carried on each rod and the induced stresses. Take the value of E for copper = 1.3×10^5 N/mm^2 and for Aluminium= 0.8×10^5 N/mm^2. (5)

Ques:4 Determine the change in length stating increase or decrease of a bar of uniform cross- sectional area of 1000 mm^2 subjected to loads shown below. E= 0.8×10^4 kN/cm^2.



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$P_{11} =$ 8

PUNJABI UNIVERSITY, PATIALA

CIVIL ENGINEERING DEPARTMENT(4th Semester)

SUB: H[illegible] MM:15

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SECTION- A

Attempt all questions(one mark each)

1. Define hydrology and its importance.
2. Explain the hydrologic cycle.
3. What are the different forms of precipitation?
4. Difference between convective and orographic precipitation.
5. What are the errors in rain gauge measurement.

SECTION- B

Attempt any two questions(5*2)

1. What are the various types of rain gauges and explain any one of them.
2. There are four rain gauge stations existing in the catchment of a river. The average annual values at these stations are 800, 620, 400 and 540 mm respectively.

   (a) Determine the optimum number of rain gauges in the catchment, if it is desired to limit the error in the mean value of rainfall in the catchment to 10%.
   (b) How many more gauges will then be required to be installed

3. Explain the various methods for measuring mean rainfall over a drainage basin.

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PUNJABI UNIVERSITY, PATIALA

CIVIL ENGINEERING DEPARTMENT (4th Semester)

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SUB: HYDROLOGY AND GROUND WATER (CVE_208) **MM:15**

SECTION- A

Attempt all questions(one mark each)

1. Define hydrology and its importance.
2. Explain the hydrologic cycle.
3. What are the different forms of precipitation?
4. Difference between convective and orographic precipitation.
5. What are the errors in rain gauge measurement.

SECTION- B

Attempt any two questions(5*2)

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3. Explain the various methods for measuring mean rainfall over a drainage basin.

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PUNJABI UNIVERSITY, PATIALA
CIVIL ENGINEERING DEPARTMENT (4th Semester)
SUB: HYDROLOGY AND GROUND WATER (CVE_208) **MM:15**

SECTION- A

Attempt all questions(one mark each)

1. Difference between transpiration and evapotranspiration.
2. What are the factors affecting run-off.
3. Difference between confined and unconfined aquifer ?
4. What do you mean by darcy's law?
5. What do you mean by base flow separation and name the methods for finding baseflow sepration?

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SECTION- B

Attempt any two questions(5*2)

1. **(a)** Explain the various types of reservoirs.
   (b) Explain selection of reservoir site.

2. An aquifer of 20m average thickness is overlain by an impermeable layer of 25 m thickness. A test well of 0.5 m diameter and two observation wells at a distance of 20 m and 70 m from the test well are drilled through the aquifer. After pumping at a rate of 0.1 m^3/ sec for a long time, the following drawdowns are stabilized in these wells: First observation well, 4 m; second observation well, 3 m. Determine the coefficient of permeability and drawdown in the test well.

3. Two storms each of 6-h duration and having rainfall excess values of 3.0 and 2.0 cm respectively occur successively. The 2-cm ER rain follows the 3-cm rain. Calculate the resulting DRH. Ordinates of 6-h unit hydrograph for a catchment are given below:

Time(h)	0	3	6	9	12	15	18	24	30	26	42	48	54	60	69
UH ordinate (m^3/s)	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

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PUNJABI UNIVERSITY, PATIALA

CIVIL ENGINEERING DEPARTMENT (4th Semester)

SUB: HYDROLOGY AND GROUND WATER (CVE_208) **MM:15**

SECTION- A

Attempt all questions(one mark each)

1. Difference between transpiration and evapotranspiration.
2. What are the factors affecting run-off.
3. Difference between confined and unconfined aquifer ?
4. What do you mean by darcy's law?
5. What do you [illegible] finding baseflow sepration?

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SECTION- B

Attempt any two questions(5*2)

1. (a) Explain the various types of reservoirs.
   (b) Explain selection of reservoir site.

2. An aquifer of 20m average thickness is overlain by an impermeable layer of 25 m thickness. A test well of 0.5 m diameter and two observation wells at a distance of 20 m and 70 m from the test well are drilled through the aquifer. After pumping at a rate of 0.1 m^3/sec for a long time, the following drawdowns are stabilized in these wells: First observation well, 4 m; second observation well, 3 m. Determine the coefficient of permeability and drawdown in the test well.

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UH ordinate (m^3/s)	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

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Roll No. ..... Total No. of Pages : 2

PC 10714-MR

O-18/2056

HYDROLOGY AND GROUND WATER–208

Semester–IV

Time Allowed : Three Hours] [Maximum Marks : 50

Note: The candidates are required to attempt any *six* questions selecting *three* questions each from Sections A and B. Section C is compulsory.

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SECTION–A (From Section A of the Syllabus)

1. Explain the Hydraulic Cycle in nature with the help of a neat sketch, indicating its various phases.

2. Distinguish between recording and non-recording rain-gauges, giving examples of such gauges used in India.

3. A reservoir had an average surface area of 20 km² during June 1982. In that month the mean rate of inflow = 10 m³/s, outflow = 15 m³/s, outflow = 15 m³/s, monthly rainfall = 10 cm and change in storage = 16 million m³. Assuming the seepage losses to be 1.8 cm, estimate the evaporation in that month.

4. How do you determine the yield from a catchment and arrive at the capacity of a tank ?

5. Describe the S-curve method of developing a 6-h Unit Hydrograph by using 12-h Unit Hydrograph of the catchment. 3×5=15

SECTION–B (From Section–B of the Syllabus)

6. Explain reservoir sedimentation and its control.

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Roll No. Total No. of Pages : 2

PC 10714-MR

O-18/2056

HYDROLOGY AND GROUND WATER–208

Semester–IV

Time Allowed : Three Hours] [Maximum Marks : 50

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3×5=15

SECTION–B (From Section–B of the Syllabus)

6. Explain reservoir sedimentation and its control.

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7. A catchment area 120 ha has a time of concentration of 30 min and runoff coefficient of 0.3. If a storm of duration 45 min results in 3.0 cm of rain over the catchment estimate the resulting peak flow rate.

8. Explain the behavior of water level in wells in confined aquifers due to changes in the atmospheric pressure.

9. The aquifer properties S and T of a confined aquifer in which a well is driven are known. Explain a procedure to calculate the draw down at a location away from the well at any instant after the pump has started.

10. Describe the method of construction of open wells in rocky sub strata. 3×5=15

SECTION–C (Common from whole syllabus)

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11. (a) Explain 'Hydrologic Equation'.

(b) Define different types of Precipitation. Explain mean precipitation.

(c) Define Infiltration indices.

(d) Name the methods for estimation of Runoff.

(e) What are the three basic propositions of the unit hydrograph theory?

(f) Explain Reservoir yield.

(g) Name the methods to determine the maximum flood discharge.

(h) Define Aquiclude and Aquifuge, site examples.

(i) Explain Hydraulics of Open Wells and define specific capacity of a well.

(j) Define specific yield of an aquifer. 10×2=20

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7. A catchment area 120 ha has a time of concentration of 30 min and runoff coefficient of 0.3. If a storm of duration 45 min results in 3.0 cm of rain over the catchment estimate the resulting peak flow rate.

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10. Describe the method of construction of open wells in rocky sub strata. 3×5=15

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SECTION-C (Covering Complete Syllabus)

11. (a) Explain 'Hydrologic Equation'.

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(c) Define Infiltration indices.

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(g) Name the methods to determine the maximum flood discharge.

(h) Define Aquiclude and Aquifuge, site examples.

(i) Explain Hydraulics of Open Wells and define specific capacity of a well.

(j) Define specific yield of an aquifer. 10×2=20

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PUNJABI UNIVERSITY, PATIALA
CIVIL ENGINEERING DEPARTMENT (4th Semester)

SUB: HYDROLOGY AND GROUND WATER (CVE_208) **MM:15**

SECTION- A

Attempt all questions(one mark each)

1. Define hydrology and its importance.
2. Explain the hydrologic cycle.
3. What are the different forms of precipitation?
4. Difference between convective and orographic precipitation.
5. What are the errors in rain gauge measurement.

SECTION- B

Attempt any two questions(5*2)

1. What are the various types of rain gauges and explain any one of them.
2. There are four rain gauge stations existing in the catchment of a river. The average annual values at these stations are 800, 620, 400 and 540 mm respectively.

   (a) Determine the optimum number of rain gauges in the catchment, if it is desired to limit the error in the mean value of rainfall in the catchment to 10%.
   (b) How many more gauges will then be required to be installed

3. Explain the various methods for measuring mean rainfall over a drainage basin.

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Roll No. .

Total No. of Pages : 2

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HYDROLOGY AND GROUND WATER–208

Semester–IV

Time Allowed : Three Hours] [Maximum Marks : 50

Note : The candidates are required to attempt any *six* questions selecting *three* questions each from Sections A and B. Section C is compulsory.

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SECTION–A (From Section–A of the Syllabus)

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3×5=15

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6. Explain reservoir sedimentation and its control.

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7. A catchment area 120 ha has a time of concentration of 30 min and runoff coefficient of 0.3. If a storm of duration 45 min results in 3.0 cm of rain over the catchment estimate the resulting peak flow rate.

8. Explain the behavior of water level in wells in confined aquifers due to changes in the atmospheric pressure.

9. The aquifer properties S and T of a confined aquifer in which a well is driven are known. Explain a procedure to calculate the draw down at a location away from the well at any instant after the pump has started.

10. Describe the method of construction of open wells in rocky sub strata. 3×5=15

SECTION–C (Common from whole syllabus)

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11. (a) Explain Hydrologic Equation.

(b) Define different types of Precipitation. Explain mean precipitation.

(c) Define Infiltration indices.

(d) Name the methods for estimation of Runoff.

(e) What are the three basic propositions of the unit hydrograph theory?

(f) Explain Reservoir yield.

(g) Name the methods to determine the maximum flood discharge.

(h) Define Aquiclude and Aquifuge, site examples.

(i) Explain Hydraulics of Open Wells and define specific capacity of a well.

(j) Define specific yield of an aquifer. 10×2=20

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Total Pages : 3

PC-4011/NR

G-2/2116

INTERNET AND WEB TECHNOLOGIES-401

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all. Select *one* question from each section A, B, C, D. Section E is compulsory.

SECTION–A

I. (a) Write a program to create a web page on the internet.

(b) Differentiate between Internet, intranet and extranet. (5×2=10)

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II. What is E-Mail? Explain the use of telnet and IRC for sending E-Mail message? (10)

SECTION–B

III. Define computer networks. Discuss various types of *networks* topologies in computer network and also discuss the advantages and disadvantages of each topologies? (10)

IV. (a) What is a proxy server? Explain the advantages of using Proxy server.

(b) Differentiate between ATM and PPP. (5×2=10)

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SECTION–C

V. (a) Differentiate between method overloading and overriding.

(b) What is Exception handling? How we can through User defined exceptions like Number is positive. (5×2=10)

VI. (a) Explain the use of DTD in XML document.

(b) Explain various steps of servlet life cycle. (5×2=10)

SECTION–D

VII. (a) Differentiate between JavaScript and Java.

(b) What are the three visibility keywords of a property or method in a PHP class? (5×2=10)

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VIII. (a) What are the features of JavaScript?

(b) Write a JavaScript program to find the factorial of a number. (5×2=10)

SECTION–E
(Compulsory Question)

IX. (a) In OSI systems, IP-routing is dealt with .....

(b) Gigabit ethernet uses ..... bit physical addresses.

(c) FDDI stands for .....

(d) For handling user interaction ..... side scripting is useful.

(e) For inline images ..... tag is used in an HTML document.

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(f) Define protocols.

(g) What is the use of this keyword in JavaScript?

(h) What is the difference between class and interface?

(i) Write syntax to get current date in JavaScript?

(j) Write a difference between XML and HTML.

(10×1=10)

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(41)

Department of Computer Engineering

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B.Tech-IV (Comput[illegible]) M.S.T.-I

Time: 1Hr Note: Section A is compulsory. Attempt any two in Section B. Max Marks: 15

Section A

1. Write Short Note on:
   1. Extranet 2. BRI 3. POP 4. Proxy Server 5. IRC 1X5= 5

Section B

2. What are the three layers in the ATM protocol? Explain 5
3. Explain IP addressing schema with suitable example. 5
4. Define Internet and explain different phases of its Growth. 5

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Department of Computer Engineering

B.Tech-IV (Computer Engg.) Subject: IWT Paper: CPE-431 M.S.T.-II

Time: Hr Note: Section A is Compulsory. Attempt any two in Section B. Max Marks: 15

Section A

1. Write Short Note on: 1X5= 5
   1. PHP 2. JDBC 3. Image Tag 4. .NET 5. Class

Section B

2. Explain **List, Frame** and **Form** tags with suitable Example. 5
3. What are different forms of inheritance? Does java support all of them? Use Example 5
4. What is the use of Java Script? Write a program to add two numbers using java Script. 5

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Roll No. .....1159.....

Total Pages : 3

4012/NR

G-2/2116

JAVA PROGRAMMING

Paper–402

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. What is Inheritance? Explain various types of inheritance with suitable examples.

2. What is Multi-threading? State and explain the methods used for Thread Synchronization.

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SECTION—B

3. What is a stream? Describe the major tasks of input and output Stream classes. Also distinguish between the follwing :

   (a) InputStream and Reader classes

   (b) OutputStream and Writer classes.

4. Explain in detail the Windows class hierarchy as defined by AWT. What are Frame windows?

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SECTION—C

5. What are the basic steps for using JDBC to access a Database? Explain briefly with syntax.

6. What is J2EE? Elaborate on the component based architecture of J2EE.

SECTION—D

7. What is the need for Session tracking in the Servlet? What are the different techniques used for Session tracking?

8. (a) Explain the lifecycle of Stateless Session Bean.

   (b) What are the various ways of passing parameters in EJB? Briefly discuss each.

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SECTION—D

9. (i) Define method overriding.

(ii) List any four controls from java.awt package.

(iii) What is Prepared Statement?

(iv) What are the advantages of using JSP over Servlets?

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(v) What is an Applet?

(vi) What are the commonly used classes of java.sql package?

(vii) List all properties of Java Beans.

(viii) What is a Constructor? How is a constructor different from a Method?

(ix) What is Socket programming?

(x) What is JDBC-ODBC bridge?

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Department of Computer Engineering

Punjabi University, Patiala

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MST-1

Java Programming (CPE-402)

SECTION-A (1 mark each) (Do all)

Q1) Why Java does not support multiple inheritance?

Q2) What is the need of super and this keywords?

Q3) To prevent any method from overriding we declare the method as_____.

Q4) What is an abstract class?

Q5) An interface can implement another interface. True/ False.

SECTION-B (5 Marks each)

Q1) Discuss in detail the salient features of JAVA language.

OR

Give the syntax of Applet tag. Explain its constituents.

Q2) Explain how to define, extend, implement and access an interface.

OR

Explain Exception Handling Mechanism in detail.

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Roll No. .....

Total Pages : 3

CC : D 3.980

3495/NR

C–20/2115

MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

Paper–305

Sem.–V

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt one question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

1. Define Address Bus, Data Bus and Control Bus. Explain their operations in Microprocessor.

2. **Draw block diagram** of ROM chip and explain its Read operation through timing diagram. 1×10

SECTION–B

3. (a) Explain Status flags of 8085 Microprocessor with examples.

   (b) Draw and explain the timing diagram of op code fetch cycle.

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4. Draw Pin out diagram of 8085 Microprocessor. Explain the function of each pin in detail. 1×10

SECTION–C

5. (a) Write an Assembly Language program to add two 2-digits BCD Number.

   (b) With suitable examples, explain, how I/O devices are connected using memory mapped I/O and peripheral I/O.

6. Design an interface circuit needed to connect DIP switch as an input device and display the value of the key pressed using a 7 segment LED display. Using 8085 Microprocessor system, write a program to implement the same. 1×10

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SECTION–D

7. Draw the block diagram of 8259 Interrupt controller and explain the function of each block.

8. Describe the operation of 8253 Timer along with its various modes. 1×10

SECTION–E

9. (a) What is the need for *ALE signal* in 8085 Microprocessor?

   (b) Define Addressing modes.

   (c) What is the significance of I/O ports?

(d) Define

(e) Compa transfe

(f) Write and M

(g) Expla exam

(i) S

(ii)

(h) Defi

(i) Wha Mic

(j) Wh

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(d) Define Subroutine. How it is useful?

(e) Compare parallel and serial type of Data transfer.

(f) Write the difference between Microprocessor and Microcontroller.

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(g) Explain the following instructions with examples :

(i) STA address

(ii) MVI A, data.

(h) Define Instruction cycle.

(i) What is the function of SIM instruction in 8085 Microprocessor?

(j) Why Address bus is unidirectional? 10×1

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10 P-30 565

Dept. of Computer Engg.

(CPE-305) Microprocessors & Assembly Languages(MALP) CE-3rd year(6th Semester)

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M.M.15

Section A is compulsory. Attempt any two ques each from Section B

Section-A(1*5=5M)

1. Define
   a) Tri-State Logic
   b) Instruction Format
   c) State Transition Diagrams
   d) Memories
   e) Difference between Address Bus And Data Bus

Section-B(2*5=10M)

2. What is Machine Cycle . Illustrate the concept of opcode fetch and read cycle in detail w.r.t an example.
3. Explain the concept of Addressing modes in detail with suitabie examples.
4. A) Explain the concept of stack with its operations in detail(3M)
   b) Diff. between PUSH & POP and LXI and MVI (2M)

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Department of Computer Engineering **MST-II**

Microprocessor & Assembly Language Prog. CPE-305 **Max.Marks-15**

B.Tech IIIrd Year 5th Sem. CE (All Groups)

Section-A (All questions are compulsory each carrying 1 mark)

1. Define RIM.
2. How memory and I/O devices are interfaced with microcomputer.
3. Can BCD adjustment be done in BCD subtraction and How.
4. Describe command words for 8259.
5. Difference between hardware and software interrupt.

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Section-B (Do any 2 questions each carrying 5 marks)

6. Explain the detailed structure of 8255A programmable peripheral interface with its pin configuration in detail.
7. WAP for Binary to ASCII code conversion.
8. Explain Interrupt driven data transfer and various types of interrupts.

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Numerical Methods-BAS 201 (CE & CIVIL-IV)

Max Marks: 15 Time: 1 hr

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Q. 1 (i) Show that eigen values of a skew-Hermitian matrix are either zero or purely imaginary.
(ii) Discuss Modified Euler's Method.
(iii) Given that $\log_{10}2 = 0.3010$, $\log_{10}3 = 0.4771$, $\log_{10}7 = 0.8451$, find the value of $\log_{10}33$.
(iv) Find all the eigen values of $\begin{bmatrix} 4 & 2 & 2 \\ 2 & 5 & 1 \\ 2 & 1 & 6 \end{bmatrix}$ using Jacobi Method. (1+1+1+2)

Section B (Attempt any Two questions)

Q. II Solve $\frac{dy}{dx} = \frac{1}{x+y}$, given is y(0) = 1 for y(0.1) and y(0.2), using Runge-Kutta method of fourth order.

Q. III From the following table of values of x and y, obtain dy/dx and d^2y/dx^2 for x = 1.6

X:	1.0	1.2	1.4	1.6	1.8	2.0	2.2
Y:	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250.

Q. IV Solve the boundary value problem $y'' + xy' + 1 = 0$ with boundary condition $y(0) = 0$, $y(1) = 0$ by taking $n = 4$

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M. S.T.I (Numerical Methods-BAS 201)

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Time: 1hr **Section-A** (Compulsory) **Max. Marks: 15**

Q. I (a) Discuss Newton-Raphson method for the system of non-liner equations.

(b) Define Partial Pivoting with an example.

(c) Give geometrical derivation of Newton Raphson method.

(d) Show that $x_{n+1} = \frac{1}{2}x_n\left(3-\frac{x_n^2}{\alpha}\right)$ has second order convergence near $\sqrt{\alpha}$.

(e) State sufficient condition for convergence of Iteration Method. (1X5)

SECTION-B (attempt any two)

Q. II Find the root of the equation $4\sin x = e^x$, using Regula-Falsi Method.

Q. III Solve the following system of equations by Factorization method

$2x - 6y + 8z = 24, \quad 3x + y + 2z = 16, \quad 5x + 4y - 3z = 2$

Q. IV Obtain order of convergence of Secant method. (2X5)

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M. S.T-I (Numerical Methods-BAS 201)

For CE & CIVIL II year

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Time: 1hr **Max. Marks: 15**

Section-A (Compulsory)

Q. I (a) Discuss Newton-Raphson method for the system of non-liner equations.

(b) Define Partial Pivoting with an example.

(c) Give geometrical derivation of Newton Raphson method.

(d) Show that $x_{n+1} = \frac{1}{2} x_n \left(3 - \frac{x_n^2}{\alpha}\right)$ has second order convergence near $\sqrt{\alpha}$.

(e) State sufficient condition for convergence of Iteration Method. (1X5)

SECTION-B (attempt any two)

Q. II Find the root of the equation $4 \sin x = e^x$, using Regula-Falsi Method.

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Numerical Methods-BAS 201 (CE & CIVIL-IV) Time: 1 hr

Max Marks:15

Section A (All Questions are compulsory)

Q. 1 (i) Show that eigen values of a skew-Hermitian matrix are either zero or purely imaginary.

(ii) Discuss Modified Euler's Method.

(iii) Given that $\log_{10}2 = 0.3010$, $\log_{10}3 = 0.4771$, $\log_{10}7 = 0.8451$, find the value of $\log_{10}33$.

(iv) Find all the eigen values of $\begin{bmatrix} 4 & 2 & 2 \\ 2 & 5 & 1 \\ 2 & 1 & 6 \end{bmatrix}$ using Jacobi Method. (1+1+1+2)

Section B (Attempt any Two questions)

Q. II Solve $\frac{dy}{dx} = \frac{1}{x+y}$, given is y(0) = 1 for y(0.1) and y(0.2), using Runge-Kutta method of fourth order.

Q. III From the following table of values of x and y, obtain dy/dx and d^2y/dx^2 for x = 1.6

X:	1.0	1.2	1.4	1.6	1.8	2.0	2.2
Y:	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250.

a3 Solve the boundary value prob

$y'' + xy' = 1$

with boundary cond. $y(0) = 0$, $y(1) = 0$ by

taking $h = 4$

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Total Pages : 4

4019/NR

G–2/2116

OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

Paper–410

Semester–VII

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Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

1. How can you relate Functional model to Object and Dynamic models ? Explain using example. 10

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2. (a) Explain the features of Object oriented systems and explain them. 5

(b) Design the DFD for Library Management system. 5

SECTION—B

3. (a) Develop an analysis model for Student Information system. 5

(b) Explain the rules for designing Associations [illegible] 5

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4. How Concurrency can be controlled during System design ? Explain all the methods. 10

SECTION—C

5. (a) Explain the difference among Bidirectional, Unidirectional and Reflexive Association. 5

(b) Differentiate between Association and Aggregation using example. 5

6. What do you mean by Class diagram ? Where is it used ? Also discuss the steps to draw the class

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SECTION—D

7. (a) Draw the activity diagram of ATM Machine system. 5

(b) Difference between Sequence diagram and Collaboration diagram. 5

8. Design the use case diagram, event state diagram and sequence diagram of Online Inventory Control system. 10

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SECTION—E

9. Answer the following questions : 10×1=10

(i) Write the advantages of Unified approach.

(ii) Define Abstraction and Modularity.

(iii) Differentiate between functional and non-functional requirements. Write a note on Physical packaging.

(iv) Differentiate between Static and Dynamic models.

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(v) Give an example of Binary Association with an Association class. Also specify the multiplicity.

(vi) List the building blocks of use case diagrams.

(vii) How the Global resources can be handled during System design ?

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(viii) Write a note on Polymorphism.

(ix) List the name of Modeling techniques for component diagrams.

(x) Write a note on Association and Aggregation.

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DEPARTMENT OF CIVIL ENGINEERING

10

MST-2 Subject-RMEG (CVE-206)

Note: Mention your group number on answer sheet. TIME: 1Hr

MM : 15

P11 = 8

Section-A 1x5=5

I. What is Rock bolting?
II. Explain the [illegible] through?
III. What do you mean by unconformity?
IV. What are shake waves?
V. What are dilatometers?

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Section-B 2x5 = 10

2) What are the in situ tests for testing the deformability of a rock mass .Describe pressure tunnel test in detail.

3) Describe in detail the Stage Method for Grouting .Also compare it with Packer Method of Grouting.

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DEPARTMENT OF CIVIL ENGINEERING

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MST-2 Subject-RMEG (CVE-206)

Note: Mention your group number on answer sheet.

TIME: 1Hr

MM : 15

Section-A

1x5=5

I. What is Rock bolting?
II. Explain the term glacial through?
III. What do you mean by unconformity?
IV. What are shake waves?
V. What are dilatometers?

Section-B

2x5 = 10

2) What are the in situ tests for testing the deformability of a rock mass .Describe pressure tunnel test in detail.

3) Describe in detail the Stage Method for Grouting .Also compare it with Packer Method of Grouting. .

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Total Pages : 3

PC-10712/MR

O-18/2056

ROCK MECHANICS AND ENGINEERING GEOLOGY-206

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Question No. XI (Section C) is compulsory.

SECTION – A

I. Give a detailed account of erosional work of rivers explaining principles and important features of river erosion.

II. How would you differentiate between Igneous, Sedimentary and Metamorphic rocks on the basis of texture and structure in hand specimens ? Give your answer in tabular form.

III. Discuss in detail the classification of joints on the basis of spatial relationships, geometry and origin with neat sketches.

IV. What do you mean by Unconformity ? What are its types ? Discuss in detail with neat sketches.

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V. Is it necessary to place the foundation of all bridges on rock ? How do you arrive at the required type of material and also the depth of foundation for a bridge in an alluvial river ? (3×5=15)

SECTION – B

VI. Write short notes on the following :
(i) Epicentre.
(ii) L-waves.
(iii) Magnitude of Earthquake.

VII. How would you find out the tensile strength of rock by Brazilian test ? Discuss with the help of neat sketches.

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VIII. How would you determine the strength of fissured rocks ? Discuss in detail.

IX. Why *in situ* tests are necessary for determination of rock properties ? How will you determine the deformability of rock by Plate load test ? Discuss in detail.

X. What do you mean by Rock bolting ? What are the situations where rock bolting is provided ? (3×5=15)

SECTION – C

(Compulsory Question)

XI. Write short notes on the following :

(a) Divsions of Geology.

(b) Chemical Weathering.

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(e) Glacial Moraines.

(d) Horst and Graben.

(e) Cleavage.

(f) Physical Properties of Minerals.

(g) Slate.

(h) Seismogram.

(i) Shear Tests on Rocks.

(j) RQD. *(10×2=20)*

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Total Pages : 3

PC-10712/MR

O-18/2056

ROCK MECHANICS AND ENGINEERING GEOLOGY–206

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Question No. XI (Section C) is compulsory.

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SECTION – A

I. Give a detailed account of erosive work of rivers explaining principles and important features of river erosion.

II. How would you differentiate between Igneous, Sedimentary and Metamorphic rocks on the basis of texture and structure in hand specimens ? Give your answer in tabular form.

III. Discuss in detail the classification of joints on the basis of spatial relationships, geometry and origin with neat sketches.

IV. What do you mean by Unconformity ? What are its types ? Discuss in detail with neat sketches.

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V. Is it necessary to place the foundation of all bridges on rock ? How do you arrive at the required type of material and also the depth of foundation for a bridge in an alluvial river ? (3×5=15)

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(ii) L-waves.

(iii) Magnitude of Earthquake.

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IX. Why *in situ* tests are necessary for determination of rock properties ? How will you determine the deformability of rock by Plate load test ? Discuss in detail.

X. What do you mean by Rock bolting ? What are the situations where rock bolting is provided ? (3×5=15)

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(Compulsory Question)

XI. Write short notes on the following :

(a) Divsions of Geology.

(b) Chemical Weathering.

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(c) Glacial Moraines.

(d) Horst and Graben.

(e) Cleavage.

(f) Physical Properties of Muscovite.

(g) Slate.

(h) Seismogram.

(i) Shear Tests on Rocks.

(j) RQD. (10×2=20)

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Total No. of Pages : 2

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PC 3496-NR

C-20/2115

SOFTWARE ENGINEERING–306

Semester–V

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt *five* questions in all selecting at least *one* question each from Sections A, B, C and Section D and the entire Section E.

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SECTION–A

1. What do you mean by the term 'Software Engineering' ? Discuss the evolution of software engineering. Why Engineering approach to software development ? 10

2. What are the central problems in Software requirement specification ? What are the basic activities performed during the requirement phase ? Discuss the characteristics of Software Requirement Specification. 10

SECTION–B

3. What is software configuration management ? Why is it important ? *Write a detailed note on the various activities performed in the software configuration management.* 10

4. *Discuss the following in detail :*
   (a) *Project scheduling* 5
   (b) *Team structure.* 5

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SECTION–C

5. Define term "Modularization". Why a system designed with high cohesion and low coupling is desired ? Also discuss in brief various types of cohesions. 10

6. Write short notes on the following : 5 5
   (a) Abstraction
   (b) Polymorphism.

SECTION–D

7. What do you mean by structured programming ? Discuss various constructs of structured programming. Also give the advantages and disadvantages of structured programming. 10

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8. What is the difference between black box testing and white box testing ? Discuss two methods of white box testing in detail. 10

SECTION–E

9. (a) What are the characteristics of software ? 1
   (b) What are the disadvantages of waterfall model ? 1
   (c) What is risk ? 1
   (d) What are the disadvantages of COCOMO model ? 1
   (e) Discuss the merits of SEI Capability Maturity Model. 1
   (f) What do you mean by structured design methodology ? 1
   (g) Define class and object. 1
   (h) What is inheritance ? List various types of inheritance. 1
   (i) What are the advantages of using standard programming styles ? 1
   (j) Differentiate between top down and bottom up approaches to coding. 1

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Dept. of CE, PhiUnivPta | B.Tech-III (CE) | MST-I | CPE-306 SOFTWARE ENGINEERING

Time: 1 hour | Date: 14 Sept'15 | MM: 15

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Q1 a. Differentiate between project, process and product.

b. What are the components of SRS?

b. Describe the role of 'Software Configuration Management Process'.

c. Differentiate between Top-Down and Bottom-Up techniques of process cost estimation.

e. List 5 software quality attributes. 5*1

Attempt any two questions:

Q2 Which development process model would you follow in following projects? Justify. Explain the steps of development you'd follow.

a. A highly reliable flight control system. There are many potential hazards in such system.

b. An online inventory management system for automobile industry. 2*2.5

Q3 Perform structured analysis for the requirements of an on-line social networking site. 5

Q4 Estimate the cost and development time of a database system for an office automationproject.

Project = organic (a=3.2, b = 1.05, c=0.38),

Estimated sizes of 4 modules to be implemented:

data entry	0.8 KLOC
data update	0.8 KLOC
query	1.0 KLOC
report generator	1.4 KLOC

Efforts are rated as follows (all others nominal, 1.0):

cost drivers	level	EAF
complexity	high	1.15
storage	high	1.06
experience	low	1.13
prog capabilities	low	1.17

5

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583 P10 (18)

Total Pages : 4

PC-10713/MR

O-18/2056

SOLID MECHANICS – 207
Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Q. No. XI (Section-C) is compulsory.

SECTION – A

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1. A solid steel bar 150 mm long and 20 mm diameter is placed inside an aluminium tube having 75 mm inside diameter and 100 mm outside diameter. The aluminium cylinder is 0.15 mm longer than the steel bar. An axial load of 600 kN is applied on the bar and the cylinder through rigid cover plates as shown in Fig. 1. Find the stresses developed in steel bar and the aluminum tube. Take E_{St} = 200 GPa, E_{Al} = 70 GPa. (5)

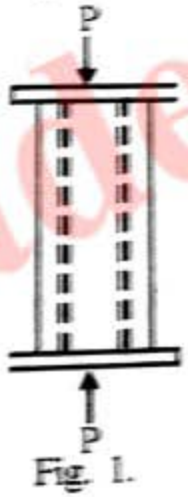

Fig. 1.

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611 P9 (8)

Total Pages : 4

PC-10713/MR

O-18/2056

SOLID MECHANICS – 207
Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Q. No. XI (Section-C) is compulsory.

SECTION – A

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I. A solid steel bar 300 mm long and 50 mm diameter is placed inside an aluminium tube having 75 mm inside diameter and 100 mm outside diameter. The aluminium cylinder is 0.15 mm longer than the steel bar. An axial load of 600 kN is applied on the bar and the cylinder through rigid cover plates as shown in Fig. 1. Find the stresses developed in steel bar and the aluminum tube.
Take E_{St} = 200 GPa, E_{Al} = 70 GPa. (5)

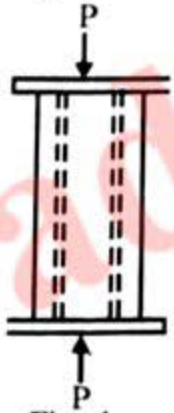

Fig. 1.

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II. The plane state of stress in which $\sigma_x = -75$ MPa, $\sigma_y = 15$ MPa, $\tau_{xy} = -60$ MPa, by using Mohr's circle, determine the following :

(i) The principal stresses and principal planes,

(ii) The maximum shear stress. (5)

III. Draw the shear force and bending moment diagram for the beam given in Fig. 2. (5)

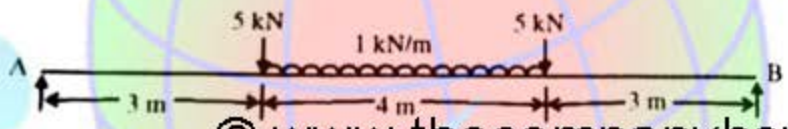

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Fig. 2.

IV. An I-section built up of steel plates welded together, has been used as a beam simply supported at the ends. The span of the beam is 6 m. The section of the beam is 200 mm × 400 mm overall. The size of flange is 200 mm × 20 mm at top and bottom, and the web is 360 mm × 10 mm. If the permissible bending stress is 150 MPa, determine the u.d.l. the beam can carry without exceeding the permissible stress. (5)

V. Prove that in the case of rectangular section, the maximum shear stress is 1.5 times the average shear stress. (5)

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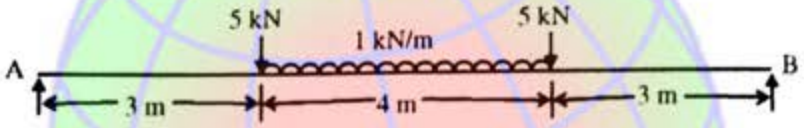

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SECTION – B

VI. A solid steel shaft 125 mm in diameter transmits 120 kW of power at 160 r.p.m. Find the maximum shear stress induced in the shaft. Also find the angle of twist in a length of 7.5 m. Take G = 80 GPa. (5)

VII. Explain the effect of gradually applied load and suddenly applied load on the strain energy developed in a material. (5)

VIII. A simply supported beam AB of span 4 m, carrying a load of 100 kN at its mid-point with cross-sectional moment of inertia of 36×10^6 mm^4 over the left half of span and 48×10^6 mm^4 over the right half of span. Find the slope at two supports and deflection under the load.
Take E = 200 GPa. (5)

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IX. Compare the crippling loads given by Euler's and Rankine's formula for a tubular steel strut 2.3 m long, having outer diameter 40 mm and inner diameter 35 mm, loaded through pin joints at each end. Take yield stress as 340 N/mm^2 and Rankine constant a = 1/7500. The modulus of elasticity of steel is 200 GPa. (5)

X. Using moment area theorem, compute the deflection at the centre and slope at the ends of a simply supported beam of span L and subjected to a u.d.l. over the entire span. The beam is of uniform cross-section with constant EI. (5)

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Take E = 200 GPa.

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IX. Compare the crippling loads given by Euler's and Rankine's formula for a tubular steel strut 2.3 m long, having outer diameter 40 mm and inner diameter 35 mm, loaded through pin joints at each end. Take yield stress as 340 N/mm^2 and Rankine constant a = 1/7500. The modulus of elasticity of steel is 200 GPa. (5)

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SECTION – C

(Compulsory Question)

XI. (a) Explain the behaviour of ductile material in a tensile stress. Also, draw its stress-strain diagram showing various stresses developed.

(b) Define the terms Shear force and Bending moment at a section.

(c) What is meant by the term 'Pure bending' ?

(d) What is Complementary shear stress ?

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(e) Explain the significance of Mohr's Stress circle.

(f) What is meant by Torsion ? Give the torsion equation, mentioning different symbols used.

(g) Define the term Stiffness.

(h) State Maxwells Reciprocal theorem.

(i) Define the terms Slenderness ratio and Radius of gyration.

(j) Mild steel has more toughness than high strength steel. Explain in terms of Strain energy. (2×10=20)

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Total Pages : 4

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O-18/2056

SOLID MECHANICS – 207
Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *seven* questions in all. Select *three* questions each from Section A and B. Q. No. XI (Section-C) is compulsory.

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SECTION – A

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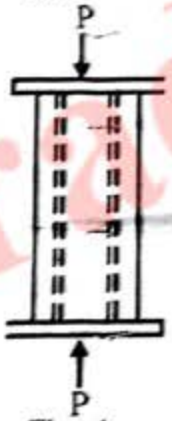

Fig. 1.

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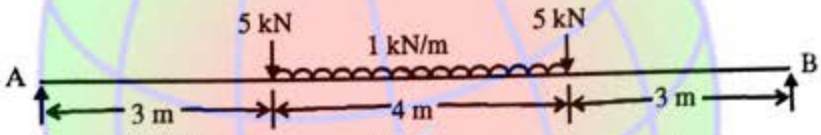

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(8) P11 = 8

Department of Civil Engineering
PUNJABI UNIVERSITY, PATIALA

MST -1

Survey-II (B.Tech Civil Engineering 4th Sem) Max.Marks-15

Time- 1 hour

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Note: Attempt all questions and carries 5 marks each

Q1. Explain The repetition method for measuring the horizontal angle in detail.

Q2. A man travels 139.6m from point A towards west and reaches point B. Calculate the latitude and departure of the line AB.

Q3. The elevation of the top (Q) of the signal on a hill, observations were made from two instrument stations P and R at a horizontal distance 100 m apart, the stations P and R being in line with Q. The angles of elevation of Q at P and R were 28° 42′ and 18° 6′ respectively. The staff readings upon the bench mark of elevation 287.28 m were respectively 2.87 m and 3.75 m when the instrument was at P and at R, the telescope being horizontal. Determine the elevation of the foot of the signal if the height of the signal above its base is 3 meters.

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Department of Civil Engineering

PUNJABI UNIVERSITY PATIALA

Survey-II (B.Tech Civil Engineering 4th Sem) **MST -1**

Time- 1 hour **Max.Marks-15**

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Department of Civil Engineering
PUNJABI UNIVERSITY, PATIALA

B.Tech IVth Sem
Survey-II

Time- 01 hour
Max.Marks-15

(Attempt all questions)

Q1. Two roads having a deviation angle of 45° 48' are to be joined by a 180m radius curve. Calculate the necessary data if the curve is to be set by perpendicular offsets method. Chainage of intersection of tangents is 3123.8 m. Assume 30 m chain.

Q2. Name various tape corrections to be applied during measurement of baseline? Explain any five.

Q3. a) Explain principal of stadia tachometry.

b) Draw various types of vertical curves.

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Department of Civil Engineering
PUNJABI UNIVERSITY, PATIALA

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Survey-II

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Total Pages : 3

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SURVEY – II

Paper–205

(Semester–IV)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *six* questions, selecting *three* questions each from Sections A and B. Section C is compulsory.

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SECTION – A

I. Explain the procedure for reiteration method of measuring horizontal angles.

II. For the traverse given below, check the closing error and correct the traverse by using Bowditch rule :

Line	Length	Bearing
AB	201.54	62° 42′
BC	189.68	154° 54′
CD	231.94	202° 32′
DE	272.55	281° 44′
EA	257.15	22° 15′

III. Explain the method of setting out a curve with the help of one and two theodolites.

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IV. What are the common errors encountered in the tachometry ? Explain the precautions to be taken to eliminate them.

V. Find the difference in elevation between stations P and Q for the data given below. (Anallactic lens is used in the tachometer)

Instrument Station	Staff Station	Vertical Angle	Hair Readings
A	P	+3°15′	1.355, 2.58, 3.935
	Q	−1°45′	0.985, 1.66, 2.335

(3×5=15)

SECTION – B

VI. Explain the basic principle of trigonometric levelling and the difference between plane and geodetic methods.

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VII. What is baseline ? Explain the different methods and corrections made for a baseline.

VIII. Explain the term reciprocal observation in trigonometric levelling and state its advantages.

IX. Write a short note about Indian Remote Sensing System.

X. What are the errors introduced in a GPS ? Explain in brief.

(3×5=15)

SECTION – C

(Compulsory Question)

XI. (a) What is meant by 'consecutive coordinates' and 'independent coordinates' ?

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(b) What is least count of a theodolite ? How can it be found out for a particular instrument ?

(c) What is versed sine of a curve ? Express it mathematically.

(d) Define the terms 'point of curve' and 'point of tangency'.

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(e) Differentiate between theodolite and tacheometer.

(f) What is subtense bar ?

(g) Does the effect of refraction remain constant ? Explain your answer.

(h) Differentiate between plane surveying and geodetic surveying.

(i) Define remote sensing with one example.

(j) What is satellite based positioning system ? (10×2=20)

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Total Pages : 3

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O-18/2056

SURVEY – II
Paper–205
(Semester–IV)

Time : Three Hours] [Maximum Marks : 50

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Department of Civil Engineering
PUNJABI UNIVERSITY, PATIALA

Time-01 hour
Max.Marks-15

B.Tech IVth Sem
Survey-II

(Attempt all questions)

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b) Draw various types of vertical curves.

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Total No. of Pages : 2

CC : D 3.980

PC 3491-NR

C-20/2115
SYSTEM PROGRAMMING—301
Semester—V

Time Allowed : Three Hours] [Maximum Marks : 50

Note :– The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. An assembly program can be divided into three sections : The data section, the bss section, the text section. Discuss each of these sections and their respective role in Assembly program. 10

2. Discuss structure of Assembly program, use of mnemonics and various types of instructions by citing appropriate examples. 10

SECTION—B

3. (a) Discuss role of Macro pre-processor with help of suitable example.

   (b) Discuss Macro language and its features. 5,5

4. What do you mean by single pass assembler ? Explain opcode table and symbol table generation in detail. 10

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SECTION—C

5. What do you mean by code optimization ? Discuss various techniques used to optimize code by citing suitable examples. 10

6. (a) Differentiate between interpreter and compiler.
   (b) Discuss each phase of compiler construction by taking suitable example. 5,5

SECTION—D

7. How operating system manages memory and processor ? Explain in detail by citing suitable examples. 10

8. Elaborate relocation and linking concepts : highlight linked and load time address translation by citing suitable examples. 10

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SECTION—E

9. Write very brief notes on the following :
   (i) Symbol Table
   (ii) Forward Reference
   (iii) Macro
   (iv) Loader
   (v) Linker
   (vi) Device Driver
   (vii) Interrupt
   (viii) Syntax analysis
   (ix) Instruction Pointer
   (x) Code section. 10×1=10

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C. CE,Pbi Univ. B.Tech-III(CE) MST-1 CPE-301 System Programming

1 hr MM:15

Difference between MAR and MBR
Advantage of machine language over other languages
why linking is needed once the program is translated? 1*3=3
Difference between application programming and system programming. 2*1=2
tempt any two questions
What is assembler? Explain pass1 and draw MOT table.
Write an assembly language program using literals. Expain use of literals.
What are Pseudo ops. Explain their use and POT table with example.(program and corresponding POT) 5*2=10

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DEPARTMENT OF COMPUTER ENGINEERING

SEMESTER 5TH, YEAR 3RD

PAPER: System Programming **MM:15**

SECTION -A

Q1 What is a Macro Call. Explain it with suitable example…….(1)

Q2 MDTC Stands for ----------?.....(1)

Q3 What is a Linker?.....(1)

Q4 What are the Different types of Operating system?.....(1)

SECTION –B (DO ANY TWO)

Q5 Differentiate between Compiler and Interpreter……(5)

Q6 Cost=Start-Finish+100.Explain it with 4 phases of Compiler……..(5)

Q7 Name the different Loading Schemes and Explain them in Detail……..(5)

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Roll No.

Total No. of Pages : 3

PC 10702-MR

O-18/2056

VISUAL PROGRAMMING USING VB .NET–206

(Common Paper, CE & Civil Engg.)

Semester-IV

Time Allowed : Three Hours] [Maximum Marks : 50

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Note : Section C is compulsory. Attempt any *six* questions by selecting *three* questions from Section A and *three* questions from Section B.

SECTION–A

1. Explain various looping statements of VB.Net with the help of suitable examples.

2. What is event driven programming ? Discuss some of the events supported by VB Objects.

3. What do you mean by Multiple Document Interface ? Write its features. What is its use in developing VB applications ?

4. Explain the steps involved in the development of a project in VB.

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Roll No. Total No. of Pages : 3

PC 10702-MR

O-18/2056

VISUAL PROGRAMMING USING VB .NET–206

(Common Paper, CE & Civil Engg.)

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Note : Section C is compulsory. Attempt any six questions by selecting *three* questions from Section A and *three* questions from Section B.

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5. Explain with the help of example nesting of if-then-else. How it differs from select case structure ? 3×5=15

SECTION–B

6. What do you mean by E-R modeling ? Explain various components of E-R model with examples.

7. How you can add properties, methods and events to a custom window control ? Discuss.

8. Describe various error handling methods available in VB.

9. Explain advantages and disadvantages of databases over traditional file system.

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10. What are DDL statements ? Discuss following DDL statements with suitable examples :

Create, Alter, Drop, Rename. 3×5=15

SECTION–C

11. (i) What are TCL statements ? Give examples.

(ii) Discuss architecture of DBMS.

(iii) What is the use of Radio Button and Check Box in a form ?

(iv) How you can create and refer objects in VB ?

(v) Differentiate between DDL and DML.

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5. Explain with the help of example nesting of if-then-else. How it differs from select case structure ? 3×5=15

SECTION–B

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(vi) How objects are created and referenced in VB programs ? Discuss.

(vii) Distinguish between Combo Box and List Box.

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(viii) Differentiate between logical and physical data independence.

(ix) What are the ways to pass arguments to a procedure ?

(x) Discuss openfile and savefile dialogs. 10×2=20

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P-11 594 (8)

BTech –2nd Sem **MST-1** **Time: 1 hour** **Max Marks: 15**

Subject: Visual Programming(CPE-206) **Department of Computer/Civil Engineering**

Section –A

1. Define following Controls: **(5 Marks)**
(a). TextBox (b). Label (c). Button (d). ListBox (e). Timer

Section –B (Do any Two Questions)

2. Explain Dot Net Framework Architecture. **(5 Marks)**
3. Explain various iterative statements available in vb.net with example. **(5 Marks)**
4. Define various types of arrays available in vb.net. **(5 Marks)**

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MM.15

Note:

Subject: Visual Programming using .net

Section-1is compulsory & attempt any one question from Section B

MST-II

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Section-A (1 mark each)

Q1. Define the following : **(5*1=5 marks)**

a. Database schema.

b. SQL syntax to rename a column in any given table.

c. Event procedure.

d. Rollback command in SQL.

e. Logical data independence.

Section-B (5 marks each)

Q2. Explain the Advantages of DBMS.

Q3. What is ADO object model? Explain in detail

Q4. Explain three tier Architecture of DBMS.

(2*5=10 marks)

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Total Pages : 3

PC-4022/NR

G-2/2116

WIRELESS AND MOBILE COMMUNICATION–403

(Semester–VII)

Time : Three Hours] **[Maximum Marks : 50**

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

I. (a) What are HSCSD, GPRS, EDGE, WLAN, and bluetooth?

(b) Explain GSM architecture. (5,5)

II. (a) What are advantages of 3G networks?

(b) What is WLL? (5,5)

SECTION–B

III. (a) Name the techniques used to improve the coverage and capacity of a cellular system. Explain any *one* of them.

(b) What are the basic propagation mechanisms which impact the propagation in mobile communication system ? Explain any *two* of them. (5,5)

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IV. (a) What is the difference between cell splitting and cell sectoring?

(b) What are different types of hand offs? Explain the hand off operation with suitable diagram. (5,5)

SECTION–C

V. (a) What are the different factors that influence small scale fading?

(b) What is the difference between pure and slotted ALOHA? What is the maximum throughput that can be achieved in slotted ALOHA? (5,5)

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VI. (a) Compare the characteristics of TDMA and CDMA.

(b) Discuss in brief about the Rayleigh distribution. (5,5)

SECTION–D

VII. (a) Discuss block diagram of IS-95 reverse link.

(b) What is TDMA ? Discuss cell capacity of a TDMA system. (5,5)

VIII. (a) Discuss system and protocol structure of 802.16 standard.

(b) What is a combiner analysis ? (7,3)

SECTION–E

IX. Answer the following question in short :

(a) What are narrow band systems ?

(b) What is large scale fading ?

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(c) What is GSMA ?

(d) What is WiFi ?

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(e) What is frequency hopped multiple access ?

(f) Why is detection difficult in wireless scenario ?

(g) What is the difference between 1G and 2G ?

(h) What are adhoc networks ?

(i) What is selective retransmission ?

(j) What is PAN ?

(1×10=10)

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Department of Computer Engineering, Punjabi University, Patiala

MSTF-I Wireless/Mobile Communications (ECE-403) B.Tech. IV Year (CE, 7th Semester, Groups C1-C6)

Time: 1 hour M. Marks: 15

Note: Question number should be clearly mentioned strictly according to the pattern of the question paper only. Use of calculator is allowed.

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SECTION-A (Attempt all)

Q. I (a) Name the handoff techniques of 1G, 2G and 3G systems.

(b) Suppose each user in a cellular communication system is allocated 30 KHz of bandwidth. If the total band of frequencies allocated per cell is 40 MHz, determine the total number of users within that cell who can communicate simultaneously.

(c) Discuss the importance of cluster size N in order to decrease the interference of a cellular system.

(d) Explain incremental redundancy in EDGE 2.5G technology.

(e) Write a short note on Bluetooth and also give its standard. (1x5)

SECTION-B (Attempt any two questions)

Q. II (a) What is a handoff? Explain the prioritization techniques for handoff in mobile technology. (2)

(b) Compare and contrast the various 2.5G technology paths that each of the major 2G standards provide. Which path has the highest Internet access speed? Is this speed true user speed, or peak instantaneous throughput speed? (3)

Q. III Discuss fixed and dynamic channel assignment strategies, which is better and why? What is the role of borrowing in fixed channel assignment? Also, give the solution to avoid unnecessary load on the MSC due to handoffs because of the simultaneous high and slow speed traffic? (5)

Q. IV (a) Differentiate between co-channel and adjacent channel interference. Also explain in detail the near far effect in adjacent channel interference and how it can be avoided. (2.5)

(b) What is large scale fading? Explain the three phenomena in large scale fading in detail with examples. (2.5)

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Department of Computer Engineering, Punjabi University, Patiala

MST-I Wireless/Mobile Communications (ECE-403) B.Tech. IV Year (CE, 7th Semester, Groups CC1-CC6)

Time: 1 hour **M. Marks: 15**

Note: Question number should be clearly mentioned strictly according to the pattern of the question paper only.
Use of calculator is allowed.

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SECTION- A (Attempt all)

Q. I (a) Name the handoff techniques of 1G, 2G and 3G systems.
(b) Suppose each user generates an average traffic of [illegible] of the total band of frequencies allocated per cell is 40 MHz, determine the total number of users within that cell who can communicate simultaneously.
(c) Discuss the importance of cluster size N in order to decrease the interference of a cellular system.
(d) Explain incremental redundancy in EDGE 2.5G technology.
(e) Write a short note on Bluetooth and also give its standard. (1x5)

802.15

SECTION-B (Attempt any two questions)

Q.II (a) What is a handoff? Explain the prioritization techniques for handoff in mobile technology. (2)
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, PUNJABI UNIVERSITY, PATIALA

MST-I, OOPS USING C++ (CPE-202), MAX. MARKS 15, TIME 1 HOUR

1. What do you understand by:-
   a) Class Access Specifier
   b) Destructor
   c) Friend Class
   d) Static Members
   e) Delete Operator
2. Explain the concept of Call by Value and Call by Reference in C++ with the help of example

   OR

   Write a note on Memory Management of objects in C++
3. Write a program to explain the concept of overloading unary operator in C++

   OR

   Write a program to explain the concept of constructor overloading in C++

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4. Draw Pin out diagram of 8085 Microprocessor. Explain the function of each pin in detail. 1×10

SECTION–C

5. (a) Write an Assembly Language program to add two 2-digits BCD Number.

   (b) With suitable examples, explain, how I/O devices are connected using memory mapped I/O and peripheral I/O.

6. Design an interface circuit needed to connect DIP switch as an input device and display the value of the key pressed using a 7 segment LED display. Using 8085 Microprocessor system, write a program to implement the above. 1×10

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SECTION–D

7. Draw the block diagram of 8259 Interrupt controller and explain the function of each block.

8. Describe the operation of 8253 Timer along with its various modes. 1×10

SECTION–E

9. (a) What is the need for *ALE signal* in 8085 Microprocessor?

   (b) Define Addressing modes.

   (c) What is the significance of I/O ports?

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(d) Define Subroutine. How it is useful?

(e) Compare parallel and serial type of Data transfer.

(f) Write the difference between Microprocessor and Microcontroller.

(g) Explain the following instructions with examples :

(i) STA address

(ii) MVI A, data.

(h) Define Instruction cycle.

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(i) What is the function of SIM instruction in 8085 Microprocessor?

(j) Why Address bus is unidirectional? 10×1

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(10) P-30

(CPE-305) Microprocessor &Assembly Languages(MALP) CE-3rd year(6th Semester) Dept. of Computer Engg.

Section A is compulsory. Attempt any two ques each from Section B

M.M.15

Section-A(1*5=5M)

1. Define
   a) Tri State Logic
   b) Instruction Format
   c) State Transition Diagrams
   d) Memories
   e) Difference between Address Bus And Data Bus

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Section-B(2*5=10M)

2. What is Machine Cycle . Illustrate the concept of opcode fetch and read cycle in detail w.r.t an example.
3. Explain the concept of Addressing modes in detail with suitable examples.
4. A) Explain the concept of stack with its operations in detail(3M)
   b) Diff. between PUSH & POP and CALL & RET(2M)

and LXI and MVI

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Department of Computer Engineering

Microprocessor & Assembly Language Prog. CPE-305 **MST-II**

B.Tech IIIrd Year 5th Sem. CE (All Groups) **Max.Marks-15**

Section-A (All questions are compulsory each carrying 1 mark)

1. Define RIM.
2. How memory and I/O devices are interfaced with microcomputer.
3. Can BCD adjustment be done in BCD subtaction and How.
4. Describe command words for 8259.
5. Difference between hardware and software interrupt.

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Section-B (Do any 2 questions each carrying 5 marks)

6. Explain the detailed structure of 8255A programmable peripheral interface with its pin configuration in detail.
7. WAP for Binary to ASCII code conversion.
8. Explain Interrupt driven data transfer and various types of interrupts.

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Roll No. .....

CC : D 3.980

Total Pages : 3

3495/NR

C–20/2115

MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

Paper–305

Sem.–V

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt one question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

1. Define Address Bus, Data Bus and Control Bus. Explain their operations in Microprocessor.

2. Draw block diagram of ROM chip and explain its Read operation through timing diagram. 1×10

SECTION–B

3. (a) Explain Status flags of 8085 Microprocessor with examples.

   (b) Draw and explain the timing diagram of op code fetch cycle.

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Roll No. 1130143

Total No. of Pages : 2

PC 3491-NR

CC : D 3.980

C-20/2115

SYSTEM PROGRAMMING—301

Semester—V

Time allowed : Three Hours] [Maximum Marks : 50

Note :– The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. An assembly program can be divided into three sections : The data section, the bss section, the text section. Discuss each of these sections and their respective role in Assembly program. 10

2. Discuss structure of Assembly program, use of mnemonics and various types of instructions by citing appropriate examples. 10

SECTION—B

3. (a) Discuss role of Macro pre-processor with help of suitable example.

   (b) Discuss Macro language and its features. 5,5

4. What do you mean by single pass assembler ? Explain opcode table and symbol table generation in detail. 10

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SECTION—C

5. What do you mean by code optimization ? Discuss various techniques used to optimize code by citing suitable examples. 10

6. (a) Differentiate between interpreter and compiler.

   (b) Discuss each phase of compiler construction by taking suitable example. 5,5

SECTION—D

7. How operating system manages memory and processor ? Explain in detail by citing suitable examples. 10

8. Elaborate relocation and linking concepts : highlight linked and load time address translation by citing suitable examples. 10

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SECTION—E

9. Write very brief notes on the following :

   (i) Symbol Table

   (ii) Forward Reference

   (iii) Macro

   (iv) Loader

   (v) Linker

   (vi) Device Driver

   (vii) Interrupt

   (viii) Syntax analysis

   (ix) Instruction Pointer

   (x) Code section.

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Dept.
Time:
Q1. A
B
C
D
Q2. A
A
B
C

CE,Pbi Univ. B.Tech-III(CE) MST-1 CPE 306 System Programming

1 hr MM:15

Difference between MAR and MBR.
Advantage of machine language over other languages
why linking is needed once the program is translated? 1*3=3
Difference between application programming and system programming. 2*1=2
tempt any two questions
What is assembler? Explain pass1 and draw MOT table.
Write an assembly language program using literals. Expain use of literals.
What are Pseudo ops. Explain their use and POT table with example.(program and corresponding POT) 5*2=10

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Department Of Computer Engineering

DEPARTMENT OF COMPUTER ENGINEERING,

System programming

MST II

Time: 60minutes

M.M.15

SECTION-A

Q1.

c) What are the basic functions of operating system?.....2

d) What is [illegible]

e) Name of tool used for lexical analysis.....1

SECTION-B

Q2. Difference between absolute loader and direct linking loader.....5

Q3. sum=num1+num2.Generate atleast 4 phases of compiler with symbol table.....5

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DEPARTMENT OF COMPUTER ENGINEERING

SEMESTER 5TH, YEAR 3RD

PAPER: System Programming

MM:15

SECTION -A

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Q1 What is Macro Call? Explain it with suitable example.....(1)

Q2 MDTC Stands for ----------?.....(1)

Q3 What is a Linker?.....(1)

Q4 What are the Different types of Operating system?.....(1)

SECTION –B (DO ANY TWO)

Q5 Differentiate between Compiler and Interpreter.....(5)

Q6 Cost=Start-Finish+100.Explain it with 4 phases of Compiler.....(5)

Q7 Name the different Loading Schemes and Explain them in Detail.....(5)

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CC = D 3.980

Total Pages : 3

PC-3494/NR

C-20/2115

THEORY OF COMPUTATION – 304

(Semester–V)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Sections A, B, C and D carrying 10 marks each, and the entire Section E consisting of 5 short answer type questions carrying 2 marks each.

SECTION–A

I. (a) Explain the following with examples :

(i) Sets.

(ii) Relations. (5)

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(b) Draw a NFA for L= a*(bb / ba)* b. (5)

II. (a) Construct a DFA accepting the following language over the alphabet {0,1}

(ab/(aba)*)*. (5)

(b) Compare and contrast Mealy and Moore machine with example. (5)

SECTION–B

III. (a) Prove that L = {ww ^{r}} (where r represents reverse) is not a regular language. (3)

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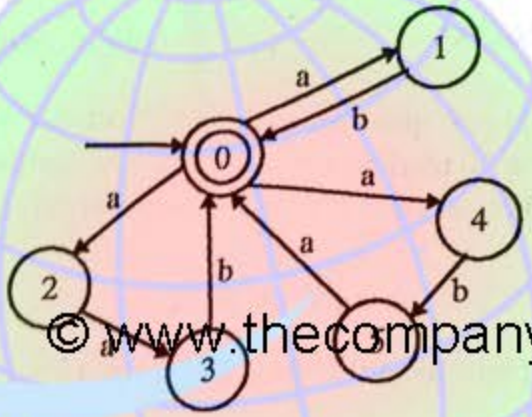
(b) Give the regular expression for string ending in 'aa' or 'bb' for $\Sigma = (a, b)$. (2)

(c) Prove that regular expression is closed under concatenation and intersection. (5)

IV. (a) Minimize the following DFA. (5)



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(b) Explain Chomsky classification of languages. (5)

SECTION–C

V. (a) Discuss any *two* normal forms with examples. (6)

(b) Prove that following grammar is ambiguous:

$S \rightarrow 0$; $S \rightarrow 0A1$; $S \rightarrow 01S1$; $S \rightarrow 0AA1$; $S \rightarrow 1S$. (4)

VI. (a) Convert the following Context free grammar into Chomsky Normal Form:

$S \rightarrow e/a/b/aSa/bSb$. (5)

(b) Explain Ambiguity and parse tree with example. (5)

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SECTION–D

VII. (a) What are Deterministic Push Down Automata? Explain with example. (6)

(b) What are Turing machines? Explain with example. (4)

VIII. (a) Discuss cellular automata with example. (4)

(b) Construct Pushdown automata that accept the language :

$L = \{a^n b^{2n} \quad \text{for } n \geq 1\}$ (6)

SECTION–E

IX. (a) Give two applications of pumping lemma for regular expressions. (2)

(b) Find all strings in following language having length less than four :

$L = ((0+1)^* 1(0+01)^*)$. (2)

(c) Differentiate between deterministic and non-deterministic finite automata. (2)

(d) Give *two* applications of the finite automata. (2)

(e) Give CFG for $\{w \mid w$ starts and ends with the same symbol$\}$ for $\Sigma = (a, b)$. (2)

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Department of Computer Engineering, Punjabi University, Patiala

B.Tech-III (CE) CPE-305 Theory of Computation

First Mid Semester Test

Time: 1 hour **MM: 15**

1130104 3

Q1 a) Write Applications of Theory of computation.

b) Construct a Grammar G for the language over {a, b} which generates strings beginning with b.

c) State Arden's Theorem.

d) Chomsky hierarchy of grammar

e) Write a R.E for the set of Strings of 0's and 1's whose 7th Symbol from the right end is 1. **1*5**

Attempt any 2 questions (each question carries 5 marks)

Q2 Construct a DFA equivalent to:

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Q3 Construct a Moore machine equivalent to the Mealy machine M defined by following table:

Present State	Next State			
	a=0		a=1	
	state	output	state	output
→ q_1	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

Q4 Prove that $P + PQ^*Q = a^*bQ^*$ where $P = b + aa^*b$ and Q is any regular expression.

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Dated: - 16/11/2015

Department of Computer Engineering, Punjabi University, Patiala
B.Tech-III (CE) CPE-305 Theory of Computation
Second Mid Semester Test

Time: 1 hour **MM: 15**

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Q1
a) Define Derivation Tree and yield of tree.
b) Define unit production and how to remove unit production in a CFG
c) Give the instantaneous description of Turing Machine
d) Define ambiguous Grammar. Give example for the same.
e) Give definition of CNF. 1*5

Attempt any 2 questions:

Q2. Design PDA for $\{wcw^T \mid w=\{a,b\}^*\}$ 5

Q3. Design Turing Machine of $\{1^n2^n3^n \mid n>=1\}$ 5

Q4. Find a grammar in GNF equivalent to the grammar 5

E -> E + T | T T -> T * F | F F -> (E) | a

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Department of Computer Engineering **MST-II**

Analysis and Design of Algorithms CPE-303 **Max.Marks-15**

B.Tech IIIrd Year 6th sem. CE (All Groups)

Section-A (All questions are compulsory each carrying 1 mark)

1) Which bound is calculated for Traveling salesman problem using Branch & Bound and Why.

2) What is purpose and principle of Floyd Warshal Algortihm.

3) Write the difference between Branch & Bound and Backtracking method.

4) What are various techniques for finding lower bound.

5) Explain with respect to ALL PAIRS SHORTEST PATH the concept of PRINICPLE OF OPTIMALITY.

Section-B (Do any 2 questions each carrying 5 marks)

6) Solve Traveling Salesman Problem using Dynamic Programming for given edge length matrix:

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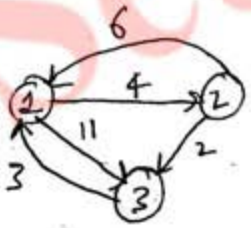
Vertices	1	2	3	4
1	0	10	15	20
2	5	0	9	10
3	6	13	0	12
4	8	8	9	0

7) Solve the following graph using pairs shortest path



8) Draw comparison tree for sorting three items giving suitable example.

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Roll No. 11301043 Total Pages : 3

CC : D 3.980

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C–20/2115

ALGORITHM ANALYSIS AND DESIGN

Paper–303

Sem.–V

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt one question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark.

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SECTION–A

1. Write down the algorithm of Merge Sort and apply the algorithm to sort the following array :

   A = [35, 40, 1, 18, 19, 23, 0, 5, 3, 21, 14] in descending order.

2. (a) Define Heap. Construct a heap for the list 11, 18, 16, 15, 13, 8, 7 by the bottom-up algorithm.

   (b) Design an efficient algorithm for finding and deleting an element of the smallest value in a heap and determine its time efficiency. 10

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SECTION–B

3. Describe the design steps in Prim's algorithm to construct minimum spanning tree with example.

4. Describe various steps of Dijkstra's algorithm to calculate the single-source shortest path in a weighted graph. 10

SECTION–C

5. Apply the Branch and Bound algorithm to solve the Traveling Salesman problem. Use suitable graph.

6. Apply the Backtracking method to solve the following:

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(a) 8 queens problem

(b) Subset-sum problem. 10

SECTION–D

7. Derive lower bounds for any sorting algorithm that sorts by comparisons of Keys.

8. Explain various phases of non-deterministic algorithm with example. 10

SECTION–E

9. (a) Define *Time Complexity* and *Space Complexity* of an algorithm.

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(b) Define Greedy approach.

(c) State the Best-case and Worst-case analysis for Linear search.

(d) List out any two drawbacks of Binary search algorithm.

(e) Compare NP-hard and NP-complete problems.

(f) Define Divide and Conquer strategy.

(g) Define Approximation algorithm.

(h) Define Optimal binary search tree.

(i) List out the disadvantages of bubble sort.

(j) Define Knapsack problem. 10×1

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Analysis and Design of Algorithms

Subject code:CPE-303

B.Tech IIIrd year 5th sem. Computer Engg.

Max.Marks:15

Time:1 hour

Attempt all questions from section A and any two from section B.

Section-A

1) What do you mean by definiteness property of algorithms (1)
2) Which one has the least and maximum complexity (1)
   Log n, n, nlogn, n^2, n^3, 2^n, n!
3) What is fractional knapsack problem (1)
4) Write down difference between Prim's and Kruskal's algorithm (2)

Section-B

5) Solve Single source shortest path problem for source vertex A using Dijkstra's algorithm for the given graph:

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6) Derive the order of complexity of strassen matrix multiplication. Mention proper comments.
7) Write down the algorithm of merge sort in your own words giving example. Draw the tree of calls of merge sort.

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Department of Computer Engineering **MST-II**

Analysis and Design of Algorithms CPE-303 **Max.Marks-15**

B.Tech IIIrd Year 6th sem. CE (All Groups)

Section-A (All questions are compulsory each carrying 1 mark)

1) Which bound is calculated for Traveling salesman problem using Branch & Bound and Why.

2) What is purpose and principle of Floyd Warshal Algortihm.

3) Write the difference between Branch & Bound and Backtracking method.

4) What are various techniques for finding lower bound.

5) Explain with respect to ALL PAIRS SHORTEST PATH the concept of PRINICPLE OF OPTIMALITY.

Section-B (Do any 2 questions each carrying 5 marks)

6) Solve Traveling Salesman Problem using Dynamic Programming for given edge length matrix:

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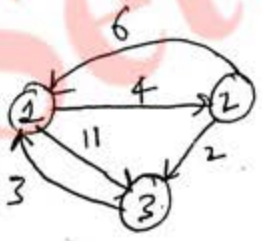
Vertices				
1	0	10	15	20
2	5	0	9	10
3	6	13	0	12
4	8	8	9	0

7) Solve the following graph using pairs shortest path



8) Draw comparison tree for sorting three items giving suitable example.

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Department of Computer Engineering **MST-II**

Analysis and Design of Algorithms CPE-303 **Max.Marks-15**

B.Tech IIIrd Year 6th sem. CE (All Groups)

Section-A (All questions are compulsory each carrying 1 mark)

1) Which bound is calculated for Traveling salesman problem using Branch & Bound and Why.

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Section-B (Do any 2 questions each carrying 5 marks)

6) Solve Traveling Salesman Problem using Dynamic Programming for given edge length matrix:

Vertices	1	2	3	4
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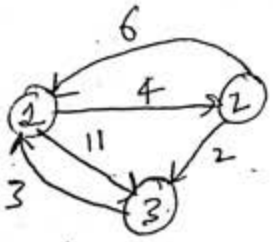

8) Draw comparison tree for sorting three items using suitable example.

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DEPARTMENT OF COMPUTER ENGG.

ANALYSIS DESIGN AND ALGORITHM(M.M.15)

(Sec-A IS COMPULSORY . ATTEMPT ANY TWO FROM Sec-B)

Sec-A

Q1. Illustrate the concept of (1M each): A) Asymptotic notations B)Dictionaries. C)Reheapify Upward

D) Diff between DAC(Divide and Conquer) and Greedy Method E)Performance Analysis

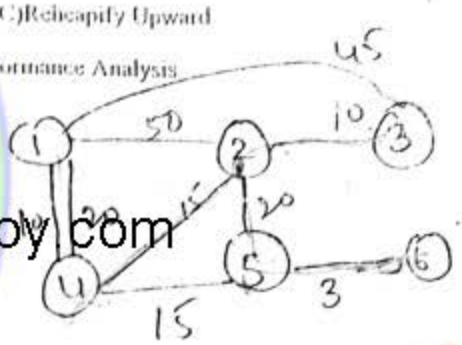
Sec-B

Q2. A) Explain strassen,s Matrix Multiplication in detail.(3M)

B) Explain how graphs can be represented in computer memory. (3M)

Q3. A) What do you mean by Single shortest path problem? (1M)

B) Solve the given example w.r.t to MST (prim's and kruskal algo) (4 M)



Q4. A) Find the profit earned by the given jobs : (2M)

Jobs	1	2	3	4
Deadline	2	1	2	1
Profit	100	10	15	27

B) Explain Binary Search w.r.t DAC in detail (3M)

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Analysis and Design of Algorithms

Max.Marks:15

Subject code:CPE-303

Time: 1 hour

B.Tech IIIrd year 5th sem. Computer Engg.

Attempt all questions from section A and any two from section B.

Section-A

1) What do you mean by definiteness property of algorithms (1)

2) Which one has the least and maximum complexity (1)

Log n, n, nlogn, n^2, n^3, 2^n, n!

3) What is fractional knapsack problem (1)

4) Write down difference between Prim's and Kruskal's algorithm (2)

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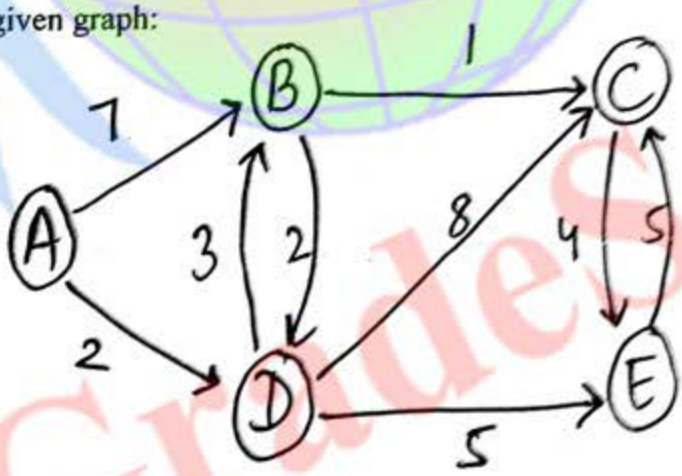
Section-B

5) Solve Single source shortest path problem for source vertex A using Dijkstra's algorithm for the given graph:



6) Derive the order of complexity of strassen matrix multiplication. Mention proper comments.

7) Write down the algorithm of merge sort in your own words giving example. Draw the tree of calls of merge sort.

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440

4. What is meant by distributed file system?
5. What are the characteristics of a distributed system?
6. State all possible semantics in Distributed File System.
7. What do you mean by fail-safe faults? Give example.
8. What are the main characteristics of peer to peer systems?
9. How we provide security?
10. What are the three components of security?

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Roll No. 438 Total Pages : 3

9366/MB

G–4/2057

DISTRIBUTED COMPUTING–314

(Semester—VI)

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION—A

1. **Explain implementation of logical clocks with an example.**

2. **Explain distributed approach for providing mutual exclusion.**

3. **What are the goals of distributed system?**

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4. Explain the reasons why the use of and popularity of distributed systems are rapidly increasing.

5. What is the goal of an election algorithm? Explain in detail.

SECTION—B

6. Write a short note on Load balancing.

7. How failures are detected in distributes system?

8. Discuss techniques for achieving high-performance in distributed file systems.

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9. Describe about distributed multimedia systems.

10. Discuss about the Distributed File Systems.

SECTION—C

11. Write brief answers :

1. Why we do you need distributed system?

2. List the distributed systems challenges.

3. What is the role of middleware in a distributed system?

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3054

Department of Computer Engineering

Punjabi University Patiala

Subject: Network Security (CPE-315) Class: 6CE12, 6CE34, 6CE56

Note: Section A is compulsory. Attempt any two questions from section (B).

Section (A) (1*5) = 5 marks

2. Explain the following
   (f) Packet Filtering Firewalls.
   (g) DMZ(De-Militarized Zone)
   (h) Ethical Hacking
   (i) Crackers
   (j) Hactivism

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4. What do you mean by message integrity? How we can achieve it by the Secure Hash Algorithm?
5. Why the security of email is important? Explain the pretty good Privacy standard in detail?
6. What are the benefits of Virtual private network over private and public networks?

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452

Department of Computer Engg.

Time : 1 Hour

MM : 15

Subject : Network Security

Semester : 6th (B.Tech)

Note: Attempt all questions from section A and any two from section B.

Section A

Q1. What is the role of initialization vector in CBC mode (1).

Q2. In case of DES, if size of LPT = 32bits and RPT after applying operations = 48bits, can XOR operation is possible on LPT and RPT? (1)

Q3. Convert given plain text into cipher text using simple columnar transposition technique (1)

COMPUTER ENGINEER

Q4. What is the significance of Shift register in CFB mode (1)

Q5. In which order secret key is used in case of decryption during 16 rounds in DES? (1)

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Section B

Q6. (a) In case of Symmetric key Cryptography for n persons, how many lock and key pairs required? (1)

(b) Explain expansion permutation with the help of example in DES (2)

(c) Explain man-in-the-middle attack (bucket brigade attack) mathematically in Diffie-Hellman Key Algorithm (2).

Q7. (a) In case of Caesar Cipher if CT is ZREWQTYM, find out PT. (2)

(b) Explain the concept of S box substitution with the help of example in DES (3)

Q8. (a) Proof mathematically that K1 = K2 =K in Diffie Hellman key exchange theory. (2)

(b) Sender A wants to send a single character F to the receiver B. Using RSA algorithm, explain encryption & decryption process by generating keys. (3)

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Department of Computer Engineering 521

Punjabi University Patiala

Subject: Network Security (CPE-315) Class: 6CE12, 6CE34, 6CE56

Note: Section A is compulsory. Attempt any two questions from section (B).

Section (A) (1*5) = 5 marks

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2. Explain the following
   (f) Diffusion/ Confusion
   (g) Stream cipher and block cipher
   (h) Caeser Cipher
   (i) Expansion Permutation box(P-box)
   (j) Triple DES.

Section (B) (2*5) =10 marks

4. How cryptanalysis of monoalphabetic cipher is done?
5. Differentiate between symmetric and asymmetric key cryptography?
6. How encryption is carried out with the help of AES? Explain its advantages over DES.

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70

CC = D 4.843

Total Pages : 2

PC-5942/MR

O-17/2055

BASIC ELECTRONICS ENGINEERING – 102
Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION – A

(3×5=15)

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I. What is the difference between Center tap full rectifier and Bride rectifier ?

II. Explain the difference between BJT and FET.

III. Explain the operational and structural characteristics of PN diode.

IV. Explain the VI characteristics of Common Emitter p-n-p type BJT amplifier.

SECTION – B

(3×5=15)

V. What is Modulation and why it is required in a communication system ?

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5942-MR/1,810/HHH/921

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VI. What is Truth Table ? Draw the truth tables of JK and RS flip-flops.

VII. Draw the block diagram of 3 : 8 Decoder, and explain its operation.

VIII. Explain the concept of Amplitude Modulation in detail. Also draw its waveforms.

SECTION – C

IX. Write short notes on the following :

(a) What is Zener diode ?

(b) Explain Barrier potential and breakdown voltage in PN junction diode.

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(c) What do you mean by Feedback amplifiers ?

(d) Draw the VI characteristics of MOSFET.

(e) Differentiate between CB and CE configurations of BJT.

(f) Convert binary $(10010)_2$ into decimal and hexadecimal number system.

(g) What are Flip-flops and why are they used as memory elements ?

(h) Define, with the help of an example, De-Morgan's Theorem.

(i) Draw the block diagram of General communication system.

(j) What is FM modulation ? (2×10=20)

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(c) What is Transistor avalanche multiplication ?

(d) Why negative feedback is preferred over positive feedback in feedback amplifier circuit ?

(e) How J-K flip-flop can be converted into T flip-flop ?

(f) What is Binary encoder ?

(g) What is Forward bias and Reverse bias in a PN junction ?

(h) What is Modulation ?

(i) How Frequency and Phase modulation are related ?

(j) Name the important components of Communication system. (10×1=10)

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1

Total Pages : 2

PC-4262/MB

F-24/2058

BASIC ELECTRONICS ENGINEERING–102

(Semester–II)

Time : Three Hours] [Maximum Marks : 50

Note : Section C is compulsory. Attempt any *six* questions selecting *three* questions from each section A and B.

SECTION–A

I. Explain the characteristics of p-n diode.

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II. Explain the operation of an n-p-n transistor with suitable diagram.

III. Explain the V-I characteristics of FET.

IV. Explain the FWR with center tapped Transformer.

V. A bridge rectifier is directly operated on the single phase ac supply voltage of 230 V, 50 Hz. If the load resistance is 100 Ω and diode forward resistance is 1 Ω. Calculate Peak load current (I_m), Average load current ($I_{L\ dc}$) and Average load voltage ($V_{L\ dc}$). (3×5=15)

SECTION–B

VI. Convert the decimal number $(225.225)_{10}$ into binary and hexadecimal codes.

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VII. Explain the R-S flip-flop with its truth table.

VIII. Explain the AM modulation with suitable waveforms.

IX. Draw the 4 : 1 multiplexer with its truth table.

X. Explain the block diagram of Communication system.

(3×5=15)

SECTION–C
(Compulsory Question)

XI. (a) Define the breakdown voltage.

(b) What are applications of CC configuration?

(c) Define the ripple factor.

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(d) What are the needs for Communication?

(e) What are the arithmetic operations?

(f) Draw the truth table of D Flip-Flop.

(g) What is AM detector?

(i) Draw only characteristics of UJT.

(i) Define the modulation.

(j) A 2 N 3298 transistor has a typical β_{dc} of 90. If the collector current is equal to 15 mA, calculate (approximates values) the base current (I_B) and emitter current (I_E).

(10×2=20)

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CC = D 4.843

53

Total Pages : 3

PC-5941/MR

O-17/2055

COMMUNICATION SKILL – 101

Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *Six* questions in all. Select *three* questions each from Section A and B. Q. No. IX of Section C is compulsory.

SECTION–A

I. Write a brief note on the significance of Communication in professional organization.

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II. What are the basic purposes of reading ? Enumerate.

III. Discuss the elements of Effective writing.

IV. Discuss the important kinds of Business letters. (3×5=15)

SECTION–B

V. Explain the process of listening.

VI. Do as directed (Do any *five*) :

(a) Sita has given me her pen. (Change the voice)

(b) "Book". (Use as a noun and a verb)

(c) She told me to come. (Change into negative)

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(d) I said to Anmol, "Did you go to meet your friend ?"
(Change the narration)

(e) I am satisfied by your behaviour.
(Correct the sentence)

(f) Give the full form of the abbreviation of 'P.M.'

VII. Discuss the process of Group discussion.

VIII. Write a comprehensive note on Speech mechanism.
(3×5=15)

SECTION–C
(Compulsory Question)

IX. Attempt all the questions.

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(a) How many channels of communication are there ? Enumerate.

(b) Enlist the various kinds of reading ?

(c) Give one-word for each of the following :

(i) A person who can neither read nor write.

(ii) Method of sending messages without the help of a wire.

(d) What is Agenda and how is it different from Memorandum ?

(e) What are Feedback skills ?

(f) Do as directed :

(i) She worked hard. (Change into Past perfect tense)

(ii) I know him well. (Change the voice)

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(g) Use the following homonyms in your own sentences to make their meanings clear :

Plain, plane.

Knew, new.

(h) Explain the effective oral presentation skills.

(i) Highlight the components of an effective talk.

(j) Give phonetic transcription of the following words :

Great, wood. (2×10=20)

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University College of Engineering, Punjabi University, Patiala

B.Tech.-III (CE) CPE-309 Compiler Design MST-II

Time: 1hour MM: 15

Note: Section A is compulsory. Do any two questions from section B

Section-A

Q1 a) What is the use of next use information? 1

b) What is Jumping code? 1

c) What do you understand by DAG? 1

d) What is activation Record? 1

e) What is the purpose of getreg function? 1

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SECTION-B

Q2 Explain in detail the concept of three address code. 5

Q3 Explain in detail the concept of peephole optimization. 5

Q4 What are the various issues in design of code generator? 5

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Total No. of Pages : 3

CC : D 4.1014

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COMPILER DESIGN–309

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 9 short answer type questions carrying 10 marks in all.

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SECTION—A

1. What is Complier ? Explain phases of Compiler by taking suitable example.

2. What is difference in Compiler and Interpreter ? What are Compiler Construction Tools ?

SECTION—B

3. What is Lexical Analyzer ? Explain the role of Lexical analyzer in Compiler by taking example.

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4. What is Regular Expression ? Draw regular expression and transition diagram for the following :

   (a) An unsigned number.

   (b) Relational operator.

SECTION—C

5. What is Parser ? What are different types of parsers ?

6. Consider following CFG for Expression :

   $E \rightarrow E + E \mid E - E \mid E * E \mid E / E \mid id$

   Check whether the [illegible] following strings :

   (i) id + id * id

   (ii) id + id + id

SECTION—D

7. What is Intermediate Code Generation ? What are types of Three Address Statements ? Explain their Implementation with example.

8. What are assignment statements in ICG ? Explain.

SECTION—E

9. Write in short :

   (a) What is Token ?

   (b) What is CFG ?

   (c) What is LEX Tool ?

   (d) What is Symbol Table ?

   (e) What is difference between error and bug ?

   (f) What is Code generator ?

   (g) What do you mean by Ambiguity ?

   (h) What is Global Register Allocation ?

   (i) What is Unreachable Code ?

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Department of Computer Engineering, Punjabi University, Patiala MST-I, March'15

Class: B.Tech-III Sem-VI

Subject: CPE - 309 **COMPILER DESIGN**

Time Allowed: 1 hr MM: 15

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Q1. Differentiate between the following (give examples):

a. assembler and preprocessor
b. token and lexeme
c. CFG and regular expression
d. syntax tree and parse tree
e. shift-reduce conflict and reduce-reduce conflict

5*1

Q2. Construct predictive parsing table for given grammar:

$E \rightarrow T+E \mid T$

$T \rightarrow int \mid int*T \mid (E)$

5

Q4. Explain **any two**:

a. Input Buffering in Lexical Analysis
b. Error Recovery Mechanisms
c. Operator Precedence Parsing using string id+id*id and grammar having productions:
E->E+E|E*E| id

2*2.5

2. What are the different ... the DES in detail.

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Department of Computer Engineering, Punjabi University, Patiala

Class: B.Tech-III Sem-VI — MST-I, March'15

Subject: CPE - 309 **COMPILER DESIGN**

Time Allowed: 1 hour — MM: 15

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Q1. Differentiate between the following (give examples):

a. assembler and preprocessor
b. token and lexeme
c. CFG and regular expression
d. syntax tree and parse tree
e. shift-reduce conflict and reduce-reduce conflict

5*1

Q2. Construct predictive parsing table for given grammar:

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2*2.5

2. What are the different ... the DES in detail.

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...ment of Computer Science and Engineering, Punjabi University, Patiala

B.Tech. - 3rd Year, Semester 5th, (CSE) MST-II

Subject Code:-CPE-309 Subject:-Compiler Design

Time: 1hour

Section A is compulsory to attempt and attempt any two questions from Sectio

Section-A

Q1 a) What do you mean by basic block? 1

b) What is Jumping code? 1

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c) What do you understand by Backpatching? 1

d) What is activation Record? 1

e) What is the purpose of loop optimization? 1

SECTION-B

Q2 Explain in detail the concept of three address code. 5

Q3 Explain in detail the concept of peephole optimization. 5

Q4 What do you mean by DAG, explain the process of its creation. 5

...matrices, where the original vertices of triangle are (2,2), (5,5), (4,5)

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University College of Engineering, Punjabi University, Patiala

B.Tech.-III (CE) CPE-309 Compiler Design MST-II

Time: 1hour MM: 15

Note: Section A is compulsory. Do any two questions from section B

Section-A

Q1 a) What is the use of next use information? 1

b) What is Jumping code? 1

c) What do you understand by DAG? 1

d) What is activation Record? 1

e) What is the purpose of getreg function? 1

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SECTION-B

Q2 Explain in detail the concept of three address code. 5

Q3 Explain in detail the concept of peephole optimization. 5

Q4 What are the various issues in design of code generator? 5

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...ment of Computer Science and Engineering, Punjabi University, Patiala

B.Tech. - 3rd Year, Semester 5th, (CSE) MST-II

Subject Code:-CPE-309 Subject:-Compiler Design

Time: 1hour

Section A is compulsory to attempt and attempt any two questions from Sectio

Section-A

Q1 a) What do you mean by basic block? 1

b) What is Jumping code? 1

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c) What do you understand by Backpatching? 1

d) What is activation Record? 1

e) What is the purpose of loop optimization? 1

SECTION-B

Q2 Explain in detail the concept of three address code. 5

Q3 Explain in detail the concept of peephole optimization. 5

Q4 What do you mean by DAG, explain the process of its creation. 5

...matrices, where the original vertices of triangle are (2,2), (5,5), (4,5)

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CC = D 4.925

Total Pages : 3

PC-5973/MR

O-18/2055

COMPUTER NETWORK – 207

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION – A

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I. Compare and contrast between the following :
   (i) OSI and TCP/IP.
   (ii) LAN and WAN. (10)

II. (a) Discuss various network topologies. (5)
   (b) Explain OSI reference model. (5)

SECTION – B

III. Compare and contrast between Circuit switching, Packet switching and Message switching. (10)

IV. Compare and contrast between Twisted pair, Co-axial and Fibre optics transmission media. (10)

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SECTION – C

V. Explain the following :

(i) CSMA.

(ii) One-bit sliding window protocol. (10)

VI. Explain the following :

(i) CSMA/CD.

(ii) Protocol using selective repeat. (10)

SECTION – D

VII. Explain the following :

(i) Distance vector routing.

(ii) UDP. (10)

VIII. Explain the following :

(i) Link state routing.

(ii) E-mail.

(iii) Domain name system. (5+3+2)

SECTION – E

IX. Write short answers of the following :

(a) What are Hubs ?

(b) What is Noise ?

(c) What is Broadcast ?

(d) What is WWW ?

(e) Define Ro

(f) What is B

(g) What are

(h) Define P

(i) What is

(j) What is

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(e) Define Routing.

(f) What is Bandwidth ?

(g) What are Switches ?

(h) Define Protocol.

(i) What is Gateway ?

(j) What is [illegible] ? (1×10=10)

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MST-I

COMPUTER NETWORKS (CPE-207), B.Tech (4th Sem. CE)

Max. Marks: 15 **Time: 1 Hour**

Section –A (Attempt all Questions, each carry one mark)

1. What are the difference between router and gateway.
2. What is the maximum size of the process data that can be encapsulated in a UDP datagram?
3. Why do we need a DNS system, when we can use an IP address?
4. What is a mask in IPv4 addressing? What is the default mask in classfull IPv4 classes A, B, & C.
5. What is the difference between classfull and classless addressing?

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Section –B (Attempt any two questions)

6.(a) Write down the short note on the following .

(i) WWW (ii) E-mail (1.5*2=3)

(b) List the different categories of congestion control mechanism. (2)

7.(a) Explain the RIP protocol in detail (3)

(b) List out the design issues of data link layer.(2)

8. (a)Compare the merits and demerits of UDP and TCP. (3)

(b) What is the difference between port number and IP address? (2)

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449 (34, 56)

MST I

Data Mining and Warehousing

Department of Computer Engineering

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SECTION A (Attempt All)

1. List out any three data mining Tools
2. What is the purpose of doing data cleaning.
3. Describe challenges to data mining regarding data mining methodology and user interaction issues
4. How A database design is represented in OLTP and OLAP systems (Give name only)
5. What are different problem that data mining can solve →

SECTION B (Attempt any 2) 2*5

6. Explain various steps of data mining process
7. Discuss the architecture of Data Warehouse.
8. Differentiate between OLTP and OLAP

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Computer Engineering department
Punjabi University Patiala
MST-1 (Data Structures)

Date:11-03-2015 **Time: (12:00-1:00) pm** **Max Marks: 15**
Examiners: Mrs. Harpreet Kaur &Mr. Rakesh Singh

Section --- A (1*5)

Q1:

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a) Write down complexity of bubble sort and selection sort in best, worst and average case.
b) Can binary search be applied on linked list? State Yes or No with reason.
c) Write down at least two applications of stack and Linked list.
d) Write condition to check "Stack is Full", "Stack is Empty".
e) Why linked lists are more advantageous over arrays?

Section --- B (Q2 is compulsory) (5+5)

Q2: (a) Write an algorithm to delete duplicate numbers from an array. (3)
b) Sort the given numbers using selection sort. Write algorithm and illustrate example with all steps. 66 16 77 12 88 99 (2)

Q3: Write an algorithm to delete a node from linked list with given information. (5)

OR

Q4: Write an algorithm to find a number in a sorted liked list. (5)

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MST-I

COMPUTER NETWORKS (CPE-207), B.Tech (4th Sem. CE) 19

Time: 1 Hour

Max. Marks: 15

Section –A (Attempt all Questions, each carry one mark)

1. What are the difference between router and gateway.
2. What is the maximum size of the process data unit can be encapsulated in a UDP datagram?
3. Why do we need a DNS system, when we can use an IP address?
4. What is a mask in IPv4 addressing? What is the default mask in classfull IPv4 classes A, B, & C.
5. What is the difference between classfull and classless addressing?

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Section –B (Attempt any two questions)

6.(a) Write down the short note on the following . (1.5*2=3)

(i) WWW (ii) E-mail

(b) List the different categories of congestion control mechanism. (2)

7.(a) Explain the RIP protocol in detail (3)

(b) List out the design issues of data link layer.(2)

8. (a)Compare the merits and demerits of UDP and TCP. (3)

(b) What is the difference between port number and IP address? (2)

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Department of Computer Engineering
Punjabi University, Patiala.

MST-I

COMPUTER NETWORKS (CPE-207), B.Tech (4th Sem. CE)

Max. Marks: 15 **Time: 1 Hour**

Section –A (Attempt all Questions, each carry one mark)

1. What is the significance of Nyquist theorem in Data communication?
2. What are the factors that determine whether a computer network is a LAN or WAN?
3. What are the advantages of Broadcast connection over Point-to-Point connection?
4. Consider a noiseless channel with bandwidth 3000 Hz transmitting a signal with four signal levels. Calculate its maximum bit rate.
5. Compare circuit switching and Packet switching and also list their application area.

Section –B (Attempt any two questions)

6. Draw a hybrid topology with a ring backbone and three bus networks. (5)
7. Write down the responsibilities of Network Support layers in OSI Model. (5)
8. Explain the TCP/IP protocol suite model in detail. (5)

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Department of Computer Science and Engineering
Punjabi University, Patiala.

Computer Networks (CPE-207)
2nd Year (4th Sem.)
MST- 1

Date of Exam: 04-03-2014
Time Allowed: 1 Hour

Roll No.....
M.M:15

Note: Section A is compulsory. Attempt any two questions from Section-B.

Section-A

Q.1 a) OSI is a reference model, justify your answer.
b) Define SNR.
c) Define flow control, which layers provide this feature.
d) Write down the differences between repeaters and amplifiers.
e) Define Bandwidth. 1*5=5

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Section-B

Q.2. Write down the differences between OSI and TCP/IP models with practical examples. 5.0

Q.3 a) Write down the differences between Circuit Switching and Virtual Circuit Switching. 2.0
b) How no of levels affect the speed of transmission in digital signals. 1.5
c) Why radio signals are used for long transmission. 1.5

Q.4 a) Explain unguided transmission media in detail. 3.5
b) Consider a noiseless channel with a bandwidth of 4000 Hz transmitting a signal with 4 signal levels. Find out maximum bit rate. 1.5

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Department of Computer Science and Engineering
Punjabi University, Patiala

Computer Networks (CPE-207)
2nd Year (4th Sem.)
MST : I

Date of Exam: 04-03-2014
Time Allowed : Hour

Roll No
M.M:25

Note: Section-A is compulsory. Attempt any two questions from Section-B.

Section-A

Q.1 a) OSI is a reference model, justify your answer.
b) Define SNR.
c) Define flow control, which layers provide this feature.
d) Write down the differences between repeaters and amplifiers.
e) Define Bandwidth. 1*5=5

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Section-B

Q.2. Write down the differences between OSI and TCP/IP models with practical examples. 5.0

Q.3 a) Write down the differences between Circuit Switching and Virtual Circuit Switching. 3.0
b) How no of levels affect the speed of transmission in digital signals.
c) Why radio signals are used for long transmission.

Q.4 a) Explain unguided transmission media in detail. 3.0
b) Consider a noiseless channel with a bandwidth of 4000 Hz transmitting a signal with 4 signal levels. Find out maximum bit rate.

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Total Pages : 3

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COMPUTER NETWORK – 207

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION – A

I. Compare and contrast between the following :

(i) OSI and TCP/IP.

(ii) LAN and WAN. (10)

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II. (a) Discuss various network topologies. (5)

(b) Explain OSI reference model. (5)

SECTION – B

III. Compare and contrast between Circuit switching, Packet switching and Message switching. (10)

IV. Compare and contrast between Twisted pair, Co-axial and Fibre optics transmission media. (10)

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SECTION – C

V. Explain the following :
(i) CSMA.
(ii) One-bit sliding window protocol. (10)

VI. Explain the following :
(i) CSMA/CD.
(ii) Protocol using selective repeat. (10)

SECTION – D

VII. Explain the following :
(i) Distance vector routing.
(ii) UDP. (10)

VIII. Explain the following :
(i) Link state routing.
(ii) E-mail.
(iii) Domain name system. (5+3+2)

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SECTION – E

IX. Write short answers of the following :
(a) What are Hubs ?
(b) What is Noise ?
(c) What is Broadcast ?
(d) What is WWW ?

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(e) Define Routing.

(f) What is Bandwidth ?

(g) What are Switches ?

(h) Define Protocol.

(i) What is Gateway ?

(j) What is Attenuation ?

(1×10=10)

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Computer Networks-207

Semester-IV

CC:D4.925

Time allowed: 3 Hours. Max.Marks:50

Note: Attempt one question each from Sections A,B,C and D carrying 10 marks each and the entire Section E consisting of ten short answer type questions carrying 01 mark each.

Section-A

1. Discuss the OSI reference model with functioning of each layer. Also write merits and demerits of OSI model. 10

2. a) Compare LAN, MAN and WAN
   b) Discuss various network topologies. 5,5

Section-B

3. a) Explain formulas used to calculate data rate limits.
   b) Discuss transmission impairments. 5,5

4. Explain in detail various wired transmission media. 10

Section-C

5. a) What are CSMA/CD protocol? Explain.
   b) Discuss unrestricted simplex protocol. 6,4

6. a) Explain the sliding window protocol with the algorithm used.
   b) Discuss how CRC is used for error detection. 6,4

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7. a) Compare and contrast the two transport layer protocols: TCP and UDP.
   b) Explain the structure and working of e-mail. 6,4

8. a) Explain distance vector routing potocol? What is its major drawback?
   b) What do you understand by DNS? How does DNS works? Explain. 7,3

Section-E

9. Explain the following in short:-
   a) Compare bridge and router.
   b) Discuss the concept of interfaces and services.
   c) Explain the term WWW.
   d) Compare switches, hubs.
   e) Write applications of networks.
   f) Differentiate between digital and analog signals.
   g) Compare OSI and TCP/IP reference models.
   h) What is congestion? Discuss.
   i) Compare circuit and packet switching.
   j) Discuss IP addressing. 10x1=10

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CPE-209 COMPUTER PERIPHERAL AND INTERFACE
B.Tech (Computer Science and Engg.), IInd Year
MST-I

Max. Marks: 15 Time: 1hour

Note: Attempt all questions from Section A and any two questions from Section B.

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Section-A

1. Write about BIOS. (1)
2. Briefly explain working of CRT display monitor. (1)
3. List the various types of input output buses. (1)
4. Discuss the various types of optical media. (1)
5. Discuss the working of a scanner. (1)

Section-B

6. *Explain* the working of various types of printers. (5)
7. *Explain* memory hierarchy in context of cost, speed and other factors. (5)
8. *Explain* various components of motherboard. (5)

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COMPUTER PERIPHERAL AND INTERFACING(CPE-209)

B.Tech (COMPUTER SCIENCE ENGINEERING), 2nd Year

MST-II

Max. Marks: 15 **Time: 1 hour**

Note: Attempt all questions from Section A and any two questions from Section B

SECTION-A

1. Differentiate serial and parallel interfaces.
2. What is an interrupt and its types?
3. What is the use of a DMA controller?
4. Write a short note on USART.
5. Differentiate SCSI and IDE.

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SECTION-B

6. Explain the various input/output buses.
7. **Write note on FAT16, FAT32 and NTFS file systems.**
8. Write down the features of ATA and explain its standards (ATA 1 TO ATA 7).

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Total Pages : 2

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COMPUTER PERIPHERALS AND INTERFACES–209

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION–A

I. (a) What are the factors affecting the display quality of the CRT screen? 5

(b) What are the various voltages given by the power supply of a Computer system? Explain the characteristics of the typical power supply of a Computer system? 5

II. (a) Explain the functioning of a keyboard in detail. 10

(b) What is BIOS? What are its different types? What are its various sections and their functionality?

SECTION–B

III. (a) Explain the booting process in detail. 5

(b) What is ROM? What are its types? 5

IV. Compare and explain the various types of memories. 10

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CC : D 4. 925

Total No. of Pages : 2

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O-18/2055

COMPUTER PERIPHERALAND INTERFACES—209

Semester—IV

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. What are the various types of Printers ? Explain the printing mechanism of the Inkjet and the Laser Printers. 10

2. What is a Motherboard ? Why is it so called ? What are the cards/components mounted on the motherboard ? Explain the BIOS functions in detail. 10

SECTION—B

3. What are the various types and the generations of the processors ? What are their features and inherent characteristics ? 10

4. Explain the functioning of a typical HDD in detail. 10

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SECTION—C

5. What is the purpose of FAT ? How many copies of FAT exist ? Distinguish between FAT 16 and FAT 32. 10

6. Compare the performance and the capabilities of PCI and VESA buses in detail. 10

SECTION—D

7. What are the differences between SCSI and PCI buses ? Compare advantages and limitations. 10

8. (a) What are the serial and the parallel interfaces ? Compare them. 5

   (b) Explain SCSI RAID in detail. 5

SECTION—E

9. Write brief notes on the following :

   (a) Define the term resouce conflict. 1

   (b) Why do we need expansion slots ? Name the expansion slots available on the motherboard. 1

   (c) What is Video Ram ? What is its need ? 1

   (d) What do you mean by the term ATA-RAID ? What is its significance ? 1

   (e) What are the benefits of using USB ? 1

   (f) What is AGP ? 1

   (g) Can we use multiple monitors with a single system ? Justify you answer. 1

   (h) What is a video driver ? What is its function ? 1

   (i) What do you mean by system bus, explain ? 1

   (j) What are the advantages of using DMA for I/O ? 1

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SECTION–C

V. (a) How the recovery software is useful ? Explain. 5

(b) What is disk formatting ? Explain. 5

VI. Explain the design and working of ISA and ElSa buses. 10

SECTION–D

VII. (a) What is current loop interface? Explain. 5

(b) Explain IDE origin and interface. 5

VIII. Explain various ATA standards. 10

SECTION–E

IX. Write brief note on the following : 10

(a) What do you mean by RAID? 1

(b) What is boot sector? 1

(c) Explain the concept of partition table. 1

(d) What is Cache memory? Why is it so called? 1

(e) What is the difference between IDE and EIDE? 1

(f) What are floppy disk tracks and sectors? 1

(g) What is a TFT monitor? 1

(h) What is the purpose of three buttons of a mouse? 1

(i) What is boot strapping? 1

(j) Why a keyboard is organized like a matrix? 1

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PUNJABI UNIVERSITY, PATIALA
DEPARTMENT OF COMPUTER ENGINEERING
MST 1

TIME: 1hour Marks: 15

Computer Peripheral and Interfaces (CPE-209)

*Attempt any 2 from section B. Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following:

1. CMOS and BIOS
2. Video card and its interfaces
3. Motherboard and its components
4. Cache Memory and its types
5. Power supply and its ratings

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SECTION B

1. Explain different types and working mechanism of printers? (5)
2. What are the types and generation of processors? (5)
3. Explain different types of RAM and ROM? (5)

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Computer Programming (CPE-101) 293
II-4/2014

Time: 60 mnts *Note: Section-A is compulsory & attempt any two questions from Section-B* **Max Marks 15**

Q1 **Section-A (1 mark each)**

A) When a value is assigned to an array element whose subscript exceeds the size of array then.....

5. the element will be set to 0.
6. Will display error message.
✔7. no error, program will run.
8. Size of array grow automatically.

B) Is any error in the following code, If yes, find out and describe.

```
int main()
{
   int *x;     *x=100;     return(0);
}
```

C) What will be the output values of i,j and m in the following program?

```
int main()
{
   int a[5] = {5, 1, 15, 20, 25};
   int i, j, m;
   i = ++a[1];
   m = a[i++];
}
```

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D) What will be the value of variable x in the following program?

```
X=f1(a,b);
int f1(int a, int b)
    { return ( f2(20) ); }
int f2(int a)
    { return (a*a); }
```

E) Usually recursion works slower than loops ?

YES /NO

Section-B (5 mark each)

Q2 Define a structure ***TimeStruct*** with 3 members named ***hour, minute*** and ***seconds***. Write a program to assign values to data members and display the time on console in the format 16:40:30.

Q3 WAP in C++ to demonstrate the encapsulation property of object-oriented programming.

Q4 *i)* WAP in 'C' to check whether the sum of diagonal elements in 3x3 matrix is even or odd. (3)
ii) Describe class and object. How object is created. Give example with data of your choice. (2)

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P7/30

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MSc III (APPLIED PHYSICS)

Time Allowed: one hour MM: 15

NOTE: All questions are compulsory.

Q1. Set up the schrodinger wave equation for a particle in an infinite square well when
V= 0 for 0<x<a
V= ∞ elsewhere, and solve it to find its energy and wave function. or

Q1. Explain the principle and working of He-Ne laser with proper diagrams. (5)

Q2. (a) Derive the time dependent schrodinger wave equation. (3)

(b) what is the numerical aperture of an optical fiber cable withy clad index of 1.378 and core index of 1.546? (2)

Q3. (i) What is holography?
(ii) What does 10 dB/Km@800 nm signify?
(iii) What is population inversion?
(iv) What is the physical significance of continuity of well behaved wave function?
(v) Why can't a particle confined in an infinite potential box have zero energy? (1×5=5)

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Roll No. ..... 347 Total No. of Pages : 4

CC : D 4. 925

PC 5974-MR

O-18/2055

DATA STRUCTURES—208

Semester—IV

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

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1. (a) Write an algorithm to delete the last node from a single linked list. Discuss your algorithm with the help of a suitable example. 6

   (b) Convert the following infix expression into the postfix expression using stack as an intermediate structure

   $a + (b * c - (x / y \uparrow z) * p) * q$ 4

2. (a) Write an algorithm to reverse the entered sequence of an array without using another array. Discuss with example. 4

   (b) Define queue. Write algorithm how you can insert and delete an element from a circular queue. Write its applications also. 6

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SECTION—B

3. (a) Develop a max heap from the following sequence of nodes and apply heap sort. Show all the intermediate steps. 7

5 32 6 12 50 45 68 48 39 19 40

(b) Define binary tree. How is it represented in memory ? Explain with examples. 3

4. (a) Develop a BST by inserting nodes from the following sequence one by one :

52 22 12 47 27 25 37 32 42 62 82 72 87

Perform the following operations on the above resulting tree independently.

(i) Node 22 is deleted

(ii) Node 62 is deleted

(iii) Node 47 is deleted. 4

(b) What are AVL trees ? Explain various rotations performed on an AVL tree while inserting elements. Give examples. 6

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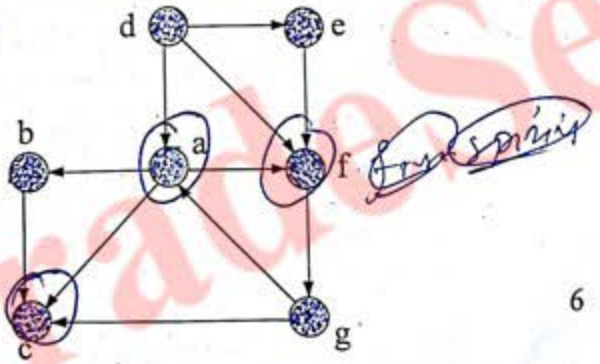
SECTION—C

5. (a) Find all the nodes approachable from d using BFS graph traversal algorithm. Show all the intermediate steps.



6

(b) Describe t graph.

6. (a) What do algorithm with the

(b) Compar organiza

7. (a) Write a same o

8 5

(b) Compa resolvi

8. (a) What hashin

(b) Write exam

9. Write brief

(a) Diffe

(b) Wha

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(b) Describe the memory representation techniques of a directed graph. 4

6. (a) What do you mean by a spanning tree ? Explain the Kruskal's algorithm used to find out the minimum spanning tree of a graph with the help of a suitable example. 7

(b) Compare Sequential, Relative and Index Sequential file organization methods. 3

SECTION—D

7. (a) Write a non-recursive algorithm for quick sort and apply the same on the following sequence :

8 5 7 3 2 4 1 6

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(b) Compare chaining and open addressing techniques of collision resolving. 4

8. (a) What is hashing ? Discuss various hash functions used for hashing. 5

(b) Write algorithm for binary search and discuss with suitable example. 5

SECTION—E

9. Write brief notes on the following :

(a) Differentiate between Stack and Queue.

(b) What is a complete binary tree ? Where is it used ?

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(c) Discuss B-tree file organization.

(d) Compare singly and doubly linked lists.

(e) Write algorithm for linear search.

(f) What is merging ?

(g) Define graph. Discuss its types.

(h) Discuss binary tree traversal techniques.

(i) Briefly explain method of hashing.

(j) What are binary search trees ? Give example. 10×1=10

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MST – 2

322

Class: B.Tech CE 5th (C1 to C6)
Max.Marks: 15

Sub: DBMS(CPE-302)
Max. Time: 1 hr

Section - A

1. Attempt All Questions.

a) What are Checkpoints? (1 mark)
b) What is cascadless rollback? (1 marks)
c) Define Steal/No-Steal (1 mark)
d) Define multivalued dependency with example (2 marks)

Section –B (Attempt any two questions) (5 marks each)

2 Explain the Time stamp ordering technique.
3 Explain the concept of query optimization and also discuss that why SQL queries are converted into relational algebra before optimization?
4 Explain the similarities and differences between 3NF and BCNF with suitable example.

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SECTION–D

7. What are the inbuilt and user defined functions ? How are they implemented ? Explain. 10

8. What are triggers ? What are their types ? Explain their uses. 10

SECTION–E

9. (a) Differentiate between DDL and DML. 1

(b) Discuss problems arising out of bad database design. 1

(c) How you can convert EER diagram to tables ? 1

(d) What are the advantages and disadvantages of database systems ? 1

(e) Why is data replication useful in Distributed Databases ? 1

(f) What are the advantages of distributed database system ? 1

(g) What is client server model ? 1

(h) Is recursion supported in PL/SQL ? IF yes, then how ? 1

(i) Distinguish between integrity and security. 1

(j) What is data dictionary ? 1

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Roll No. 59

323

Total No. of Pages : 3

PC 10761-MR

O-19/2056

RDBMS USING SQL AND PL/SQL–307

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrrying 1 mark each.

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SECTION–A

1. Explain the client-server architecture in detail. 10

2. Discuss database security control measures. 10

SECTION–B

3. Consider the schema given below:

Branch-schema (Branch-name, asset, Branch-city)

Customer-schema (Customer name, street, customer-city)

Deposit-schema

(Branch-name, account-number, customer-name, balance)

Borrow-schema

(Branch-name, loan-number, customer-name, amount)

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Client-schema (Customer-name, banker-name).

Write the SQL statements for the following :

(i) Find all customers who have a balance of over Rs. 1000.

(ii) Write the query to find the clients of banker Patel and the city they live in.

(iii) Write a statement to find all the customers who have a loan amount of more than Rs. 1200.

(iv) Write a statement to find all the customers whose name starts with "R" and who have a balance of more than Rs. 10,000. 10

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4. Explain the following in context of SQL :

(i) Exists

(ii) Having

(iii) Order by

(iv) On delete cascade

(v) Intersect

(vi) Correlated queries. 10

SECTION–C

5. What are the nested blocks ? Explain with example. 10

6. (a) What are cursors ? Explain their types. 7

(b) Discuss creation and scope of a variable. 3

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7. What are the inbu
implemented ? Ex

8. What are trigger

1962

9. (a) Differer

(b) Discus

(c) How y

(d) What
syste

(e) Why

(f) Wh

(g) W

(h) I

(i)

(j)

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Roll No. .....

Total No. of Pages : 2

PC 10800-MR

CC : ECE-D 4.923
ME-D 4.924
CE-D 4.925
Civil-D 4.1015

O-18/2054

ENVIRONMENTAL STUDIES

(Common Paper ECE, CE, ME, Civil)

Semester—IV

Time Allowed : Three Hours] [Maximum Marks : 75

Note :— Attempt any *five* questions from Part – I, each carrying 5 marks and any *five* questions from Part – II, each carrying 10 marks.

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PART–I

1. Attempt any *five* of the following :

(i) List the various problems associated with Dam projects.

(ii) Differentiate between a food chain and a food web.

(iii) What are alternate sources of energy ? Write a note on any alternate source of energy.

(iv) Describe the structure of a forest ecosystem.

(v) Differentiate between species diversity and ecosystem diversity.

(vi) Compare the renewable and non-renewable sources of energy.

(vii) Discuss briefly the nuclear hazards.

(viii) What is rain water harvesting ? List the various benefits of rain water harvesting.

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Roll No. .....

CC : ECE – D 4.923
CE – D 4.925
ME – D 4.924
Civil – D 4.1015

Total No. of Pages : 4

PC 5959-MR

O-18/2055

ENVIRONMENTAL AND ROAD SAFETY AWARENESS

(Common Paper ECE, ME, CE, Civil and MGT Integrated Program)

Semester–IV

Time Allowed : Three Hours] [Maximum Marks : 100

Note:– The paper will have two parts. Part I and Part II. Each part will be of 50 marks and will contain *ten* questions. The candidates will attempt *five* questions out of each part. The answer to each question should not exceed 500 words. Each question will carry 10 marks.

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PART–I

1. Define an ecosystem. Discuss the structure and function of a forest ecosystem.

2. Write notes on :
   (a) Food Web and Food Chains
   (b) Sustainable development.

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3. Enlist the various types of renewable and non–renewable energy resources. Discuss the importance and use of alternate energy resources.

4. Define Biodiversity. Elaborate the value and possible threats to Biodiversity. Discuss the various measures adopted for conservation of biodiversity. 11

5. Write an illustrated account on the effects of modern agriculture on environmental degradation.

6. Explain briefly the following :
   (a) Waterlogging
   (b) Deforestation.

7. Write notes on :
   (a) Ecological Pyramids
   (b) Biosphere.

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8. Discuss in brief the importance, scope and multidisciplinary nature of environmental studies.

9. Write about the following :
   (a) Mineral resources of India
   (b) Hotspots of Biodiversity.

10. Write short notes on :
   (a) Fertilizer and pesticide effects on environment.

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(b) Effects of over exploitation of mineral resources on environment.

PART–II

11. Define pollution. Discuss the causes, effects and control measures of air pollution.

12. Write notes on :
    (a) Earth Quakes and Cyclones
    (b) Nuclear hazards.

13. Discuss in detail the importance and scope of rainwater harvesting and watershed management in water conservation.

14. Write briefly about the following :
    (a) Forest Conservation Act
    (b) Global Warming.

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15. Write a detailed account about the concept and significance of road safety awareness. Mention the various steps that are needed to obtain a driving license.

16. What do you understand by Population Explosion ? Discuss the role of Family Welfare Programme in controlling population explosion in India.

17. Explain the following :
    (a) Nuclear hazards
    (b) Solid Waste management

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18. Discuss in detail the role of an individual in controlling pollution. Enlist the different sources which are responsible for causing noise pollution.

19. Write short notes on :
    (a) Vermicompositing
    (b) Marine pollution.

20. (a) Discuss the problems and concerns which are involved in the resettlement and rehabilitation of people.
    (b) Traffic offences and Traffic penalties.

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(ix) Briefly discuss the role of information and technology in environment protection.

(x) Write a short note on Global Warming. 5×5=25

PART–II

2. Attempt any *five* of the following :

(i) Discuss the scope and importance of environmental studies.

(ii) Define the term 'Ecosystem'. Describe the structure and functions of an ecosystem.

(iii) Write a note on the different types of threats to the biodiversity.

(iv) What is air pollution ? Describe the different causes and control measures for air pollution.

(v) Define population growth. Explain the various factors responsible for population growth.

(vi) Define ozone depletion. Describe the factors responsible for ozone depletion and effects of ozone depletion on human health.

(vii) What are hot spots of biodiversity ? Discuss the features of any two hot spots in India.

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(viii) Describe the Environmental Pollution Act with particular reference to Air (Prevention and Control of Pollution) Act, 1981.

(ix) Discuss the effect of modern agriculture on environment.

(x) What do you mean by the term 'Acid Rain' ? Describe the factors responsible for acid rain and its effect on environment.

5×10=50

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Digital Circuits and Logic Design
MSIT-1
(July-November 2012)
Date: 17/09/2012

Section-A (5 marks each)

Q1) Convert
a) $(153.513)_{10} = (?)_8$
b) $(10101.1101)_2 = (?)_{16}$

Q2) Convert SOP expression (AB+BC'+C'D) into its equivalent POS form.

Q3) Subtract $(1101)_2$ from $(1001)_2$ using 2's complement.

Q4) Convert $(10110)_2$ to Gray code.

Section B(Do any two)(5 marks each)

Q6) Minimize the following expression using K-Map
Y= ∑m(0,1,2,5,13,15)

Q7) Design full adder with the help of logic gates.

OR

Q8 Minimize the following equations using k maps
Y= (A+B)(A+B')(A+C')
Y= A'B+AB'C+AB

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DEPARTMENT OF COMPUTER ENGINEERING, PUNJABI UNIVERSITY PATIALA

B.Tech.Part-II-3rd Sem

Discrete Mathematics(CPE-205)

Date: 23-09-17 Time: 11.30 PM-12.30 PM MM:15

Note: Section A is compulsory. Attempt any two from Section B

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Q.1: a) Find fog and gof where $f(x) = x^2 + 1$ and $g(x) = x + 2$, are functions from R to R.

b) Give an example of a relation which is both equivalence relation partial order relation.

c) Prove that $f(x) = (x^3+1)/3$ for all $x \in R$ is invertible, where $f: R \to R$. Also find its inverse.

d) Let R be a relation on set A={1,2,3,4}, defined by R={(1,2), (2,3),(3,4),(2,1)}. Find transitive closure of R.

e) Express following function in disjunctive normal form: $x \wedge (y \vee z)$.

SEC-B (5 *2=10 marks)

Q.2 Solve recurrence relation $a_n - 4a_{n-1} + 3a_{n-2} = k^2$

Q.3. Find generating function G(S,Z) of S(K)-6 S(K-1)+ 5 S(K-1)=0, S(0)=1, S(1)=2.

Q4. . a) Let R be relation on the set of ordered pair of positive integers such that (a,b), (c,d) ∈ R if and only if a+d=b+c. Show that R is an equivalence relation. (2)

b) Let D_{30} be the relation under divisibility (/) . Prove that it is a lattice. also Determine the complement of each element. (3)

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DEPARTMENT OF COMPUTER ENGINEERING
PUNJABI UNIVERSITY PATIALA
MST-1 (20-9-2018)

Subject- Discrete Mathematical Structure-205 **Max. Marks-15**
B.Tech(2ND YR) **Time: 1 Hr.**

Note: Section-A is compulsory. Attempt any two from Section-B.

Section - A (1*5=5)

Q1 a) A bounded, distributive and complemented lattice is called Boolean Algebra. (T/F)

b) Let f: N →N be defined by $f(n)=2^n$, prove that f is one to one but not onto.

c) If f,g : [illegible] defined by $f(x)=x^2+2x+2$, $g(x)=2x-$. find fog and gog.

d) Evaluate the following exponential expression for x= -3
x^2+4y^3-3x+4

e) Find generating function for series 0,-5,25,-125.....

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Section – B

Q2 Solve Recurrence Relation $a_n=5a_{n-1}-6\,a_{n-2}+2^n+3$. (5)

Q3 a) If $D_6=\{1,2,3,6\}$ be a lattice under divisibility. Then determine the complement of each element of D_6 . (3)

b) If $f(x,y,z)=(\overline{x} \vee y) \wedge (x \vee \overline{y}) \wedge (\overline{x} \vee z)$ be a given Boolean function, determine its DN form. (2)

Q4 a) Let R be relation on the set of ordered pair of positive integers such that (x,y) R (u,v) if xv=yu. Show that R is an equivalence relation. (3)

b) Consider following relation on set A={1,2,3}, S =Empty relation, T=Universal Relation.
Determine whether or not each of above relation on A is an equivalence relation. (2)

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Department of Electronics and Communication Engineering

(Punjabi University, Patiala)

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Subject: Electronic Devices [illegible] **Max. Marks: 15**
Dated: 16-Nov-2015 **Time: 60 Minutes**

Section-A (1x5) (All questions are compulsory)

1. Why is a hybrid model of a transistor preferred to over the other models?
2. Why operating point is fixed in the centre of active region of transistor characteristics?
3. Define pinch off voltage of a JFET.
4. Name the factors which make the JFET superior to BJT.
5. Give an example of VLSI chip which we normally use in our daily life.

Section-B (2x5) (Attempt any two questions)

6. Write down various steps in chronological order involved in the fabrication of monolithic transistor?
7. Two MOFETs having drain resistances of rd1 and rd2 and amplification factor of μ1 and μ2 respectively are connected in parallel. Show that

$$\frac{1}{rd} = \frac{1}{rd_1} + \frac{1}{rd_2}$$

$$\mu = \frac{\mu_2\, rd_1 + \mu_1\, rd_2}{rd_1} + rd_2$$

Where rd and μ are drain combined resistance and combined amplification factor of parallel combination?

8. What is importance of Biasing? Explain anyone?

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Roll No. 1130039. Total No. of Pages : 3

PC 2664-NR

CC : ECE D 4.888

CC : Civil : D 3.981

C-11/2114

MANAGEMENT PRACTICE AND ORGANIZATION BEHAVIOUR–201

(Common Paper ECE and Civil Engg.)

Semester–III

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and *entire* Section E (carrying 1 mark each).

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SECTION—A

1. What do you understand by planning premises ? What are their different types ? How does correct assessment of planning premises help in the preparation of reliable plans ?

2. Discuss the concept of Management by Objectives. What is the process to be followed to implement MBO ?

SECTION—B

3. How are decisions important to an organization ? Explain the decision making process in detail.

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MST-2

Class: B.Tech 2nd year (ME and CE)

Time: 1hour

Sub: HSS-201 Management Practices & Organization Behavior

Max. Marks: 15

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1. Dysfunctional conflict
2. Leadership styles
3. Machiavellianism
4. Power vs. Politics
5. Social Learning

1*5= 5

Section B (Attempt any two)

Q-2 Explain two factor theory of motivation with example.

Q-3 How attitude is formed? Elaborate its components.

Q-4 **Politics is not inherently bad. It is merely a way to get things accomplished at workplace. Do you agree or disagree? Elaborate.**

2*5= 10

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Roll No. .....

Total No. of Pages : 2

CC : ME-D4. 924
CE-D4. 925

10801-MR

O-18/2054

MANAGEMENT PRACTICES AND ORGANIZATIONAL BEHAVIOUR-201

(Common Paper ME & CE Semester–IV)

Time Allowed : Three Hours]

[Maximum Marks : 50

Note :- Candidates are required to attempt *one* question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal weightage.

SECTION—A

1. Define Management. Distinguish between traditional goal setting and management by objectives.

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2. What do you understand by authority and responsibility ? Discuss in detail.

SECTION—B

3. How do managers develop, analyze, select and implementation alternatives and then assess whether the decision was effective ?

4. Define controlling. Discuss briefly the barriers to control making. How would you ensure to make control successful ?

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SECTION—C

5. Discuss the concept of motivation. What role money would play in (a) The hierarchy of needs theory. (b) Heizberg theory ? Explain.

6. Define Perception. What factors influence perception ?

SECTION—D

7. What is learning ? What is social learning theory and what are its implications for managing people at work ?

8. What is Organisation culture ? Describe the various dimensions of organizational culture.

SECTION—E

9. Discuss in brief the following :

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(a) Span of Management

(b) Factors influencing Centralization

(c) Rational Decision Maker

(d) Division of Labour

(e) Emotional intelligence

(f) Stereotyping

(g) Group Dynamics

(h) Dysfunctional conflicts

(i) Situational leader.

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4. What is Communication ? What are various types of communication ? How is communication important to an organization ?

SECTION–C

5. What is Organizational behaviour ? Explain its importance in business management. What are the various challenges ahead of OB ?

6. What do you mean by perception ? How the study of perceptual process is important in Organizational Behaviour ?

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SECTION–D

7. What are the various functions performed by a leader in the company ? What are the essential characteristics of a good leader ?

8. Explain the concept of organizational culture. How the study of cultural dimensions is important.

SECTION–E

9. Write short notes on the following :

   (a) Perceptual Accuracy

   (b) Cultural Environment

   (c) Leadership Styles

   (d) Opportunities for OB

   (e) Organizational conflicts

   (f) Social Perception

   (g) Power and Politics

   (h) Attitudes

   (i) Reinforcement

   (j) Authority and Delegation.

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Roll No. 11302259.....

Total No. of Pages : 2

CC : D 4.924

PC 5961-MR

O-18/2055

MANAGEMENT PRACTICES & ORGANISATION BEHAVIOUR–HSS 201

(Common Paper ME and CE Semester–IV)

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt *four* questions selecting *one* question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal marks.

SECTION–A

1. Explain in detail the contribution of classical and neo-classical schools of management thought.

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2. What is a 'Mission' ? What is the importance of having a mission statement in an organization ? How is the mission created ?

SECTION—B

3. Differentiate between delegation and decentralization. It is said, "Delegation of authority is essential for organizing". Explain this statement.

4. Define the control process. What is feed forward and feed backward control ? What type of control do you think is best for service organizations ? Give reasons.

Control types

5961-MR-O-18/1410/ALM-26421 [P.T.O.

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SECTION—C

5. What is Personality ? Discuss the various theories of personality.

6. Discuss the process of perception in detail. How according to you can perceptual in accuracies have negative impact on decision making process in an organization ?

SECTION—D

7. Define Learning. Discuss in detail the theory of 'Classical Conditioning' and its application in business organization.

8. Why does conflict happen in organization ? What measures can be adopted to resolve conflict ?

SECTION—E

9. Write notes on all of the following :

(a) Strategy

(b) Policies

(c) Informal Communication

(d) Grapevine

(e) Negative reinforcement

(f) Learning by insight

(g) Democratic leader

(h) Expert power

(i) Illegitimate power

(j) Feedback in communication process.

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University College of Engineering
Punjabi University Patiala.
MST-1 (Date 07-03-2014)
B.Tech (4th Semester,ME&CE Engg.)
PAPER- MANAGEMENT PRACTICE AND ORGANISATIONAL BEHAVIOUR
BAS-201

Time: 1Hr MM:15

Section A is compulsory. Attempt any two questions from section B.

Section A

Ques 1. (5 x 1)

a. What is rationality in Decision Making.
b. What is centralization.
c. Explain any two barriers to communication.
d. Define operational planning.
e. Define organizing.

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Section B

Ques 2. Explain the process of decision Making. (5 x2)
Ques 3. Explain the contribution of Elton Mayo in Management.
Ques 4. "Planning is the thinking process and managers being men of action should have no use for it." Comment.

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MST-II

Subject: Management practices and organization behavior **Subject code: HSS-201**

Class: 2nd year (CE and ME) **Max. Marks: 15**

Time allowed: 1hour

Section A (All questions are compulsory)

a) What is re-enforcement?

b) Write a short note on stereotyping?

c) Meaning of inter-personal Attraction

d) Differentiate between values and beliefs

e) Discuss stimulus factor in perception

5*1=5.

Section B (Attempt Any Two)

Q-2 What are the various levels of conflicts in organization? What causes conflicts at these various levels? **5.**

Q-3 "leaders are born and not made." Comment on this statement. **5.**

Q-4 How do Mc. Gregor's theory X and theory Y of human behavior help motivation of employees? Do you think an integrated approach and amalgamation of these theories may be more effective in our country? **5.**

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Class: B.Tech 2nd year (ME and CE) MST-I

Sub: HSS-201 Management Practices & Organization Behavior

Time: 1hour

Max. Marks: 15

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1) Bureaucratic Organization.
2) Initiating
3) Functional authority.
4) Management v/s Administration
5) Programmed decisions.

1*5= 5

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Section B (Attempt any two)

Q-2 "To take decision is also a decision". Explain it in detail.

Q-3 "It's not the plan that is important, it's the planning" comment.

Q-4 Do you think MBO is possible in real business world? Elaborate.

2*5= 10

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Department of Mechanical Engineering, Punjabi University Patiala

MCE-102, Manufacturing Processes

B.Tech Part-Ist, IInd Semester

Ist Mid-Semester Test, March 2014

11302086

Maximum Marks=30

Time-One Hour

Class:Ist Semester B1 to B12Gps. ***Attempt any two questions:-***

Note: Support the answers with a neat and clean sketch wherever needed.

Q1. (a) Define pattern & describe the various pattern allowances (10)

(b) What are the beneficial effects of cutting fluids. (5)

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Q2. (a) Draw the line diagram of Lathe showing its main parts. (7.5)

(b) Explain the mechanism of metal cutting and describe the various Cutting tool materials (7.5)

Q3. Write short note on the following along with neat and clean sketches

(a) Use of Chills and Chaplets

(b) Classification of manufacturing processes (2x7.5=15)

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DEPARTMENT OF MECHANICAL ENGINEERING, PUNJABI UNIVERSITY PATIALA

MACHINE DRAWING, MCE-251 **B-TECH 2ND YEAR** **Reappear Exam**

Date 04-12-2014 Maximum Marks - 100 Time: 10:00AM TO 12:00PM

NOTE: 1. Section A is compulsory

2. Attempt any three questions from Section B

Section A

1. Define lead of a thread. it is distance b/w axial axis. Point b/w centre &
2. Why bearings are lubricated –
3. Name different types of rivets.
4. Define bolt. →
5. Differentiate between Key and Cotter
6. What are different types of Couplings?
7. What is meant by crowning of a pulley?
8. What are locking devices? → It used to prevent the net to working loss. ex- joint nut, cost le net
9. Write various parts of pulley.
10. Write purpose of a bracket. → it is used to bearing a support to overbearing shaft 10X4=40 which is near to an axis act insulator in electric

Section B

1. Draw the following types of thread profiles, taking pitch = 40mm
   (a) ISO metric thread (b) Acme thread 10+10
2. Draw double riveted Butt joint using chain riveting. Take diameter of rivet = 20mm 20
3. From the details given in fig: 2; draw the front view (lower half in section) of the assembly of a protected type flange coupling. 20
4. Fig: 1 show the isometric view of a cast iron pulley. Draw its front view(top half in section) and right side view. 20

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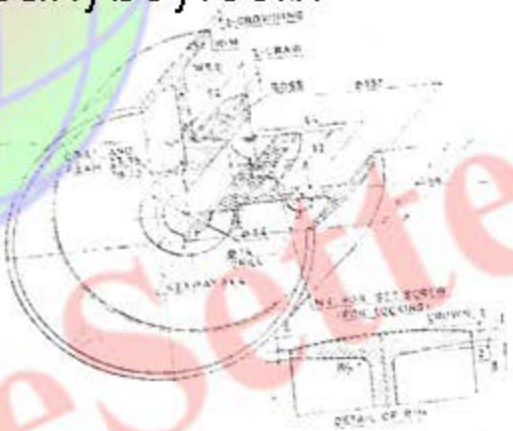
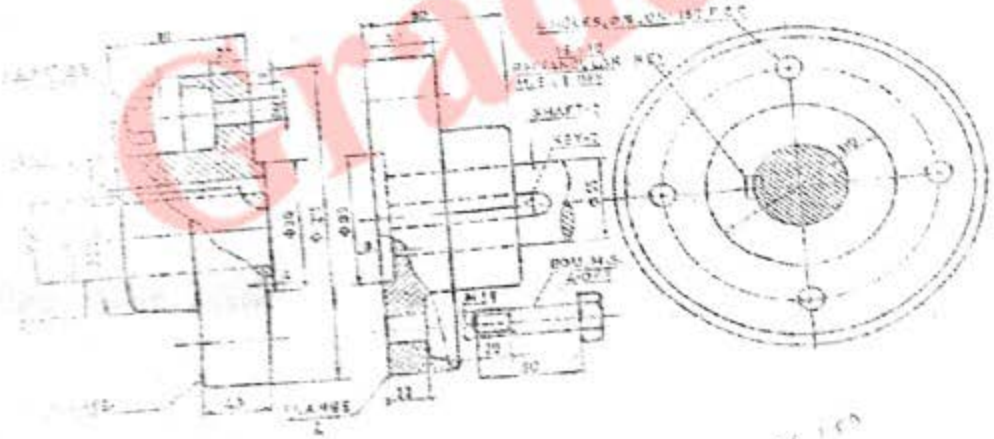


Fig: 1



snap head
pan head
ellipsoidal
flat tank sink
~~[illegible]~~
pan head with
taper head

Fig: 2

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Department of Mechanical Engineering
Punjabi University Patiala

Class: 3ME **MST - I**
Time: 1hr **Subject: HMT (MCE-303)**
Note: Section A is compulsory. Attempt any two questions from section B. Use of tables is allowed.

Section A (5x1)

1. What is the effect of temperature on thermal conductivity of solids, liquids and gases? Justify your answer.
2. Define fin effectiveness. What parameters should be considered for fin to be effective?
3. Write general heat conduction equation in cylindrical coordinates.
4. A black body has a total emissive power of 5kW/m^2. Determine its wavelength of maximum emission.
5. Define intensity of radiation. Write relation b/w intensity of radiation and emissive power.

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Section B (2x5)

6. Derive relation of temperature distribution and heat transfer for thin fin insulated at the tip.
7. The temperature of the inner side of a furnace wall is 640^{0}C and on the other side is 240^{0}C. It is exposed to atmosphere at 40^{0}C. In order to reduce the heat loss from the furnace, wall thickness is increased to double. Calculate the % age decrease in the heat loss due to increase in wall thickness.
8. For a hemispherical furnace, the flat floor is at 700K and has an emissivity of 0.5. The hemispherical roof is at 1000K and has emissivity of 0.25. Find the net radiative heat transfer from roof to floor and vice-versa.

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...Languages CPE-305 Max.Marks-15

B.Tech IIIrd Year CE (All Groups)

Attempt all questions

Section-A

Q1. Define(**each one mark**)

f) Serial I/O Lines
g) Synchronous &Asynchronous Modes
h) Memory Mapped I/O
i) Control Word in 8255
j) Cascading in 8259

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Section-B

Q2. A) Write the code for BCD to Binary Conversion in detail (3M)

B) Illustrate the concept of BCD addition in detail with an example (2M)

Section-C

Q3. A) Explain the concept of 8255A Programmable Peripheral Interface in detail (3M)

B) Explain DMA controller in detail (2M)

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Analysis and Design of Algorithms CPE-303 Max.Marks-15

B.Tech IIIrd Year CE (All Groups)

Department of Computer Engineering
Punjabi University, Patiala

MST-I (B.Tech 3CE_12, 34,56) Marks:15
Subject: Database Management Systems Paper: CPE 302 Time: 1Hr
Note: Question 1 is compulsory. Attempt total three question each carries 5 marks.

Q.1 Mention True/ False
a) Given the functional dependency R b -→ (S, T), then it is also true that R b→ S.?
b) A relation is in Boyce-Codd Normal Form (BCNF) if every determinant is a candidate key.
c) [illegible] will need to consider normalization principles.
d) A Transaction which is either committed or [illegible]
e) Unpredictable read occur when a transaction calculates some summery function over a set of data while other transactions are updating the data

Q.2 Explain Query optimization with the help of diagram.
Q. 3 Explain Concept of shadow paging, its advantages and disadvantages.
Q.4 Explain the concurrency control management in transactions.

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Department of Computer Science & Engineering

Microprocessor & Assembly Language Programming

MST-1 M.M.15

All questions are compulsory

Section-A

1. Define(each one mark)
   a)Debugging
   b) Explain Stack Pointer & Stack operation.
   c) Counters
   d)Machine Cycle
   e) RLC and RAL

Section-B

2. a) Explain the concept of Addressing Modes in detail.(2M)
   b) [illegible] Cycle, Read cycle, Write Cycle. (3M)

Section-C

3. a) Write a program to add two 8-bit numbers starting at memory address 2000H. The result is to be stored at memory location 2050H and the carry at memory address 2051H.(3M)
   b) Explain the concept of the time delay for the loop within loop with an example.(2M)

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MST-I 577

Time: 1hour

Class: B Tech 2nd year (ECE and CIVIL)

Max. Marks: 15

Sub: HSS-201 Management Practices & Organization Behavior

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

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1) Administration V/s Management.
2) Objective and policies.
3) Benefits of MBO.
4) Define Mission.
5) Routine and strategic decision.

1*5= 5

Section B (Attempt any two)

Q-2 "Do you think business should be responsible towards society"? Comment

Q-3 Write about the contribution of F.W Taylor in management.

Q-4 In what ways is communication important for effective managerial performance? As a manager, how would you ensure that you are an effective communicator?

2*5= 10

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056

MST-I Time: 1 Hour Max. Marks: 15

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HSS-201 Management Practices & Organizational Behaviour Class: B.Tech 2nd year (CE)

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1) Informal Organization
2) Span of Control
3) Programmed Decision making
4) Difference between Single use plan & Standing plan.
5) Administrative Vs Management.

1*5= 5

Section B (Attempt any two)

Q-2 Management contains element of both Sciences and Art. Comment

Q-3 Briefly point out the essentials features of Management Process School.

Q-4 Why Planning is essential in Business? Elaborate this with an example. 2*5= 10

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MST-I 659

HSS-201 Management Practices & Organization Behaviour **Class: B.Tech 2nd year (CE)** **Max. Marks: 15**

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1) Informal Organization
2) Span of Control
3) Programmed Decision making
4) Difference between Single use plan & Standing plan.
5) Administrative Vs Management.

1*5= 5

Section B (Attempt any two)

Q-2 Management contains element of both Sciences and Art. Comment

Q-3 Briefly point out the essentials features of Management Process School.

Q-4 Why Planning is essential in Business? Elaborate this with an example. 2*5= 10

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MST-I

659

HSS-201 Management Practices & Organization Behaviour Class: B.Tech 2nd year (CE)

Time: 1 Hour Max. Marks: 15

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Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1) Informal Organization
2) Span of Control
3) Programmed Decision making
4) Difference between Single use plan & Standing plan.
5) Administrative Vs Management.

1*5= 5

Section B (Attempt any two)

Q-2 Management contains element of both Sciences and Art. Comment

Q-3 Briefly point out the essentials features of Management Process School.

Q-4 Why Planning is essential in Business? Elaborate this with an example. 2*5= 10

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Department of Computer Science and Engineering
Punjabi University, Patiala.

Computer Networks (CPE-207)
2nd Year (4th Sem.)
MST- II

Date of Exam: 22-04-2014
Time Allowed: 1 Hour

Roll No... ...
M.M:15

Note: Section A is compulsory. Attempt any two questions from Section-B.

Section-A

Q.1 a) Why selective repeat sliding window is better than go back to N? Justify your answer in brief.

b) Find the class of following IP address and its value in decimal form along with its default subnet mask value.
11011101.100[illegible]

c) Define DNS.

d) IP address 141.14.2.21 is assigned to an organization. The organization wants to design 7 subnets. Find value of Subnet mask used by the organization.

e) What is socket address? How many bits are used to represent a socket address? 1*5=5

Section-B

Q.2 Define Routing? Explain with example one static and one dynamic routing algorithm. 5.0

Q.3 a) What do mean by error detection and correction. 1.0

b) Find checksum of following bit sequence; assume 8 bit segment size.
10010011, 10010011, 10011000 2.0

c) Explain the design of Simplex protocol. 2.0

Q.4 a) What do mean by node to node, host to host and process to process communication. 2.0

b) Define congestion control? Explain the protocols used to avoid and remove the congestion 3.0

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SECTION—E

9. Answer in brief :-

(a) Define absolute and relative error. Explain them with an example.

(b) Write the conditions of Newton Raphson method for nonlinear equations so that the method converges to a unique solution for any choice in [a, b].

(c) Compute the maximum error in the integration $\int_0^1 \frac{1}{1+x}\,dx$ by Simpson's 3/8 rule.

(d) Explain partial and scaled pivoting strategies in Gauss elimination method and why we use these pivoting.

(e) Find the first three non-zero terms of Taylor Series for the initial value problem $y''' + yy'' = 0$, $y(0) = 0$, $y'(0) = 0$, $y''(0) = 1$ and hence find $y(0.1)$.

5×2=10

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(b) Maximize $Z = 2x_1 + x_2 - 3x_3 + 5x_4$

subject to $x_1 + 7x_2 + 3x_3 + 7x_4 \leq 46,$

$2x_1 + 3x_2 - x_3 + x_4 \leq 10$

$3x_1 - x_2 + x_3 + 2x_4 \leq 8,$

$x_1, x_2, x_3, x_4 \geq 0.$ 7

SECTION–B

III. Explain the following in the context of Transportation problem :

(i) Stepping stone method.

(ii) Degenerate transportation problem.

(iii) Maximal transportation problem. 10

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IV. Explain the following in the context of Assignment problem :

(i) Balanced assignment problem.

(ii) Hungarian method.

(iii) Infeasible assignment. 10

SECTION–C

V. (a) Write short note on Applications of Game theory. 3

(b) Use dominance property to solve the following game between two players A and B :

	B		
A	6	8	6
	4	12	2

7

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SECTION–B

III (a) Solve the system of equations

$$\begin{bmatrix} 2 & 1 & 1 & -2 \\ 4 & 0 & 2 & 1 \\ 3 & 2 & 2 & 0 \\ 1 & 3 & 2 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} -10 \\ 8 \\ 7 \\ -5 \end{bmatrix},$$

using Gauss elimination method with partial pivoting. Also calculate the number of operations required for the solution of the system given above. (6)

(b) Perform only three iterations of Jacobi's method to solve the following system of equations taking zero initial vector :

$$2x - y = 7$$
$$-x + 2y - z = 1,$$
$$-y + 2z = 1.$$ (4)

IV (a) Using the Jacobi's method, find all the eigen values and corresponding eigen vectors of the matrix

$$A = \begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$$ (5)

(b) Consider the following data of a data and obtain a least squares fit of the form $f = ae^{-3t} + be^{-2t}$:

t	0.1	0.2	0.3	0.4
$f(t)$	0.76	0.58	0.44	0.35

(5)

SECTION–C

V Derive Simpson's 3/8th formula for the integral $\int_{x_0}^{x_3} f(x)\,dx$.

Evaluate the integration $\int_0^6 \frac{dx}{1+x^2}$, using Trapezoidal and Simpson's 1/3rd rule with $h = 1$. Compare the results with exact solution and conclude which is better. (10)

VI. Derive the formula for the first derivative of $y = f(x)$ of order $O(h^2)$ using forward difference approximation and hence use it for $f(x) = \sin x$ to estimate $f'(\pi/4)$ with $h = \pi/12$. Also obtain the bounds on truncation error and compare with exact solution. (10)

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SECTION–D

VII. (a) Using modified Euler's method solve the following initial value problem :

$$\frac{dy}{dx} + 2xy^2 = 0,\ y(0) = 1 \text{ for } [0, 0.6] \text{ with } h = 0.2.$$ (5)

(b) Solve the following boundary value problem using finite difference method

$$y'' + y = 0,\ y'(0) + y(0) = 0 \text{ and } y(1) = 1,\ h = 0.25.$$ (5)

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Faculty of Engineering, Punjabi University, Patiala
MST-I (Numerical Methods-BAS 201) B. Tech.-IV Sem. (CE & Civil)
Note: All questions are compulsory.

M.M. Marks: 15. Time Allowed: 1 hr.

Q. I (a) State sufficient condition for the convergence of iteration method.

(b) Show that $x_{n+1} = \frac{1}{2} x_n \left(3 - \frac{x_n^2}{\alpha}\right)$ has second order convergence near $\sqrt{\alpha}$.

(c) Use the Regula-Falsi method to find the root of $x^3 - 4x + 1 = 0$, correct up to four decimal places.

(d) Write working steps to solve tridiagonal system of equations given by Thomas.

(e) Show that the eigen values of an Hermitian matrix are real numbers. **(1X5)**

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Q. II Solve $x + y + z = 3$, $2x - y + 3z = 16$, $3x + y - z = -3$, using Factorization Method. **(5)**

OR

Q. III Solve $20x + y - 2z = 17$, $2x - 3y + 20z = 25$, $3x + 20y - z = -18$, using Gauss-Seidal Method. **(5)**

Q. IV (a) Find order of convergence of Secant method.

(b) Perform two iterations of the NR-method to solve the system of equations $x^2 + xy + y^2 = 7$ and $x^3 + y^3 = 9$ taking the initial approximation as $x_0 = 1.5$ and $y_0 = 0.5$. **(2.5+2.5)**

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Faculty of Engineering, Punjabi University, Patiala
MST-I (Numerical Methods-BAS 201) B. Tech.-IV Sem (CE & Civil)
Note: All questions are compulsory.

MSE Marks: 15. Time Allowed: 1 hr.

Q. I (a) State sufficient condition for the convergence of iteration method.

(b) Show that $x_{n+1} = \frac{1}{2} x_n \left(3 - \frac{x_n^2}{\alpha}\right)$ has second order convergence near $\sqrt{\alpha}$.

(c) Use the Regula-Falsi method to find the root of $x^2 - 4x + 1 = 0$, correct up to four decimal places.

(d) Write working steps to solve [illegible] system of equations given by [illegible]

(e) Show that the eigen values of an Hermitian matrix are real numbers. (1X5)

Q. II Solve $x + y + z = 3$, $2x - y + 3z = 16$, $3x + y - z = -3$, using Factorization Method. (5)

OR

Q. III Solve $20x + y - 2z = 17$, $2x - 3y + 20z = 25$, $3x + 20y - z = -18$, using Gauss-Seidal Method. (5)

Q. IV (a) Find order of convergence of Secant method.

(b) Perform two iterations of the NR-method to solve the system of equations $x^2 + xy + y^2 = 7$ and $x^2 - y^2 = 9$ taking the initial approximation as $x_0 = 1.5$ and $y_0 = 0.5$ (2.5+2.5)

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Roll No. .....

Total No. of Pages : 4

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PC 5971-MR

O-18/2055

NUMERICAL METHODS AND APPLICATIONS—201

(Common Paper CE and Civil Engg., Sem.—IV)

Time Allowed : Three Hours]

[Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 5 short answer type questions carrying 2 marks each.

SECTION—A

1. (a) Explain geometrical interpretation of Newton-Raphson method and show that this method converges quadratically for simple root. 5

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(b) Find an interval of unit length which contains the negative root of smallest magnitude of the equation :

$$f(x) = 3x^3 + 10x^2 + 10x + 7 = 0$$

Also perform two iterations of bisection method to find this root. 5

2. (a) Perform two iterations of Newton-Raphson method to solve the following nonlinear system of equations which has one solution close to $x = 1, y = 2$.

$$y \cos(xy) + 1 = 0$$

$$\sin(xy) + x - y = 0.$$

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(b) Find the root of the equation $\cos x = xe^x$, using Regula-Falsi method correct to three decimal places. 4

SECTION—B

3. (a) Solve the following system of equations $Ax = b$, using LU decomposition method. Take all the diagonal elements of lower triangular matrix as 1.

$$2x + y + z - 2w = -10$$
$$4x + 2z + w = 8$$
$$3x + 2y + 2z = 7$$
$$x + 3y + 2z - w = -5.$$

6

(b) Perform only three iterations of Gauss-Seidal method to solve the following system of equations taking zero initial vector

$2x - y = 7$; $-x + 2y - z = 1$; $-y + 2z = 1$ 4

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4. (a) Using the Jacobi's method, to find the largest eigenvalues and corresponding eigen vector of the matrix

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & 2 \\ -1 & 2 & 1 \end{bmatrix}$$

to three correct decimal places. 5

(b) Find the least squares approximation of second degree for the following data :

x	:	−2	−1	0	1	2
f(x)	:	15	1	1	3	19

5

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SECTION—C

5. Derive the formula for the first derivative of $y = f(x)$ of order $O(h^2)$ using central difference approximation and hence use it for $f(x) = \sin x$ to estimate $f'(\pi/4)$ with $h = \pi/12$. Also obtain the bounds on truncation error and compare with exact solution. 10

6. Derive composite Simpons's 1/3 formula and hence use it to evaluate $\int_0^1 \frac{dx}{1+x}$, with 6 subintervals. Also find the minimum number of intervals required to evaluate this integral with accuracy 10^{-6}, by using the same method. Compare your result with exact solution. 10

SECTION—D

7. (a) Apply Runge-Kutta method of order four to solve the initial value problem $\frac{dy}{dx} = \frac{y-x}{y^2+x^2}$, $y(0) = 1$, for $[0, 0.4]$ with $h = 0.2$. 5

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(b) Solve the following boundary value problem using finite difference method :

$y'' - y = x$, $y(0) = 0$ and $y(1) = 1$, $h = 0.25$. 5

8. Use Milne's predictor–corrector method to find $y(0.4)$ for the equation $\frac{dy}{dx} = x - y^2$, $y(0) = 1$. Find the starting values, using modified Euler method. 10

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Roll No. .....

Total No. of Pages : 3

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PC 2666-NR

NUMERICAL METHODS AND APPLICATIONS–201

(Common Paper ECE & ME Semester–III)

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt *four* questions, selecting *one* question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal weightage.

SECTION–A

1. (a) Explain Newton-Raphson method and prove that it converges quadratically. 5

(b) Determine a solution correct to four decimal places for $xe^x - \cos x = 0$ using Secant method. 5

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2. Perform two iterations of Newton-Raphson method to solve the system of equations $x^2 + xy + y^2 = 7$, $x^3 + y^3 = 9$. Take the initial approximation $x_0 = 1.5$, $y_0 = 0.5$. 10

SECTION–B

3. (a) Solve the following system of equations $Ax = b$, using Gauss elimination method with partial pivoting :

$$2x + y + z - 2w = -10$$

$$4x + 2z + w = 8$$

$$3x + 2y + 2z = 7$$

$$x + 3y + 2z - w = -5$$

5

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(b) Using the Jacobi's method, to find all the eigenvalues and corresponding eigen vectors of the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & 2 \\ -1 & 2 & 1 \end{bmatrix}$. 5

4. (a) Find the least squares straight line $y = Ax + B$ for the following data and also find the least squares error :

x	:	50	70	100	120
y	:	12	15	21	25

5

(b) Solve the linear system $3x + 2y + 7z = 4$, $2x + 3y + z = 5$, $3x + 4y + z = 7$ using LU decomposition with u_{ii}'s = 1. 5

SECTION–C

5. Derive Simpson's 1/3rd formula for the integration and hence evaluate $\int_0^6 \frac{1}{1+x^2}\,dx$, by dividing the interval into six parts each of width $h = 1$ and compare the results with exact solution. 10

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6. Derive the formula for the first derivative of $y = f(x)$ of $O(h^2)$ using forward difference and hence estimate $f'\left(\frac{\pi}{4}\right)$ if $f(x) = \cos x$. Also obtain the bounds on truncation error and compare with exact solution. 10

SECTION–D

7. Solve the following boundary value problem using finite difference method $y'' + y = 0$, $y(0) = 0$, $y(1) = 1$, $h = 0.25$. Solve the resulting system of equation generated by finite differences using Gauss Seidal method taking initial approximation as zero vector. 10

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8. Compare y(2) by Milne's predictor-corrector method for the differential equation $\frac{dy}{dx} = \frac{1}{2}(x + y)$, $y(0) = 2$, $h = 0.5$, by finding initial values with modified Euler method. 10

SECTION–E

9. Do as directed :

(i) Find the root of $f(x) = x^3 - x - 1 = 0$ using bisection method lying in the interval [1, 2]. (Perform only two iterations).

(ii) Define truncation and relative error. Explain them with an example.

(iii) Differentiate between direct and iterative method for linear system of equation and also define the rate of convergence of an iterative method.

(iv) Compute the maximum error in the integration $\int_0^1 \frac{1}{1+x}\,dx$ by Trapezoidal rule.

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(v) Use Picard's method to find first approximation y_1 for $x = 0.1$.

Given that $\frac{dy}{dx} = 3x + y^2$; $y(0) = 1$. 2×5=10

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M. S.T-I (Numerical Methods)
Department of C.E & Civil Engg (IV sem.)

Time: 1hrs. **Max. Marks: 15**

Note: ***All Questions are compulsory.***

Q. No. 1. (i) Using Newton Raphson method, find general formula n-root of inverse of number N.

(ii) State sufficient condition for convergence of iteration method.

(iii) Give geometrical interpretation of NR method.

(iv) Discuss Gauss Seidal Method.

(v) Define Partial Pivoting with example. **(5X1 = 5)**

Q. No. 2. Discuss NR-method for the system of non-liner equations and solve $x^3 + 2y^3 = 10$, $4y^2 + 3x^2 = 16$ starting with $x = 1.8$ and $y = 0.8$. **(5)**

Q. No. 3. Discuss the order of convergence of **Secant method.** **(5)**

Q. No. 4. Using **Factorization** method solve $x + y + z = 3$; $2x - y + 3z = 16$; $3x + y - z = -3$. **(5)**

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M. S.T-II (Numerical Methods, BAS-201)
B. Tech-III Sem. (Computer Engineering)

Time: 1hrs. *Max. Marks: 15*

Note: All Questions are compulsory.

Q. No. 1. (i). Find f(x) as a polynomial in x for the following table, by divided difference interpolation method

X:	- 4	- 1	0	2	5
f(X):	1245	33	5	9	1335

(1)

(ii). Derive Improved Euler's method. **(2)**

(iii). Fit an exponential curve $e = a\,x^b$ to the given data. **(1)**

(iv). Write formula for first order derivative using Striling formula. **(1)**

Q. No. 2. Find the order of error in Simpson's 1/3 rd rule. **(2.5)**

Q. No. 3 From the following table of values of x and y, obtain dy/dx and d^2y/dx^2 for x = 1.2 and 2.2

X:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.2
Y:	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

(2.5)

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Q. No. 4. (i) Solve the equation $y''(x) - x\,y(x) = 0$ for $y(x_i)$, where $x_i = 0, 1/3, 2/3$, given that $y(0) + y'(0) = 1$ and $y(1) = 1$. **(2.5)**

(ii) Find the value of y(0.3), using Adam's Predictor-Corrector method, given that $\frac{dy}{dx} = (x + y)e^{x}$, y(- 0.1) = 0.9053, y(0) = 1, y(0.1) = 1.1046 and y(0.2) = 1.2173. **(2.5)**

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M. S.T-II (Numerical Methods-BAS 201)
(For B. Tech ECE and ME III Semester)

Time: 1hrs. ***Max. Marks: 15***

Note: ***All Questions are compulsory and carry equal marks.***

Q. 1 (i) Solve $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$ by Picard's method. (2)

(ii) Write Milne's Predictor- Corrector Formulas. (1)

(iii) Evaluate $\frac{dy}{dx}$ at x = 2 when

X:	0	1	3	6
Y:	18	10	- 18	40

(1)

Q. 2 By dividing the range into ten equal parts, evaluate $\int_0^{\pi} Sinx\,dx$ by Trapezoidal and Simpson's rules. (3)

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Q. 3 Find y (0.2) for $\frac{dy}{dx} = x^2 y$, $y(0) = 1$ by using Runge-Kutta method of fourth order. (3)

Q. 4 (i) Find the first derivative of the function tabulated below at x = 0.6

X:	0.4	0.5	0.6	0.7	0.8
f(X):	1.5836	1.7974	2.0442	2.3275	2.6511

(3)

(ii) Explain Modified Euler's method. (2)

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Total Pages : 4

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O-18/2054

NUMERICAL METHODS & APPLICATIONS–201

(Common Paper with CE & Civil Engg.)

Semester–IV

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 5 short answer type questions carrying 2 marks each.

SECTION–A

I. (a) Show that order of convergence of secant method is 1.618. (5)

(b) Use Newton-Raphson method to compute the root of equation $e^{2x} + x - 2 = 0$ [illegible] correct to four decimal places starting with initial approximation 0.5. (5)

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II. (a) Perform only one iteration of Newton's method for non-linear system of equations

$$x^2 + y^2 = 1.12, \; xy = 0.23. \quad (6)$$

Take the initial approximation $x_0 = 0.9$, $y_0 = 0.2$.

(b) Determine the initial approximation to find the smallest positive root for the equation $x - e^{-x} = 0$, and use Regula-falsi method to find this root correct to three decimal places. (4)

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VIII. Use Adam's predictor-corrector method to advance the solution to $x = 0.8$ for the equation

$$\frac{dy}{dx} = y - x^2,\ y(0) = 1,\ h = 0.2.$$

Find the starting values, using R.K. method of order four. (10)

SECTION–E

IX. Answer the following in brief :

(a) Explain Truncation and Round off errors with examples.

(b) Find the root of $f(x) = x^3 - x - 1 = 0$ using bisection method lying in the interval [1, 2]. (Perform only two iterations.)

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(c) Define the rate of convergence of an iterative method for the solution of non-linear equations and also write the name and their rate of convergence of any two iterative methods.

(d) Give an example of 2×2 linear system, for which total pivoting gives more accurate result than scaled partial pivoting in four decimal floating arithmetic.

(e) Explain Picard's method for initial value problems.

(5×2=10)

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B.Tech-III(CE), Dept. of CE, Pbi. Univ. Pta. MST-1 CPE-309 COMPILER DESIGN
Time: 1 hour Date: 24.02.2016 MM: 15

1.

a. Do left factoring in the following grammar:
A →aBcC | aBb | aB | a
B → ε
C → ε

b. Name two compiler construction tools.

c. [illegible]

d. List the functions of a pre-processor.

e. List the various error recovery strategies for a lexical analysis. 5*1

2. Explain in detail the process of compilation. Illustrate the output of each phase of compilation for the input "a = (b+c) * (b+c) * 2". 5

ATTEMPT ANY ONE OF QUESTION 3 AND 4

3. Construct a table-based LL(1) predictive parser for the following grammar:
G = {bexpr, {bexpr, bterm, bfactor}, {not, or, and, (,), true, false}, P} with P:
bexpr → bexpr or bterm | bterm
bterm → bterm and bfactor | bfactor
bfactor → not bfactor | (bexpr) | true | false 5

4. (a)Show the steps of shift reduce parser to parse the string:(a, a) using following grammar:
S → (L) | a
L → L,S| S
(b) Explain the conflicts during shift-reduce parsing with example.

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Roll No. 1301102

Total No. of Pages : 3

PC 10763-MR

O-19/2056

COMPILER DESIGN–309

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: Attempt *four* questions selecting *one* question each from Sections A, B, C and D. Section E is compulsory.

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1. (a) Define a compiler. Discuss the basic structure of complier.

   (b) Explain the tool based approach to Compiler Construction.

   2×5=10

2. (a) Write regular expressions for the following patterns. Use auxiliary definitions wherever convenient.

   (i) The set of words having a, e, i, o, u appearing in that order, although not necessarily consecutively.

   (ii) Comments in C.

   (b) List the various error recovery strategies for a lexical analysis. Explain each with the help of suitable examples.

   2×5=10

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Roll No. 11301102

Total No. of Pages : 3

PC 10763-MR

O-19/2056

COMPILER DESIGN–309

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: Attempt *four* questions selecting *one* question each from Sections A, B, C and D. Section E is compulsory.

SECTION-A

1. (a) Define a compiler. Discuss the basic structure of compiler.

(b) Explain the tool based approach to Compiler Construction.

2×5=10

2. (a) Write regular expressions for the following patterns. Use auxiliary definitions wherever convenient.

(i) The set of words having a, e, i, o, u appearing in that order, although not necessarily consecutively.

(ii) Comments in C.

(b) List the various error recovery strategies for a lexical analysis. Explain each with the help of suitable examples.

2×5=10

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SECTION–B

3. What is Context Free Grammar ? Consider the following context free grammar:

S-> S S +

S-> S S *

S-> a

For the string aa+a* answer the below mentioned questions.

(i) Give a leftmost derivation for the string.

(ii) Give a rightmost derivation for the string.

(iii) Give a parse tree for the string.

(iv) Is the Grammar ambiguous or unambiguous ? Justify your answer.

(v) Describe the language generated by this grammar.

1×10=10

4. Write an algorithm for Predictive Parsing. Explain it with help of an example. 1×10=10

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SECTION–C

5. What is 3-address code ? What are the various methods to implement 3-address code ? Explain with help of an example. 1×10=10

6. (a) What is intermediate code generation ? What are the benefits of generating intermediate code ?

(b) What is Back patching ? What are the functions used for manipulating the list of labels in Back patching ?

2×5=10

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SECTION–D

7. What is heap storage allocation ? Explain in detail. 1×10=10

8. What is Code Optimization ? What are different techniques used for Code Optimization ? Support your answer with the help of examples. 1×10=10

SECTION–E

9. (a) What is input buffering ?

(b) Name and define the cousins of compiler.

(c) Write any two problems associated with top down parser .

(d) What types of conflicts that may occur during shift reduce parsing ?

(e) Define Context Free Grammar.

(f) What is Short Circuit Code ?

(g) Write any two applications of DAG.

(h) Define Code Optimization.

(i) What do you mean by machine independent optimization ?

(j) Define Token. 10×1=10

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B.Tech-III(CE), Dept. of CE, Pbi. Univ. Pta.
Time: 1 hour

MST-I
Date: 24.02.2016

CPE-309 COMPILER DESIGN
MM: 15

1.

a. Do left factoring in the following grammar:
$A \rightarrow aBcC \mid aBb \mid aB \mid a$
$B \rightarrow \varepsilon$
$C \rightarrow \varepsilon$

b. Name two compiler construction tools.

c. Write a short note on 'cousins of a compiler'?

d. List the functions of a pre-processor.

e. List the various error recovery strategies for a [illegible]

2. Explain in detail the process of compilation [illegible] 5*1
input "a [illegible] the output of each phase of compilation for the

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ATTEMPT ANY ONE OF QUESTION 3 AND 4

3. Construct a table-based LL(1) predictive parser for the following grammar: 5
G = {bexpr, {bexpr, bterm, bfactor}, {not, or, and, (,), true, false}, P} with P:
bexpr → bexpr or bterm | bterm
bterm → bterm and bfactor | bfactor
bfactor → not bfactor | (bexpr) | true | false

4. (a)Show the set of shift reduce parser to parse the string:(a, a) using following grammar: 5
S → (L) | a
L → L,S | S

(b) Explain the conflicts during shift-reduce parsing with example. 3

2

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Analysis and Design of Algorithms CPE-303 Max.Marks-15

B.Tech IIIrd Year CE (All Groups)

Department of Computer Engineering
Punjabi University, Patiala

MST-II (B.Tech 3CE_12, 34,56) Marks:15
Subject: Database Management Systems Paper: CPE 302 Time: 1Hr
Note: Question 1 is compulsory. Attempt total three question each carries 5 marks.

.1 Mention True/ False
a) Given the functional dependency R b -→ (S, T), then it is also true that R b→ S.?
b) A relation is in Boyce-Codd Normal Form (BCNF) if every determinant is a candidate key.
c) [illegible] will need to consider normalization principles.
d) A Transaction which is either [illegible]
e) Unpredictable read occur when a transaction calculates some summery function over a set of data while other transactions are updating the data

Q.2 Explain Query optimization with the help of diagram.
Q. 3 Explain Concept of shadow paging, its advantages and disadvantages.
Q.4 Explain the concurrency control management in transactions.

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Department of Computer Engineering
Punjabi University, Patiala

MST-1 (B.Tech 3CE_12,34,56) Marks:15
Subject: Database Management Systems Paper: CPE 302 Time: 1Hr
Note: Section-A is compulsory. Attempt any two questions from section-B (each Question carries 5 marks).

Q.1

Section-A

a) How does hierarchical data model address the problem of redundancy?
b) Difference between primary and foreign key
c) What is the role of mapping?
d) Define Disjoint Total constraint of EER model.
e) Difference between truncate and drop

Q.2

Section-B

Make an ER diagram as per the following detail
- An university has many departments
- Each department has multiple teachers, one among them is the head of the department
- A teacher belongs to only one department
- Each department offers multiple courses, each of which is taught by a single teacher
- A student can enroll in multiple courses from multiple departments

Q.3 The following database schema. Write down the SQL query to obtain the result.

Sailors(*sid*: integer, *sname*: string, *rating*: integer, *age*: real)
Boats(*bid*: integer, *bname*: string, *color*: string)
Reserves(*sid*: integer, *bid*: integer, *day*: date)

- Find the names and ages of all sailors in ascending order of their age.
- Find the names of sailors who have reserved a red boat.
- Find the names of sailors who have reserved at least one boat
- Find the color of boat reserved by Preet
- Find the total number of sailors.

Q.4 Compare different record based data models.

Q.5

Data Entry: 0.6 KLOC

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SECTION–B

III. Discuss the convergence of the following series :

(a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} \sin \frac{1}{n}$

(b) $\sum_{n=1}^{\infty} x^{n+1} (\log (n+1))^q$ (5+5)

IV. (a) State and prove Weierstrass's M-test for uniform convergence of a series.

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(b) Test the uniform convergence of $\sum_{n=1} r^n \sin nx$, for all real x and $0 < r < 1$. (5+5)

SECTION–C

V. (a) Find the possible Taylor's or Laurent series expansion of the function $f(z) = \frac{1}{(z+1)(z+2)^2}$ in the region $|z-1| < 2$.

(b) Prove $\int x^{-\nu} J_{\nu+1}(x)\, dx = -x^{-\nu} J_{\nu}(x) + c$; $J_{\nu}(x)$ is a Bessel's function of first kind. (5+5)

VI. Prove the fo

(a) $\int_{-1}^{1} x P_n$

(b) P'_n (-

VII. Evaluate

(a) L{

(b) L^{-1}

Here L a
respecti

VIII. (a) O

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VI. Prove the following for Legendre polynomials :

(a) $\int_{-1}^{1} x P_n(x) P_{n-1}(x)\, dx = \frac{2n}{4n^2 - 1}, \quad n = 1, 2, \cdots$

(b) $P'_n(-1) = (-1)^{n-1}\, n(n+1)/2$. (5+5)

SECTION–D

VII. Evaluate

(a) $L\left\{\int_0^t \frac{e^t \sin t}{t}\, dt\right\}$.

(b) $L^{-1}\left\{\frac{1}{s^3 (s^2 + a^2)}\right\}$.

Here L and L^{-1} stands for Laplace transforms and its inverse respectively. (5+5)

VIII. (a) Obtain the Fourier series for the function

$$f(x) = \begin{cases} 0, & -\pi < x < 0 \\ x^2, & 0 \le x < \pi. \end{cases}$$

Hence deduce that

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots \infty = \frac{\pi^2}{6}.$$

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(b) Find the Fourier series expansion of

$$f(x) = \pi + x, \; -\pi < x < \pi.$$

Hence decuce that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \cdots \infty.$$

(5+5)

SECTION–E

IX. Do as directed

(a) What is an exact differential equation ?

(b) Determine Wronskian of 1, sin x, cos x for all $x \in (0, \infty)$.

(c) What is integrating factor of the

$$M(x, y)dx + N(x, y)dx = 0$$

(d) if M, N are homogeneous functions of degree n ?

(d) Is the series $\sum_{n=1}^{\infty} \left(\frac{1}{n}\right)^{\left(1+\frac{1}{n^2}\right)}$ convergent ?

(e) State Cauchy convergence criterion for convergence of sequences.

(f) Write the Legendre's differential equation.

(g) Show that $J_n(x)$ is even function for even integer n.

(h) State Second shifting theorem for Laplace transformations.

(i) Is the Inverse Laplace transformation linear ? Justify.

(j) Write Fourier coefficients for Fourier expansion of $f(x)$ in $[-l, l]$ if $f(x)$ is odd function. (1×10=10)

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Total Pages : 4

PC-10785/MR

O-17/2054

APPLIED MATHEMATICS–II

Paper : BAS-105

Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : The candidates are required to attempt *one* question each from section. A, B, C and D carrying 10 (ten) marks each, and the entire Section E of 10 (ten) short answer type questions carrying 1 (one) mark each.

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SECTION–A

I. (a) Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = e^{e^x}$.

(b) Apply method of variation of parameters to solve $y'' + y = \sec x$. (5+5)

II. Solve

(a) $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = \log x \sin(\log x)$.

(b) $x^3\frac{d^3y}{dx^3} - 3x\frac{dy}{dx} + 3y = 16x + 9x^2 \log x,\ x > 0$. (5+5)

[P.T.O.

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3. Define Poynting Vector. Derive an expression for it and explain its physical significance for a Plane Electromagnetic Wave. 1+4=5

4. State the fundamental Postulates of the special theory of relativity. Deduce an expression for the variation of mass with velocity. 1+4=5

5. Prove the relation $E^2 - p^2c^2 = m_0^2c^2$, where p is the momentum. 5

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SECTION—B

6. Deduce Maxwell-Boltzmann law for the distribution of molecules in a gas. 5

7. Find an expression for the energy distribution function for electron gas in a metal. 5

8. Show that FCC and HCP are the closed packed structure. Find the Miller indices of a plane that makes an intercepts of 1 on x-axis and 2 on b-axis and is parallel to c-axis. 3+2=5

9. Derive Lo
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10. What is
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11. Answer
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(ii) If
(iii) W
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(iv) W
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(v) S
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9. Derive London equations of superconductivity and estimate the magnitude of the penetration depth of an applied magnetic field. 5

10. What is meant by Polarization of a Material ? Mention the different mechanism of polarisation in a dielectric. 2+3=5

SECTION—C

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11. Answer the following questions : 10×2=20

(i) What do you understand by gradient of a scalar field ?

(ii) If $r = x\hat{i} + y\hat{j} + z\hat{k}$, show that curl r = 0 ?

(iii) What are dielectric breakdown and dielectric strength ?

(iv) What do you mean by Frame of reference ?

(v) Show that a particle which travels with speed of light must have a zero rest mass.

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(vi) What do you mean by grand Canonical ensembles ?

(vii) What is the difference between a Boson and Fermions ?

(viii) Derive the relation between Interplaner spacing and Lattice parameter of a crystal system.

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(ix) Find atomic packing factor of diamond Crystal.

(x) What are Type-I and Type–II superconductors ?

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Roll No. .....

Total Pages : 4

9304/MB

G–2/2057

APPLIED PHYSICS–II

Paper–104

Semester–II

Time Allowed : 3 Hours] [Maximum Marks : 50

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Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION—A

1. State and prove Gauss-Divergence theorem. 5

2. **Prove that the velocity of plane electromagnetic wave in the vacuum is given by** $c = 1/\sqrt{(\mu_0 \varepsilon_0)}$. 5

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PUNJABI UNIVERSITY , PATIALA

CE MST 1

TIME: 1hr Marks: 15

.NET PROGRAMMING CPE 310

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following :-

1. Class Libraries
2. Strings in .Net
3. Event Handlers
4. Timer Control
5. MDI forms

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SECTION B

1. Write Features of .Net Framework. (5)
2. Discuss Control Structures with example? (5)
3. Define Procedures and Functions in .Net (5)

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PUNJABI UNIVERSITY , PATIALA

CE MST 1

TIME: 1hr Marks: 15

.NET PROGRAMMING CPE 310

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following :-

1. Class Libraries
2. Strings in .Net
3. Event Handlers
4. Timer Control
5. MDI forms

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SECTION B

1. Write Features of .Net Framework. (5)
2. Discuss Control Structures with example? (5)
3. Define Procedures and Functions in .Net (5)

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PUNJABI UNIVERSITY , PATIALA

CE MST 2

TIME: 1hr Marks:

Dot Net Programming

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following :

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1. Write various classes that implement IList
2. Write 5 web controls
3. What are namespaces?
4. Applications of crystal reports
5. Explain concept of classes in .net

SECTION B

1. Explain Active Data Object (5)
2. Write about Custom Window Controls. (5)
3. Explian validation controls (5)

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CE MST 2

TIME: 1hr Marks:

Dot Net Programming

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following :

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1. Write various classes that implement IList
2. Write 5 web controls
3. What are namespaces?
4. Applications of crystal reports
5. Explain concept of classes in .net

SECTION B

1. Explain Active Data Object (5)
2. Write about Custom Window Controls. (5)
3. Explian validation controls (5)

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Roll No. .....

Total No. of Page

PC 10762-M

O-19/2056

COMPUTER GRAPHICS–308

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrrying 1 mark each.

SECTION–A

1. Write down and explain midpoint circle drawing algorithm. Assume 200 units radius and co-ordinate origin as the Center of the circle. 10

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2. (a) Distinguish between random and raster scan displays. 5

   (b) Explain the following devices :

   (i) Image scanners

   (ii) Plotters. 5

SECTION–B

3. Derive the transformation matrices for the following transformations :

   (a) Reflection about X-axis

   (b) Reflection about Y-axis

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(c) Reflection about origin

(d) Reflection about line Y = X

(e) Reflection about Y = -X. 10

4. Show that the reflections in the line y = x and the line y = -x can be performed by a scaling operation followed by rotation. 10

SECTION–C

5. Show why the Sutherland-Hodgeman clipping algorithm will only work for convex clipping regions. 10

6. A cube is defined by 8 vertices, A (0,0,0), B (2,0,0), C (2,2,0), D (0,2,0), E (0,0,2), F (2,0,2), G (2,2,2), H (0,2,2). Find the final co-ordinates after it is rotated by 45 (degree) around a line joining the point (2,0,0) and (0,2,2). 10

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SECTION–D

7. Explain the properties of the Bezier and B spline curves. 10

8. What are the steps required to shade an object using Phong shading algorithm ? Explain. 10

SECTION–E

9. (a) Write any two line attributes. 1

(b) Differentiate between window and viewport. 1

(c) What do you mean by the shading of objects ? 1

(d) What is the viewing transformation ? 1

(e) What is line clipping ? Explain. 1

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(f) Define:

(i) View reference point

(ii) View plane normal. 1

(g) For large polygons the flood fill algorithm may fail, why? What could be the method to avoid this? 1

(h) Explain the working of the raster scan monitors. 1

(i) What is aspect ratio? What is its importance? 1

(j) Distinguish between Phong and Gouraud shading. 1

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...UTER GRAPHICS CPE-308

Class: B.Tech IIIrd Year Computer Engineering (All Groups) Time: 1Hour

Max.Marks-15

Section-A (All are compulsory. Each question carries 1 mark)

1) What are the components of surface data required for a surface in A-Buffer method.
2) Why Sutherland Hodgeman polygon clipping method cannot correctly clip the Concave polygons.
3) Write the significance of viewing coordinates in viewing transformation pipeline.
4) What is the difference between Phong and Gouraud shading methods.
5) What is the significance of Z-value in visible surface detection methods.

Section-B (Do any 2 questions. Each question carries 5 marks)

6) Apply Sutherland Hodgeman and Weiler Atherton polygon clipping methods to clip the given polygon. [illegible] clipped region obtained for both the methods.

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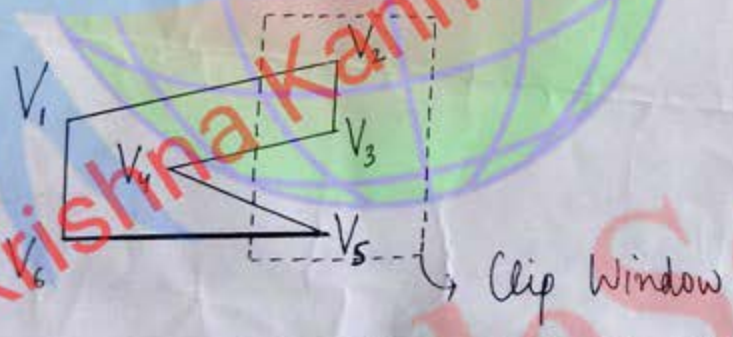

7) Explain Scan Line method for visible surface detection giving suitable example.
8) Discuss parallel projections and subtypes giving mathematical expressions and diagrams for all.

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Department of Computer Engineering
Punjabi University, Patiala
Subject: Computer GraphicsClass: 6th Semester

MM. 15 MST-I

(Section-A) Answer all the questions

1. Define Following: (1X5)
   a. Pixel and Resolution
   b. TFT
   c. Shear Transformation
   d. Difference between Trackball & Spaceball
   e. Reflection

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(Section-B) Answer any two questions (5X2)

2. List down the differences between DDA and Breshenham's Line Drawing Algorithm alongwith their merits and demerits.
3. What are various flat panel displays? Explain in detail.
4. A) Perform 45degrees rotation of a triangle A(0,0), B(1,1),C(5,2) a) about the origin b) about the point P(-1,-1)(4M)
   B) Write the general form of scaling matrix w.r.t fixed point P(h,k). (1M)

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Department of Computer Engineering
Punjabi University, Patiala
Subject: Computer Graphics Class: 6th Semester

MM. 15 MST-II

(Section-A) Answer all the questions

1. Define Following: (1X5)
   a. Projection
   b. Viewing Pipeline
   c. Clipping
   d. Flood Fill versus Boundary Filling
   e. Shadi[illegible]

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(Section-B) Answer any two questions

2. Explain Cohn Sutherland line clipping algorithm with suitable example. (5X2)
3. How A-Buffer algorithm is better than depth buffer algorithm. Explain its steps.
4. Elaborate the concept of transformations in 3D space by mentioning their types and ma[illegible]

[illegible]int P(-1,-1)
(1M)

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Department of Computer Engineering
Punjabi University, Patiala
Subject: Computer Graphics Class: 6th Semester

MM. 15 MST-I

(Section-A) Answer all the questions (1X5)

1. Define Following:
   a. Projection
   b. Viewing Pipeline
   c. Clipping
   d. Flood Fill
   e. Shading

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(Section-B) Answer any two questions (5X2)

2. Explain Cohn Sutherland line clipping algorithm with suitable example.
3. How A-Buffer algorithm is better than depth buffer algorithm. Explain its steps.
4. Elaborate the concept of transformations in 3D space by mentioning their types and ma... (1M)

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Department of Computer Engineering
Patiala University, Patiala
Subject: Computer Graphics
Class: 6th Semester

(Section-A) Answer all the questions

1. Define following:
   a. Retracing
   b. DFT
   c. Show Transf
   d. DDA and its Problems
   e. CRT (with Diagram)

(Section-B) Answer any two questions

2. Describe the concept of [illegible] in Mid-Point Circle Drawing Algorithm. Also elaborate its various steps.
3. What are various [illegible] panel displays? Explain in detail.
4. Calculate the final vertices of a triangle after rotating it on an angle of 45 degree around a point (1,2) by using homogenous metrics, where the original vertices of triangle are (2,2), (5,3), (4,5).

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Roll No. ..... Total No. of Pages : 3

CC : D 4.1014

PC 6034-MR

O–19/2055

DOT NET PROGRAMMING–310

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 9 short answer type questions carrying 1[illegible]

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SECTION—A

1. Explain Fundamentals of DotNet Framework and features of DotNet Framework.

2. What does CLI embody ? Write the security features available in DotNet Framework.

SECTION—B

3. Explain the flow control structure with example. How is exit statement different from break ?

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4. (i) Write brief of MDI application.

(ii) Explain the following properties of gridView control :

(a) Page Size

(b) Selected Index

(c) Caption Align

SECTION—C

5. Explain how try-catch-finally statement is executed.

6. Explain the ADO.Net SQL client data adapter object model and DataSet object model.

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SECTION—D

7. How to add new properties, methods and events ?

8. Write the program to validate the user's First name, Last name and Address. All fields are required. Write a code validate the fields.

SECTION—E

9. Write in short :

(a) Define namespace.

(b) Define delegates.

(c) Which method is used to force all the validation controls to run ?

(d) What are the various authentication techniques in ASP.Net ?

(e) Define Anchoring and Docking.

(f) How to update data and edit data in ADO.Net ?

(g) Difference between Textbox and TextArea.

(h) Difference between Progress bar and Timer.

(i) Define Widening and Narrowing Conversions.

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PUNJABI UNIVERSITY , PATIALA

CE MST 1

TIME: 1hr Marks: 15

.NET PROGRAMMING CPE 310

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following :-

1. Class Libraries
2. Strings in .Net
3. Event Handlers
4. Timer Control
5. MDI forms

SECTION B

1. Write Features of .Net Framework. (5)
2. Discuss Control Structures with example? (5)
3. Define Procedures and Functions in .Net (5)

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PUNJABI UNIVERSITY , PATIALA

CE MST 1

TIME: 1hr Marks: 15

.NET PROGRAMMING CPE 310

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

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Write in brief about following :-

1. Class Libraries
2. Strings in .Net
3. Event Handlers
4. Timer Control
5. MDI forms

SECTION B

1. Write Features of .Net Framework. (5)
2. Discuss Control Structures with example? (5)
3. Define Procedures and Functions in .Net (5)

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PUNJABI UNIVERSITY , PATIALA

CE MST 2

TIME: 1hr Marks:

Dot Net Programming

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following :

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1. Write various classes that implement IList
2. Write 5 web controls
3. What are namespaces?
4. Applications of crystal reports
5. Explain concept of classes in .net

SECTION B

1. Explain Active Data Object (5)
2. Write about Custom Window Controls. (5)
3. Explian validation controls (5)

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CE MST 2

TIME: 1hr Marks:

Dot Net Programming

*Attempt any 2 from section B . Section A is compulsory.

SECTION A (1 mark each)

Write in brief about following :

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1. Write various classes that implement IList
2. Write 5 web controls
3. What are namespaces?
4. Applications of crystal reports
5. Explain concept of classes in .net

SECTION B

1. Explain Active Data Object (5)
2. Write about Custom Window Controls. (5)
3. Explian validation controls (5)

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Roll No. .....1159..... Total Pages : 3

4012/NR

G-2/2116

JAVA PROGRAMMING

Paper–402

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. What is Inheritance? Explain various types of inheritance with suitable examples.

2. What is Multi-threading? State and explain the methods used for Thread Synchronization.

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SECTION—B

3. What is a stream? Describe the major tasks of input and output Stream classes. Also distinguish between the follwing :

   (a) InputStream and Reader classes

   (b) OutputStream and Writer classes.

4. Explain in detail the Windows class hierarchy as defined by AWT. What are Frame windows?

SECTION—C

5. What are the basic steps for using JDBC to access a Database? Explain briefly with syntax.

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6. What is J2EE? Elaborate on the component based architecture of J2EE.

SECTION—D

7. What is the need for Session tracking in the Servlet? What are the different techniques used for Session tracking?

8. (a) Explain the lifecycle of Stateless Session Bean.

   (b) What are the various ways of passing parameters in EJB? Briefly discuss each.

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SECTION—D

9. (i) Define method overriding.

(ii) List any four controls from java.awt package.

(iii) What is Prepared Statement?

(iv) What are the advantages of using JSP over Servlets?

(v) What is an Applet?

(vi) What are the commonly used classes of java.sql package?

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(vii) List all properties of Java Beans.

(viii) What is a Constructor? How is a constructor different from a Method?

(ix) What is Socket programming?

(x) What is JDBC-ODBC bridge?

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Department of Computer Engineering
Punjabi University, Patiala
MST-1
Java Programming (CPE-402)

SECTION-A (1 mark each) (Do all)

Q1) Why Java does not support multiple inheritance?

Q2) What is the need of super and this keywords?

Q3) To prevent any method from overriding we declare the method as_____.

Q4) What is an abstract class?

Q5) An interface can implement another interface. True/ False.

SECTION-B (5 Marks each)

Q1) Discuss [illegible] language.

OR

Give the syntax of Applet tag. Explain its constituents.

Q2) Explain how to define, extend, implement and access an interface.

OR

Explain Exception Handling Mechanism in detail.

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Roll No. .....

Total Pages : 3

4013/NR

G-2/2116

SYSTEM MODELING AND SIMULATION

Paper–403

Semester–VII

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION—A

1. Explain the concept of System with any one live example. Discuss the various ways of Modeling a system.

2. What is Simulation? What is the difference between Simulation and Modeling? With the aid of flow diagram explain various steps in a simulation study.

13207

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SECTION—B

3. Describe a queuing system with respect to arrival and service mechanisms, system Capacity, queue discipline, flow diagrams of arrival and sevice events.

4. Explain the linear congruential method for generating random numbers and generate three random numbers using above methods with X_0=27, a=17, c=43 and m=100.

SECTION—C

5. Explain in detail the chi-square goodness of fit test.

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6. With illustrative examples, describe the Output analysis for Steady state simulations.

SECTION—D

7. Discuss the concepts of high-level Computer simulations by sketching a simulation model at a Computer system that services requests from the world wide web.

8. What do you mean by Simulation language? How these languages are different from high level languages? Explain the features of any one simulation language you are working with.

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SECTION—I

9. (i) Discuss the general Systems theory in brief.

(ii) Differentiate between Continuous and Discrete systems.

(iii) What are the desirable properties of Random numbers?

(iv) What is acceptance rejection technique?

(v) Explain any two situations where Simulation is not an appropriate tool.

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(vi) Differentiate between Endogenous and Exogenous activity.

(vii) What are the problems or errors in generating pseudo random numbers?

(viii) Enlist the steps involved in development of a useful model of Input data.

(ix) What are the elements of an Inventory system?

(x) Briefly discuss the Stochastic simulation.

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M.15

Subject: System Modeling & Simulation (CPE-403)

Date:

MST-I

Section-A is compulsory & attempt any two questions from Section-B

4CE12, 4CE34, 4CE56

Section-A

1. Write any two advantage of simulation? (1)
2. Define poisson process. (1)
3. What is stochastic system? (1)
4. Write the properties of Pseudo-random numbers. (2)

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Section-B (5 marks each)

5. Explain the steps involved in simulation study. (5)
6. What is inverse transformation method? Explain how it is used for producing non-uniformly distributed random numbers for exponential distribution. (5)
7. Describe various tests used for testing the pseudo-random numbers. (5)

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Department of Computer Engineering **MST-II**

System Modeling&Simulation CPE-403 **Max. Marks: 15**

B.Tech IV year 7th sem. CE **Time: 1 Hour**

Section A (All questions are compulsory)

1. Difference betweenTerminating and Non-Terminating simulation. (2)
2. Define Output Analysis. (2)
3. Define Run Size. (1)

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Section B (Do any two questions each carrying 5 Marks)

4. Describe the steps involved in design of simulation experiments.
5. Describe the step by step procedure for selection of suitable simulation language.
6. Explain different types of variables involved in simulation study.

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Roll No. .....

Total No. of Pages : 2

CC : D 4. 925

PC 5972-MR

O-18/2055

VISUAL PROGRAMMING—206

(Common Paper CE and Civil Engg. Semester—IV)

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

1. (a) Explain conditional statements available in Visual Basic.

   (b) How can you pass variables to some function with and without using global variables ? 5,5

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2. (a) What are various data types in Visual Basic ?

   (b) Discuss date and time functions. Display date and time in a form. 4,6

SECTION—B

3. (a) How do you add and remove items from a listbox ?

   (b) Write a procedure to create MDI applications. 5,5

4. (a) What are the controls that provide choice to the user ?

   (b) Write a procedure to set the properties of command button control.

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5,5

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Roll No. ..... www.thecompanyboy.com Total No. of Pages : 3

CC : D 4. 925

10812-MR

O-18/2054
VISUAL PROGRAMMING-206
(Common paper CE & Civil Engg.)
Semester–IV

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 9 short answer type questions carrying 10 marks in all.

SECTION—A

1. (a) What are different interfacing elements in Visual Basic ?
   (b) What is event procedure ?
   (c) Discuss the difference between if-then-else and select-case statement. 3,3,4

2. (a) Discuss for-next statement with example. When is it preferred over the other looping statements ?
   (b) What are user defined data types ?
   (c) Why is GUI easy to work with ? 3,3,4

SECTION—B

3. (a) Discuss Combo Box with options.
   (b) Discuss component object model. 5,5

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CC : D 4. 925

10812-MR

O-18/2054
VISUAL PROGRAMMING-206
(Common paper CE & Civil Engg.)
Semester–IV

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 9 short answer type questions carrying 10 marks in all.

SECTION—A

1. (a) What are different interfacing elements in Visual Basic ?
   (b) What is event procedure ?
   (c) Discuss the difference between if-then-else and select-case statement. 3,3,4

2. (a) Discuss for-next statement with example. When is it preferred over the other looping statements ?
   (b) What are user defined data types ?
   (c) Why is GUI easy to work with ? 3,3,4

SECTION—B

3. (a) Discuss Combo Box with options.
   (b) Discuss component object model. 5,5

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4. (a) Differentiate between tree view and image list view.
   (b) What are advantages of using active x controls ? 5,5

SECTION—C

5. (a) What are the ways in which active x controls can be included in an object ?
   (b) Discuss connection and event elements of ADO programming model. 5,5

6. (a) What is MDI ? How do you create MDI application ?
   (b) What are customer controls ? Are active x controls and customer controls the same ?
   (c) Explain how you create calculated fields data. 3,3,4

SECTION—D

7. (a) How can you create view in Visual Basic ?
   (b) What is the difference between schema and subschema ?
   (c) What are components of a database system ? 3,3,4

8. (a) Write short notes on :
   (i) SQL (ii) ER Model
   (b) How can you access data from ODBC database ? 3,3,4

SECTION—E

9. Explain the following in short :
   (a) What is explicit declaration ?
   (b) What are static variables ?
   (c) What is a constant ?
   (d) What is the purpose of function Cbool ?
   (e) What are properties ?
   (f) What is DML ?
   (g) Which files are saved when you save a project ?
   (h) What are system events ?
   (i) What is the functions of timer control ? 5×1=5

4×1¼=5

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SECTION—C

5. (a) What are advantages and disadvantages of using graphics method as compared to controls method ?

   (b) What are different data access options ? 5,5

6. (a) What are the different ways to declare and instantiate an object ?

   (b) What are the differences between linked object and embedded object ? What OLE automation ? 5,5

SECTION—D

7. (a) How do you put a picture in a database ?

   (b) What is ODBC ?

   (c) What is the difference between DBMS and RDBMS ? 3,3,4

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8. (a) What is an entity and what does E-R diagram indicate ?

   (b) What is DML and how is it different from DDL ? 5,5

SECTION—E

9. Explain a brief note on the following :

   (a) Which files are saved when you save a project ?

   (b) How can you check to see if a file exists ?

   (c) What is SQL ?

   (d) What is an object ?

   (e) What are properties ?

   (f) How can you move a file ?

   (g) What is the use of ScrollBar control ?

   (h) What is subschema ?

   (i) What is an event ?

   (j) What are forms ?

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Total Pages : 3

PC-3035/NR

D-14/2113

VISUAL PROGRAMMING – 206

Semester–III

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all selecting *one* question each from Section A, B, C and D, and the entire Section E. All questions carry equal weightage.

SECTION–A

I. What do you mean by Event oriented language ? Give its characteristics. How event driven programming is different from procedural programming ? Is VB an event driven language ? Justify your answer. 10

II. How forms are used for building interactive applications ? What are the most common controls used with forms ? Explain. 10

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SECTION–B

III. What do you mean by Advanced ActiveX controls ? Discuss any *three* with suitable examples. 10

IV. (a) What do you mean by Multiple Document Interface (MDI) ? 3½

(b) Discuss briefly the process of loading and unloading of child forms. 3½

(c) Differentiate between TextPad and MDIPad. 3

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Total Pages : 3

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VISUAL PROGRAMMING – 206

Semester–III

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all selecting *one* question each from Section A, B, C and D, and the entire Section E. All questions carry equal weightage.

SECTION–A

I. What do you mean by Event oriented language ? Give its characteristics. How event driven programming is different from procedural programming ? Is VB an event driven language ? Justify your answer. 10

II. How forms are used for building interactive applications ? What are the most common controls used with forms ? Explain. 10

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SECTION–B

III. What do you mean by Advanced ActiveX controls ? Discuss any *three* with suitable examples. 10

IV. (a) What do you mean by Multiple Document Interface (MDI) ? 3½

(b) Discuss briefly the process of loading and unloading of child forms. 3½

(c) Differentiate between TextPad and MDIPad. 3

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SECTION-C

V. What is major difference between ActiveX EXE and ActiveX DLL components ? Which of these is in-process and which is out-process server ? What is meant by these terms ? 10

VI. Discuss the following in detail :

(a) Optimizing VB applications. 5

(b) OLE automation. 5

SECTION-D

VII. Discuss in detail the three level architecture of Database management system. 10

VIII. Define Integrity. Discuss the various integrity constraints in SQL giving suitable examples. 10

SECTION-E

(Compulsory Question)

IX. Explain briefly the following :

(a) How do we declare the variable explicitly in Visual Basic ? 1

(b) What do you mean by Collection ? 1

(c) What is the scope of a procedure ? 1

(d) Differentiate between MsgBox statement and MsgBox() function. 1

(e) What is the difference between a List box and a Combo box ? 1

(f) Write short note on RadioButton. 1

(g) Which function is used for displaying messages ? Give its syntax. 1

(h) Write short note on Active data objects. 1

(i) Write any two commands of Data Manipulation Language. 1

(j) What are the disadvantages of DBMS ? 1

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SECTION-C

V. What is major difference between ActiveX EXE and ActiveX DLL components ? Which of these is in-process and which is out-process server ? What is meant by these terms ? 10

VI. Discuss the following in detail :

(a) Optimizing VB applications. 5

(b) OLE automation. 5

SECTION-D

VII. Discuss in detail the three level architecture of Database management system. 10

VIII. Define Integrity. Discuss the various integrity constraints in SQL giving suitable examples. 10

SECTION-E

(Compulsory Question)

IX. Explain briefly the following :

(a) How do we declare the variable explicitly in Visual Basic ? 1

(b) What do you mean by Collection ? 1

(c) What is the scope of a procedure ? 1

(d) Differentiate between MsgBox statement and MsgBox() function. 1

(e) What is the difference between a List box and a Combo box ? 1

(f) Write short note on RadioButton. 1

(g) Which function is used for displaying messages ? Give its syntax. 1

(h) Write short note on Active data objects. 1

(i) Write any two commands of Data Manipulation Language. 1

(j) What are the disadvantages of DBMS ? 1

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MM.15

Subject: Visual Programming

Date:09-03-2015

Note: *Section-A is compulsory & attempt any two questions from Section-B*

MST-I

B.Tech-Part-II (4th sem)

Branch: 2CE, 2CVL

Section-A (1 mark each)

Q1.

a. Difference between Radio Button and Check Box. **(5*1=5 marks)**

b. How controls are grouped in VB?

c. Define Immediate Window?

d. Write down the difference between implicit and explicit declaration.

e. Why VB is called even driven language?

Section-B (5 marks each) **(5*2=10 marks)**

Q2. List down various data type available in Visual programming and give suitable example.

Q3. Difference between List Box and Combo box. Discuss their commonly used properties & methods.

Q5. List various types of common dialog control available in vb 6.0. Explain any one of them with their properties.

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Department of Computer Engineering, Punjabi University, Patiala

MST-I
Class: B.Tech-II (CE)
Time: 1 hour

Session: Jan-May, 2014
Subject: **CPE-206 Visual Programming**
MM.15

Q 1. (a) What is the difference between:

(i) 'End Sub' and 'Exit Sub' (ii) 'Combo Box' and 'List Box'.

(b) Complete the syntax: MsgBox(_____, _____, _____)

(c) Fill ups:

(i)The _____ function converts user input from a TextBox to a value of type Double.

(ii)The Select Case statement ends with the keywords _____.

(d) Define 'Control Array'.

(e) Differentiate between Event Procedure and General Procedure. 5*1

Attempt any two questions out of following:

Q 2. Write a short note on 'Variables in VB 6.0'. 5

Q 3. Write an application that implements Find and Replace functions in a TextBox. 5

Q 4. Describe properties, methods and events of ListBox control with the help of examples. 5

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MST-I
Class: B.Tech-II (CE)
Time: 1 hour

Department of Computer Engineering, Punjabi University, Patiala
Session: Jan-May, 2014
Subject: CPE-206 Visual Programming
MM 15

Q 1. (a) What is the difference between:

(i) 'End Sub' and 'Exit Sub' (ii) 'Combo Box' and 'List Box'.

(b) Complete the syntax: MsgBox(_____,_____,_____)

(c) Fill ups:

(i) The _____ [illegible] Double

(ii) The Select Case statement ends with the keywords _____.

(d) Define 'Control Array'.

(e) Differentiate between Event Procedure and General Procedure. 5:1

Attempt any two questions out of following:

Q 2. Write a short note on 'Variables in VB 6.0'. 5

Q 3. Write an application that implements Find and Replace functions in a TextBox. 5

Q 4. Describe properties, methods and events of ListBox control with the help of examples. 5

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MM.15
Note:

Subject: Visual Programming

Q1, Q4 are compulsory & attempt any one question from Q2 & Q3

MST-II

2CE, 2CT1

Section-A (1 mark each)

Q1.

a. Differentiate between [illegible] and tree view.

b. List down the DML commands.

c. Name different scale properties and methods in graphics.

d. Differentiate between delete and drop command.

e. What is data independence?

(5*1=5 marks)

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Section-B (5 marks each)

Q2. What is ADO object model? Explain in detail

Q3. What is OLE? Write short note on OLE automation.

(2*5=10 marks)

Q4. Explain three tier Architecture of DBMS.

(Compulsory)

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P31 506

Ch-i,(CE), Dept. of CE, Pbi. Univ. Pta. MST-II **CPE-206 VISUAL PROGRAMMING**

me. 1 hour Date: 21.04.2014 MM: 15

Q1 a) How is a table altered in SQL? Give example.

b) Define various forms of Data Independence.

c) How are images saved from VB applications?

d) Write the disadvantages of OLE.

e) Write ways to optimize VB applications. 1*5

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Attempt any two questions:

Q2. Write a short note on graphical methods with proper examples. 5

Q3. Define DBMS. Differentiate between Relational Model and ER Model, giving suitable examples. 5

Q4. Write a short note on Common Dialogs. 5

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Roll No. .....

Total Pages : 3

10764/MR

O-19/2056

DOT NET PROGRAMMING

Paper-310

Semester-VI

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **one** question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 objective type questions carrying 1 mark each.

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SECTION—A

1. Explain the various components of Dot Net Framework. 10

2. Explain the following :

   (a) Language Independence and CLR engine. 5

   (b) Memory Management in Dot Net. 5

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SECTION—B

3. W.A.P. to find the factorial of given number. 10

4. Explain Drawing Graphics, location and size of controls. Draw lines and shapes and Fi shapes. 10

SECTION—C

5. Explain significance of multilevel inheritance by writing a Program. 10

6. What is Application Domain ? How to create application domain and loading/unloading assemblies in it ? 10

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SECTION—D

7. What do you understand by Thread pool ? How do we set thread properties in .Net ? 10

8. Name and explain different types of collections. What are genetic collections ? 10

SECTION—E

9. (i) What is use of memory stream class ?

(ii) What are Rendezvous models ?

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(iii) Explain how to create a font object.

(iv) Elaborate Generics.

(v) What are Interfaces ?

(vi) How can you create and sort array ?

(vii) Explain navigating file system.

(viii) What is type forwarding ?

(ix) Name some of languages .NET support.

(x) What is reference type ? 10×1=10

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Department of Computer Engineering
Punjabi University, Patiala
Subject: DotNet Programming
Class: 6th Semester

MM: 15 MST-1

Q1. All questions are compulsory
a)Differ[illegible]
b)What is CTS
c)What is managed code
d)Differentiate between checkbox and radio button
e)Explain CLR

(1 mark each)

Attempt any two questions
Q2. Explain .NET architecture in detail
Q3. WAP to maintain employee name and salary using array and display the name of employee with highest salary
Q4. How vb.net is different from vb

(5 marks each)

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Dept. of Computer Engineering MST II

...PHICS CPE-308 Time: 1Hour

Department of Computer Engineering

B.Tech CE MST-2 (3CE Group 12, 34, 56)

Subject: Network security

Paper: CPE 315 Marks:

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Note: Question 1 is compulsory. Attempt total three question each carries 5 marks.

Q.1. Short note (50 words each) on following: 1x 5 = 5

I. Denial of Service (DoS)
II. Web servers
III. Hash function.
IV. Network monitoring tools
V. Ethical hacking

Q.2 Explain SHA 1 algorithm in detail. 5

Q.3 Explain different steps of PGP with suitable diagram. 5

Q.4 What is the role of VPN in network security discuss different types of VPN. 5

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CC : D 4.1014 PC 6040-MR

O-19/2055

NETWORK SECURITY–315

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 9 short answer type questions carrying 10 marks each in all.

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SECTION–A

1. (a) Confidentiality, Integrity and Authentication are three pillars for network and information security ; explain each of these in detail.

   (b) Discuss role of encryption to achieve confidentiality and integrity of data. Highlight use of monoalphabetic substitution.

2. Differentiate between Stream and Block ciphers ; use Vigenere cipher to encode " Network Security" Plain text with CPE 311 as key.

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SECTION—B

3. Explain mathematical concepts behind secret key systems : explain in detail working of AES.

4. Discuss the concept behind public key encryption system, why, where and how such implementations happen in real life scenarios–discuss in detail.

SECTION—C

5. What do you mean by Hashing ? Draw flowchart to explain working of MD5 hash algorithm.

6. What do you mean by [illegible] vector w.r.t flooding of network traffic.

SECTION—D

7. (a) Apache is one of the most used web servers : discuss implementation details to configure https using apache.

   (b) What do you mean by Ethical Hacking ? Define various classes of hackers and their respective domain knowledge.

8. Discuss the following terms :

   (a) PGP

   (b) Passive Information Gathering

   (c) Hackers vs. Crackers.

SECTION—E

9. Write very brief notes on the following :

   (a) Authorization

   (b) Caesar Cipher

   (c) DES

   (d) SHA

   (e) Hactivism

   (f) Trojans

   (g) Brute force password cracking systems 7×

   (h) DMZ

   (i) Cryptanalysis. 2×

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Department of Computer Engineering

Punjabi University Patiala

Network Security(CPE-315)

Section (A)

1. Explain poly alphabetic cipher.
2. Differentiate between virus and worms.
3. Explain phishing?
4. Explain the cryptanalysis of mono alphabetic cipher?
5. Explain the vernam cipher.

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Section (B)

1. What is symmetric key Cryptography? Explain the DES in detail.
2. What are the different principles of network Security?
3. Explain the different types of network attacks?

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Department of Computer Engineering

Punjabi University Patiala

Network Security(CPE-315)

Section (A)

1. Explain poly alphabetic cipher.
2. Differentiate between virus and worms.
3. Explain phishing?
4. Explain the cryptanalysis of mono alphabetic cipher?
5. Explain the vernam cipher.

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Section (B)

1. What is symmetric key Cryptography? Explain the DES in detail.
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Dept. of Computer Engineering MST II

...PHICS CPE-308 Time: 1Hour

Department of Computer Engineering

B.Tech CE MST-2 (3CE Group 12, 34, 56)

Subject: Network security

Paper: CPE 315 Marks:

©www.thecompanyboy.com Time:

Note: Question 1 is compulsory. Attempt total three question each carries 5 marks.

Q.1. Short note (50 words each) on following: 1x 5 = 5

I. Denial of Service (DoS)
II. Web servers
III. Hash function.
IV. Network monitoring tools
V. Ethical hacking

Q.2 Explain SHA 1 algorithm in detail. 5

Q.3 Explain different steps of PGP with suitable diagram. 5

Q.4 What is the role of VPN in network security discuss different types of VPN. 5

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Roll No. .....

Total No. of Pages : 4

CC : D 4.1013

PC 6013-MR

O–19/2055

REFRIGERATION AND AIR CONDITIONING–308

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- Attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 9 short answer type questions carrying 10 marks in all.

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SECTION-A

1. Explain with neat diagram, the working of Boot Strap Air Evaporative Cooling System used in aircrafts. Also draw its T-s plot. 10

2. A Freon-12 refrigerating machine has capacity of 12 TR and working temperature of 26°C in the condenser and 28°C in the evaporator. The refrigerant is sub cooled by 4°C before entering the expansion valve and the vapour is superheated by 5°C before leaving the evaporator. Find COP. Take :

   Specific heat of liquid refrigerant = 0.963 kJ/kgK

   Specific heat of vapour refrigerant = 0.615 kJ/kgK 10

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SECTION—B

3. (a) What are the advantages of compound compression with intercooler over single stage compression ? 4

(b) Explain in single flow diagram and on p-H diagram, the 2-stage compression with :

(i) Water Intercooler

(ii) Flash-Intercooler

(iii) Liquid Sub-cooler

(iv) Multiple Expansion Valves. 6

4. Explain the working of Practical Vapour Absorption Refrigeration system with Aqua-Ammonia. How is it different from Vapour Compression Refrigeration System ? 7+3

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SECTION—C

5. (a) Explain the principles and working of steam jet refrigeration system. 6

(b) How are refrigerants numbered ? Illustrate with an example. 4

6. Explain in brief :

(i) Bare tube coil evaporator

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(ii) Thermostatic Expansion Device

(iii) Evaporative Condenser. 10

SECTION—D

7. Describe in brief the following Psychometric processes :

(i) Cooling and Dehumidification

(ii) Heating and Humidification

(iii) Heating and Dehumidification

(iv) Sensible Heating

(v) Sensible Cooling. 10

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8. (a) Saturated air at 21°C is passed through a drier so that its final relative humidity is 20%. The drier uses silica gel as adsorbent. The air is then passed through a cooler until its final temperature is 21°C without change in specific humidity. Determine :

(i) The temperature of air at the end of the drying process,

(ii) The heat rejected during the cooling process,

(iii) The relative humidity at the end of the cooling process,

(iv) The dew point temperature at the end of the drying process

(v) The moisture removed during the drying process. 7

(b) What is the importance of cooling load calculations in case of an air conditioning system ? 3

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SECTION—E

9. Write in short :

(a) Explain the term "tonne of refrigeration".

(b) Draw P-V diagram of Bell-Coleman cycle.

(c) What is Cascade Refrigeration System ?

(d) What is the difference between primary and secondary refrigerants ? Give examples.

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(e) Name the refrigerant used in Electrolux refrigeration system.

(f) What are the various types of Expansion Devices ?

(g) Explain Wet bulb and Dew point temperature. 7×1=7

(h) Define Room Sensible Heat Factor. How RSHF line is drawn on the Psychrometric chart ?

(i) State the factors that determine human comfort. 2×1½=3

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Total Pages : 2

PC-4310/NB

H-10/2117

SYSTEM MODELLING AND SIMULATION-403

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION–A

I. Discuss various advantages and disadvantages of simulation. 5

II. Define the term 'Model'. Explain various types of models in brief. 5

III. Explain simulation of queuing system in detail. 5

IV. Explain Poisson process in detail. 5

V. Explain convolution method in detail. 5

SECTION–B

VI. Discuss inventory system simulation model in detail. 5

VII. Discuss any *one* goodness of fit test with example. 5

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VIII. Discuss various experimental design considerations in simulation. 5

IX. Compare and contrast any *two* general purpose simulation languages, in short. 5

X. Discuss output analysis and interpretation validation. 5

SECTION–C

XI. (a) Name various types of simulations. 2

(b) Explain system simulation. 2

(c) Discuss *two* application areas of simulation. 2

(d) Discuss continuous distribution. 2

(e) Explain steady state simulation. 2

(f) Explain random numbers with example. 2

(g) Define any *two* parameter estimation techniques. 2

(h) Name any *four* simulation tools. 2

(i) Define discrete distribution. 2

(j) What is inverse transform technique. 2

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MST-I

HSS-201 Management Practices & Organizational Behaviour

Class: B.Tech 2nd year (Civil)

Time: 1hour **Max. Marks: 15**

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

1) Span of Control
2) Centralization
3) Formal and Informal Organizations
4) Planning Premises
5) Difference between Power & Authority

1*5= 5

Section B (Attempt any two)

Q-2 "Management is regarded as art by some, science by others & in exact science by many. The truth seems to be somewhere in between". Explain

Q-3 Explain Social Responsibility with example.

Q-4 Explain decision-making process in detail.

2*5= 10

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IST-I

Time: 1 Hour

Max. Marks: 3

HSS-201 Management Practices & Organization Behaviour Class: B.Tech 2nd year (Civil

Section A (All Questions are compulsory)

Q-1 Explain the following concepts:

a) Formal Organization

b) Semantic Barrier

c) Programmed and Non-Programmed Decision Making

d) MBO

e) Difference between Delegation & Decentralization.

Section B (Attempt any two)

Q-2 What is Social Responsibility and explain it with example.

Q-3 Define Communication. Explain in detail the process of communication.

Q-4 State the contributions of Administrative Management.

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46

CC = D 4.843

Total Pages : 3

PC-5944/MR

O-17/2055

APPLIED PHYSICS – II

Paper : BAS-104

Semester–II

Time : Three Hours] [Maximum Marks : 50

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Note : Attempt *three* questions each from Section A and B. Section C is compulsory.

SECTION – A

I. (a) Differentiate between Scalar and Vector fields by taking suitable example.

(b) For a typical metal, electrical conducticity is 2×10^7 $(\Omega m)^{-1}$, permeability is 3×10^{-7} NA^{-2}, and permittivity is 10^{-11} C^2/Nm^2. Find for which electromagenetic wave region, it will be conducting ? Also find the skin depth at the optical frequencies, and comment. (2,3)

II. Discuss the behaviour of magnetic field vectors for a boundary across free space and conducting media. What is the significance of such boundary value problems in view of eletromagnetic propagation ? (5)

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III. (a) Why the relativity of time is also called "clock paradox" ?

(b) Find rest mass of a particle possessing total energy of 6 GeV and momentum of 3 GeV/c. (2, 3)

IV. How does mass vary with relativistic velocity ? Develop its relation. (5)

SECTION – B

V. Draw a comparative analysis between Bose-Einstein and Fermi-Dirac statistics. (5)

VI. (a) The interplanar spacing d_{220} in a BCC metal is 0.107 nm. Calculate its lattice constant and atomic radius.

(b) What is role of X-rays in analysis of crystal structure ? (3,2)

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VII. What is meant by Nano synthesis ? Discuss its relevance in today's context. (5)

VIII. Differentiate between Type-I and Type-II superconductors, and comment on the present status of superconductivity. (5)

SECTION – C

(Compulsory Question)

IX. Write short answers of the following :

(a) Write Poisson equation and discuss its *three* important applications.

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4P

(b) What do you mean by transverse nature of electro-magnetic wave ?

(c) What is meant by Double dengeneracy ?

(d) What is meant by Coordination number ?

(e) What is the concept of Black body radiation ?

(f) What do you mean by Galilean transformations ?

(g) What do you understand by Dielectric polarization ?

(h) What is meant by Relativity of simultaneity ?

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(i) Why the concept of "ether" came into being ?

(j) Explain the concept of Fermi energy. (10×2=20)

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CC = D 4.843

Total Pages : 4

PC-10785/MR

O-17/2054

APPLIED MATHEMATICS–II

Paper : BAS-105

Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : The candidates are required to attempt *one* question each from section. A, B, C and D carrying 10 (ten) marks each, and the entire Section E of 10 (ten) short answer type questions carrying 1 (one) mark each.

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SECTION–A

I. (a) Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = e^{e^x}$.

(b) Apply method of variation of parameters to solve $y'' + y = \sec x$.

II. Solve

(a) $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = \log x \sin(\log x)$.

(b) $x^3\frac{d^3y}{dx^3} - 3x\frac{dy}{dx} + 3y = 16x + 9x^2 \log x,\ x > 0$.

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Department of Electronics and Communication Engineering

Punjabi University, Patiala

Class: 1st year | **Sub: Basis Electronics (ECE-102)** | Marks: 15

Date: | **MST-1** | Time: 1Hr.

Note: Attempt all questions of Section-A and any two questions of Section-B.

Section-A (1*5)

Q1: What is the need of biasing? 4-37

Q2: Derive the relation between α and γ.

Q3: Derive an expression how negative feedback effects on gain? 4-73

Q4: Explain Zener diode as voltage regulator. 2-58

Q5: Draw output of following circuit:

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Section-B (5*2)

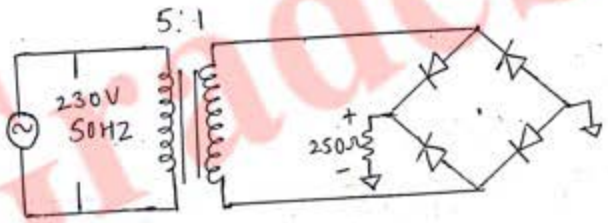
Q1: (a) Write name of various biasing methods. Derive the expression of I_c for mostly preferred biasing method. (3)

(b) What is the importance of Q-point? (2) 1-32

Q2: Draw circuit diagram of CE transistor configuration and plot its input and output characteristics. Show different regions of the output characteristics and explain their occurrence. 4-19, 4-21, 4-22

Q3: For the circuit shown below Determine: (2+2+1)

(a) DC output voltage (b) Rectification efficiency (c) PIV



$\frac{230}{5} = 46$ V.

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Department of Electronics and Communication Engineering

Punjabi University, Patiala

Class: 1st year | **Sub: Basis Electronics (ECE-102)** | Marks: 15

Date: | **MST-1** | Time: 1Hr

Note: Attempt all questions of Section-A and any two questions of Section-B.

Section-A (1*5)

Q1: What is the need of biasing?

Q2: Derive the relation between α and γ.

Q3: Derive an expression how negative feedback effects on gain?

Q4: Explain Zener diode as voltage regulator.

Q5: Draw output of following circuit:

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Section-B (5*2)

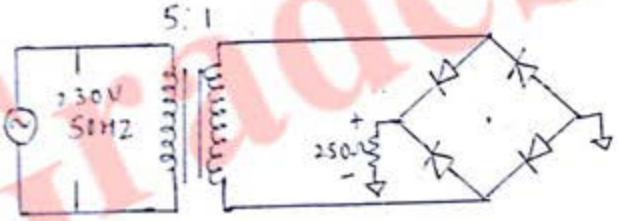
Q1: (a) Write name of various biasing methods. Derive the expression of I_c for mostly preferred biasing method. (3)

(b) What is the importance of Q-point? (2)

Q2: Draw circuit diagram of CE transistor configuration and plot its input and output characteristics. Show different regions of the output characteristics and explain their occurrence.

Q3: For the circuit shown below Determine:

(a) DC output voltage (b) Rectification efficiency (c) PIV (2+2+1)



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P15/20

10 MST-1, 2015

[illegible] OF ELECTRONICS & COMMUNICATION ENGINEERING

(Punjab University - Patiala)

B.Tech (1st Semester - 1st Year)

BASIC ELECTRONICS (ECE - 102)

MST # 1

[illegible] Maximum Marks: 15

[illegible] compulsory. Attempt any two questions out of *three* from SECTION - B.

[illegible] Assume missing data, if any.

SECTION - A

(Attempt all questions)

[illegible]

[illegible] and β

[illegible] capacitance?

[illegible] Explain its significance in context with diode VI characteristics.

[illegible] diode clipper circuit with sinusoidal input of V_P = 15V applied. Sketch the corresponding [illegible] Assume the diode to be Silicon.

[illegible] with respect to applied input

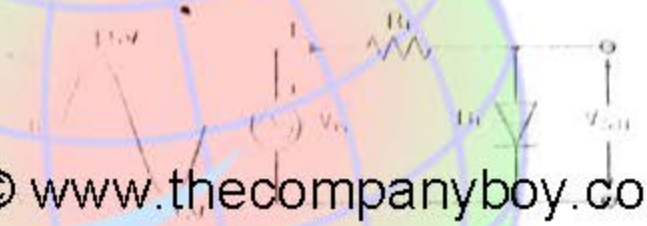


Figure 1

SECTION - B

(Attempt any two questions out of three)

[illegible] Common Emitter (CE) configuration for NPN transistor.

[illegible] with PN junction diode.

[illegible] Explain in detail.

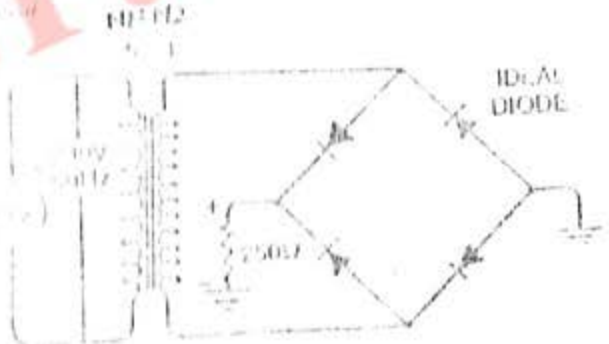
[illegible] biasing technique in amplifiers? Explain it in detail.

[illegible] of four diodes connected to 230V, 50 Hz AC supply is shown in Figure 2. Determine [illegible] rectifier.

(d) ripple frequency

(e) ripple factor

[illegible]



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Q2

Department of Electronics and Communication Engineering
Punjabi University Patiala
Subject: Basic Electrical Engineering **Code:** ECE-101

MST: II **Max. Mark:** 15

Note: Write down your roll number and group number at the top of your answer sheet.

Section: A (All questions are compulsory)		
Q1. (A)	Write down the formula for synchronous speed.	1
Q1.(B)	Write the expression for back emf of dc motor.	1
Q1.(C)	Draw the phasor diagram of transformer at no load.	1
Q1. (D)	Write down the various losses occurs in a transformer.	1
Q1. (E)	Write down the parts of dc machine.	1

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Section: B (Do any two Questions)		
Q2.	Draw and explain the characteristics of DC motors.	5
Q3.	Write in detail on short circuit test of transformer.	5
Q4. (I)	Drive the emf equation of a transformer.	2.5
Q4. (II)	A 4-pole, d.c. shunt motor has s flux per pole of 0.04 Wb. And the armature is lap-wound with 720 conductors. The shunt field resistance is 240Ω and the armature resistance is 0.2Ω. Brush contact drop is1V per brush. Determine the speed of the machine when running as a motor taking 60 A current. The terminal voltage is 480V.	2.5

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

Second Mid-Semester Test, Nov 2017

B. Tech. Ist Year, 1st Sem (Group B)

Time Allowed: 1 Hour **Max. Marks: 15**

NOTE: Section A is compulsory. Attempt any two questions from Section B.

Q.1	**Section A; Answer the following five questions with pen only**	
(i)	The three axes in isometric projection are inclined to each other at an angle of _____. (90°, 120°, 30°)	01
(ii)	The development of a right regular pentagonal pyramid is carried out by _____ method. (Parallel line, Radial line).	01
(iii)	A solid bounded by four equilateral triangles is called_____.	01
(iv)	A solid is resting on HP with its axis perpendicular to it. It is cut by a cutting plane, AVP; projected shape of the section is shown in _____ view. (Top, Front)	01
(v)	The length of an object in isometric drawing is 81.5 % greater than the length in isometric projection.	01
	Section B; Draw any two out of the following three questions.	
Q. 2	A hexagonal pyramid of base side 25 mm height 50 mm is resting on its base in HP. One side of the base is perpendicular to VP. Draw (a) The auxiliary top view of the solid on an AIP inclined at 30° to HP, (b) The auxiliary front view on an AVP inclined at 45° to VP.	05
Q. 3	A pentagonal prism of base side 30 mm, height 50 mm is resting on HP with one side of the base parallel to VP. A cutting plane perpendicular to VP and inclined to HP at 50° cuts the solid, meeting the axis at a distance of 15 mm from top surface. Draw the sectional top view and develop the lateral surface of the solid.	05
Q. 4	A cylindrical block of diameter 40 mm, height 20 mm is resting centrally on the top of a cube of side 50 mm. Draw the isometric projection of the combined solid.	05

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Side
view

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DEPARTMENT OF MECHANICAL ENGINEERING
PUNJABI UNIVERSITY PATIALA

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ENGINEERING GRAPHICS, MCE-151

B-TECH 1ST YEAR END SEM (GROUP B6 TO B12)

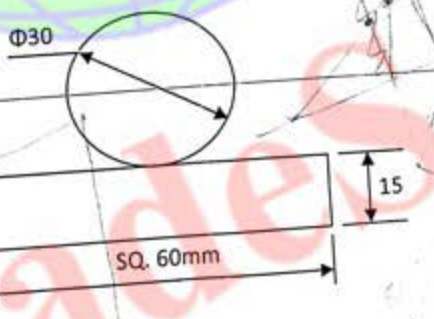
Time: 1HR 45MIN

Date 28-11-2013

Maximum Marks - 30

NOTE: DO ANY THREE QUESTIONS. Each Question Carry Equal Marks

1. A line AB 70mm long has its end A on HP and 15mm in front of VP the other end B is 40mm above HP and 60mm in front of VP. Draw the projection of line and find the angle of inclination of line with HP and VP and also locate its traces.
2. A triangle ABC of 50mm side has its plane inclined at 30° to HP. Its one side AB is on HP and inclined at 45° to VP. End A is 20mm in front of VP. Draw its projections.
3. A cylinder of 60mm diameter of base and axis 100mm long has one of its base on HP. A cutting plane cut the solid 30mm from the top and makes an angle of 60° with HP. Draw the sectional top view and true shape of section.
4. A square pyramid side of base 30mm and height 60mm is resting on its base on HP such that its base making an angle of 30° with VP. It is cut by A.I.P inclined at 30° to the HP and passing through a point 25mm from apex on the axis. Draw the views and develop the lateral surface of the pyramid.
5. Draw the isometric projection of a sphere resting centrally on the top of a square block, the front view of which is shown in fig:



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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

Second House Test, April 2015

B. Tech. Ist Year (SET-II)

98

Time Allowed: 1 Hour **Max. Marks: 15**

Q.1	**Answer the following five questions:**	
(i)	Total number of edges of a square pyramid are _____ (4, 8, 12).	01
(ii)	A pyramid lying with its base on HP and axis perpendicular to it is cut by a cutting plane parallel to VP and perpendicular to HP. The _____ view shows the true shape of the section. (Top, Front, Side)	01
(iii)	A truncated solid of a right prism is cut by a cutting plane _____ to its base. (Inclined/Parallel)	01
(iv)	The development of a square prism consists of four _____ (Rectangles, Triangles)	01
(v)	Isometric projection of a sphere is a circle having a diameter _____ (less, equal, greater) than that of a sphere.	01
	Draw any two out of the following three questions:	
Q. 2	A square pyramid of base side 40 mm height 65 mm is resting on HP on one of its base edges such that the axis of the solid makes an angle of 30° with HP and the edge on which it rests on HP makes an angle of 40° with VP. Draw the projections of the solid.	05
Q. 3	A cylinder of diameter 60 mm and height 75 mm resting on HP is cut by an AIP inclined at 45° to HP meeting the axis of the solid at a distance of 30 mm from top. Draw the development of the lateral surface of the cut solid.	05
Q. 4	Draw the isometric drawing of a sphere of 40 mm diameter which rests centrally on a square block of base edge 45 mm and height 25 mm.	05

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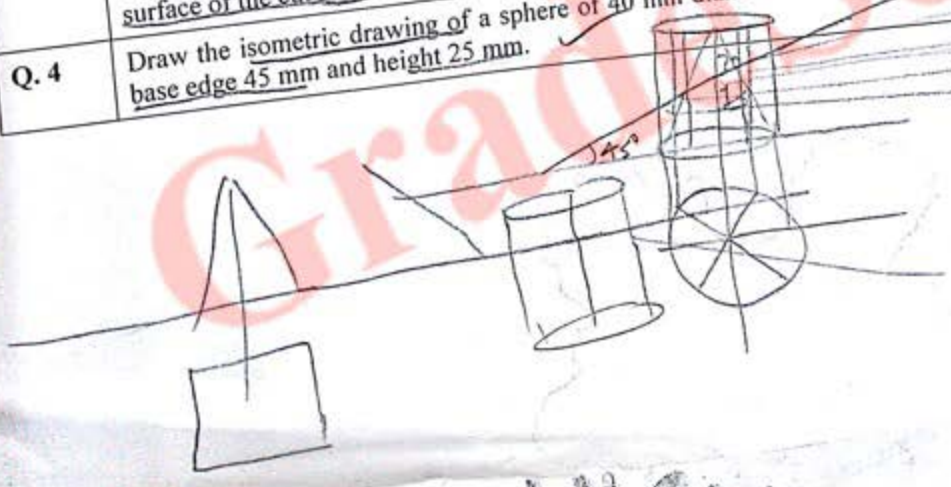

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

Second House Test, April, 2018

B. Tech. Ist Year (SET-II)

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Time Allowed: 1 Hour **Max. Marks: 15**

Q.1	**Answer the following questions:**	
(a)	A tetrahedron is a _____ (regular polyhedron / prism / pyramid / sold of revolution).	01
(b)	A frustum is obtained by cutting the solid _____ to its base.	01
(c)	The true shape of a section will be seen in the top view of an object when the cutting plane is _____ to the HP. (i) Parallel (ii) Inclined (iii) Perpendicular (iv) None of above	01
(d)	A sphere is cut by an AIP inclined at 45°, the top view of the sphere will reveal the shape of cut section as _____ (circle / parabola / ellipse / hyperbola).	01
(e)	Which development method is used for the development of cone?	01
	Answers any two of the following questions:	
Q. 2	A pentagonal pyramid with edge of the base 25 mm and axis height 55 mm rests on one of its edges of the base on ground with its base inclined at 40° to the HP and the edge on which it rests on ground is further inclined at 30° to VP. Draw the projections of the solid.	05
Q. 3	A hexagonal prism, base edge 25mm and axis height 60mm is resting on its base on ground with one base edge perpendicular to VP. The solid is cut by a cutting plane perpendicular to VP and inclined to HP at an angle of 45° meeting the axis at 25mm from the top. Draw the sectioned top view, front view and true shape of the cut section.	05
Q. 4	A hexagonal prism of edge 25mm and length 65mm rest on one of its rectangular faces on the ground. Draw the isometric projections of the solid.	05

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DEPARTMENT OF MECHANICAL ENGINEERING, PUNJABI UNIVERSITY, PATIALA

SECOND MID SEMESTER EXAM: April 2014

B-TECH 1ST YEAR GROUP: (A7 TO A12) Sub: MCE-151 ENGINEERING GRAPHICS

Time: 1Hr M.Marks-15

Note: Section A is compulsory. Attempt any two questions from Section B

SECTION-A (1x5=5)

1. (a) A plane lamina parallel to HP and perpendicular to VP has no _____ trace.

(b) Differentiate between a cube and a square prism.

(c) The top view of a truncated right regular pentagonal pyramid shows the_____ shape of the section. (Apparent/True)

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(d) The three isometric axes are inclined to each other at an angle of _____.

(e) Why the methods used for the development of cylindrical objects like cylinder, cone, and sphere are approximate.

SECTION- B (2x5=10)

Q2 A pentagonal prism of base side 25 mm, height 50 mm rests on HP with one of the base sides perpendicular to VP. It is cut by a cutting plane perpendicular to VP and inclined to HP at 45° passing through a point of axis 40 mm above the base. Find the true shape of the section. sectional top view.

3 A right square pyramid of base side 60 mm, height 100 mm rests on HP with two sides of the base parallel to VP. A cutting plane parallel to HP and perpendicular to VP cuts the solid bisecting the axis. Draw the development of the pyramid.

4 A cube of side 30 mm rests centrally on the top of a right circular cylinder of diameter 50 mm and height 30 mm. Draw the isometric projection.

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

Second House Test, November - 2015

B. Tech. Ist Year (B7-B12 Group)

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Time Allowed: 1 Hour **Max. Marks: 15**

Q.1 Answer the following questions:

(a) Define oblique solids. 01

(b) A Truncated solid is obtained by cutting the solid _____ to its base. 01

(c) The true shape of a section will be seen in the front view of an object when the section plane is_____ to the VP. (i) Parallel (ii) Inclined (iii) Perpendicular (iv) None of above 01

(d) Whatever be the position of the plane cutting by sphere, the true shape of the section obtained is a circle. (True/False) 01

(e) Parallel line development method is used for the development of _____ 01

Answers any two of the following questions:

Q. 2 A pentagonal prism with edges of the base 20 mm and length of the axis 70 mm rests on one of its edges of the base with its axis parallel to the VP and inclined at 30° to the HP. Draw its projections. 05

Q. 3 A cone of base 40 mm diameter & height 65 mm rests on its base on HP. The cone is cut by an AIP perpendicular to VP and inclined to HP at an angle of 30o at a point on axis 20mm below apex. Draw the front view, the sectional top view and the true shape of such a section of the pyramid. 05

Q. 4 Draw the isometric projections of a hexagonal prism resting on its rectangular face on ground. The edge of hexagonal is 25 mm and the axis length is 60 mm. 05

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

End Semester Examination, April 2018

B. Tech. Ist Year (SET-II)

Time Allowed: 1 Hour **Max. Marks: 50**

Q.1	**Answer the following questions:**	
(i)	In fourth quadrant, the top view and front view both lie _____ (above/below) X-Y line.	02
(ii)	In first angle projection, the left hand side view is drawn on the _____ side of front view.	02
(iii)	If the line is inclined with HP and parallel to VP, its true length will be obtained in _____ plane.	02
(iv)	When a line is perpendicular to HP, its _____ trace will coincide with its _____ view.	02
(v)	When a plane is perpendicular to a reference plane, its projection on that plane is a _____	02
(vi)	A solid bounded by four equilateral triangular faces is called _____.	02
(vii)	When a cylinder is cut at its base by a section plane inclined to its axis, the true shape of a section is a _____ (circle / parabola)	02
(viii)	The section lines are evenly spaced and inclined at _____ to the reference plane.	02
(ix)	Parallel line method is used for development of _____ (prisms / pyramids).	02
(x)	The isometric scale is constructed at an angle of _____ degrees, while the true scale is constructed at an angle of _____ degrees to the reference line.	02

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Draw any three out of the following five questions:

Q. 2	A straight line AB 65 mm long makes an angle of 30° to the HP and 45° to the VP. End A is 20 mm in front of VP and 30 mm above HP. Draw the projection of the line AB, show HT, VT using rotation of line method.	10
Q. 3	A regular pentagonal lamina, of 25 mm side, rests on H.P. on one of its sides such that it is inclined to the H.P. at 30° and the side on which it rests, inclined at 45° to the V.P. Draw its projections.	10
Q. 4	A cone of 35 mm base diameter and 60mm height has its axis inclined at 30° to HP and the plan of the axis is inclined at 45° to VP. Draw the projections of the solid.	10
Q. 5	A right regular hexagonal pyramid, side of base 25 mm and height 65 mm, rests on its base in HP with one of its base edges parallel to VP. A section plane perpendicular to the VP and inclined to the HP (AIP) at 45° bisects its axis. Draw the sectional top view and true shape of the cut section.	10
Q. 6	Draw the isometric projections of the pentagonal prism, base edge 30mm and axis length 55mm, resting on one of its rectangular faces on the ground.	10

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M.S.T.-II

Subject: RDBMS

Paper: CPE-307

Time: 1Hr

Note: Section A is compulsory. Each Question carries one mark. Attempt any two in Section B. Each question carries 5 marks.

Section A:

1.

i. List the different Relational Operators used in PL/SQL along with the symbols used to denote them. 1

ii. Write a PL/SQL block to find the sum first 100 natural numbers. 2

iii. Explain %ROWCOUNT. 1

iv. List and explain any two Cursor Attributes. 1

Section B:

2. What is a Cursor? Explain different types of Cursors. Explain with the help of an example how to create and use an External Cursor. 5

3. Consider the following relation:
Marks(Rollno,M1,M2,M3)
Where M1, M2 and M3 denote marks in three subjects.
Create a function named Grade inside package Student. The function should return the grade of the student whose Rollno is passed to it. The grade is to be calculated based on the percentage of marks in M1, M2 and M3. 5

4. Create a trigger which keeps an audit trail of a table and stores the type of operation and changes made by update and delete operation in another table. 5

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RDBMS USING SQL AND PL/SQL – 307

Semester–VI

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION – A

I. How is the discretionary access control based on granting and revoking privileges implemented ? Explain. (10)

II. Diccuss EER to relational mapping taking an appropriate illustrative example. (10)

SECTION – B

III. What is SQL ? What is the difference between SQL and Programming languages ? What are the advantages of SQL ? (10)

IV. Consider the following 3 tables :

PAINTER (Ptr_Num, Ptr_Firstname, Ptr_Lastname, Ptr_Areacode, Ptr_Phone)

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GALLERY (Gal_Num, Gal_Owner, Gal_Areacode, Gal_Phone, Gal_Rate)

PAINTING (Pntg_Num, Pntg_Title, Pntg_Price, Pntr_Num, Gal_Num)

Write the SQL Plus queries for the following :

(i) Find all painters who have painted in GAL_NUM=4.

(ii) Find all paintings of Gallery whose rate is >1000.

(iii) Find the Gallery in which painter "Ramesh' has displayed his paintings.

(iv) Find the number of paintings displayed in Gallery owned by "Shyam". (10)

SECTION – C

V. What are the co[illegible] PL/SQL ? Explain. (10)

VI. (a) Distinguish between SQL and PL/SQL. (5)

(b) Discuss data types in PL/SQL. (5)

SECTION – D

VII. (a) What are the applications where you use row-level triggers ? (5)

(b) What is a trigger ? What are its uses ? Explain its working. (5)

VIII. Explain the following with respect to the parameter passing to subprograms :

(i) Actual Versus Formal Suprogram Parameters. (5)

(ii) Using Positional, Named, or Mixed Notation for Subprogram Parameters. (5)

SECTION – E

IX. Write short answers of the following :

(a) What are the Database management objectives and evaluation ?

(b) Write a statement in SQL to use it as a DDL.

(c) What is the major advantage of DBMS over the traditional file system ?

(d) What is Query evaluation ?

(e) What are Cursors ?

(f) What are various types of Join operators ?

(g) What is the difference between Logical and Physical independence ?

(h) What are Triggers ? Name their different types.

(i) What is Query optimization ?

(j) What is Data dictionary ? (10×1=10)

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BTech – 6th Sem
Subject: RDBMS

MST-1
Subject Code: CPE-307
Department of Computer Engineering
Punjabi University, Patiala

Time: 1 hour
Max Marks: 15

Section –A

1. Explain the following: **(5 Marks)**
(a). Data Dictionary (1)
(b). Vertical Fragmentation (1)
(c). on delete cascade (1)
(d). What is category or union type? How is it represented using EER diagram? (2)

Section –B (Do any Two Questions)

2. Write the queries for following:
(a). Give the user sanjay the permission only to view records in the tables sales_order and client_details along with an option to further grant permission on these tables to other users. **(2 Marks)**
(b). **product_master**

product_no	description	qty_on_hand	sell_price	Cost_price
P001	1.44 Floppies	100	525	500
P002	Monitors	10	12000	11280
P003	Mouse	20	1050	1000

sales_order_details

order_no	product_no	qty_ordered	product_rate	delivery_date
O001	P001	4	525	20-Jan-96
O001	P003	2	1050	27-Jan-96
O001	P002	3	12000	20-Feb-96
O002	P001	5	525	07-Apr-96
O003	P003	2	1050	22-May-96
O004	P002	3	12000	26-May-96

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Retrieve the data as shown below **(2 Marks)**

Description	Qty_ordered*product_rate
1.44 Floppies	-------
Monitors	-------
Mouse	-------

(c) Display the delivery_date in the format 'DD-Month-YY' e.g. 12-February-96 for order_no 'O001' **(1 Mark)**

3. Differentiate between DBMS and distributed DBMS and explain the pros and cons of one over another. **(5 Marks)**

4. Create a View from the following tables selecting columns product_no,order_no and status
product_master

product_no	description	qty_on_hand	delivery_date

sales_master

order_no	qty_ordered	product_rate	status

Also explain what operations in terms of insert, delete and update can be performed on the view as well as base tables. **(5 Marks)**

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M.S.T.-II

Subject: RDBMS

Paper: CPE-307

Time: 1Hr

Note: Section A is compulsory. Each Question carries one mark. Attempt any two in Section B. Each question carries 5 marks.

Section A:

1.

i. List the different Relational Operators used in PL/SQL along with the symbols used to denote them. 1

ii. Write a PL/SQL block to find the sum first 100 natural numbers. 2

iii. Explain %TYPE attribute. 1

iv. List and explain any two Cursor Attributes. 1

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Section B:

2. What is a Cursor? Explain different types of Cursors. Explain with the help of an example how to create and use an External Cursor. 5

3. Consider the following relation:
Marks(Rollno,M1,M2,M3)
Where M1, M2 and M3 denote marks in three subjects.
Create a function named Grade inside package Student. The function should return the grade of the student whose Rollno is passed to it. The grade is to be calculated based on the percentage of marks in M1, M2 and M3. 5

4. Create a trigger which keeps an audit trail of a table and stores the type of operation and changes made by update and delete operation in another table. 5

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University College of Engineering

Punjabi University, Patiala
Manufacturing Processes, MCE-102
B.Tech. Part-I, Ist Semester, Group (A1-A12)
MST-Ist, Oct., 2013

Roll No. 1130396

Date of Exam: Oct., 2013

Time Allowed-One Hour

Maximum Marks:15

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Sub:- Manufacturing Processes

Attempt any two Questions:

Q.1.(a) Define pattern, Briefly describe skeleton & Sweep pattern with neat sketches. - 4 Marks
(b) What are the functions of a Core? Describe various types of core with neat & clean sketches? - 3.5 Marks

Q.2.(a) Draw the line diagram of Lathe showing its main parts. - 5 Marks
(b) Differentiate between drilling, boring and reaming operations. - 2.5 Marks

Q.3.(a) Distinguish between shaper & planner. - 3 Marks
(b) Explain Up willing and Down milling with neat sketch. - 4.5 Marks

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Department of Mechanical Engineering, Punjabi University Patiala

MCE-102, Manufacturing Processes B.Tech Part-Ist, Semester A1 to A12 Groups

Time-One Ho[illegible] Maximum Marks-45

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Note: Section A is compulsory. Attempt any two questions from Section B

Section A (compulsory & 5 marks)

Q1. (a) Define runner and riser in mould (1)

(d) What properties are desired in a cutting tool material? (1)

(c)Write functions of pattern. (1)

(d) List various manufacturing processes. (1)

(e) Write the composition and applications of grey cast iron. (1)

Section B (Attempt any two questions & 5 marks each)

Q.2. Draw the block diagram of an engine lathe and write about its important parts. (5)

Q.3. Write short note on the following.

(a) Use of Chills and its types (2)

(b) Core and its types (Horizontal core and Balanced Core) (3)

Q.4.Briefly describe the various mechanical properties of engineering materials along with their applications. (5)

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Department of Engineering, Punjabi University Patiala

B.Tech. 1st Year 1st Semester, Group A1 to A12

MST-I
Subject: Manufacturing Processes (MCE-102)
Session: July 14 – Dec 14.

Max. Marks-**15**
Time – **60** minutes

Note: Section A is compulsory. Attempt any two Questions from Section B.

SECTION A (1x5=5 marks)

Q.1.
a) What are the advantages of cold forging over hot forging?
b) Draw the diagram of Indirect Extrusion.
c) Give the classification of cast iron.
d) Define toughness and hardness.
e) What is draft allowance? Show with diagram.

SECTION B (2 X 5 = 10 marks)

Q.2. What are the various properties of moulding materials. Make the flow diagram of casting process.
Q.3. Name different types of patterns. Explain with diagram sweep pattern and Loose-piece pattern.
Q.4. Define recrystallization. Differentiate between open die forging and closed die forging.

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2. ਸਾਵਣ ਮਹੀਨੇ ਕਿਸ ਤਿਥੀ ਤੋਂ ਤੀਆਂ ਸ਼ੁਰੂ ਹੁੰਦੀਆਂ ਹਨ ?

(i) ਦੂਜ

(ii) ਤੀਜ

(iii) ਪੰਚਮੀ

(iv) ਦਸਮੀ

3. ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਰੀੜ੍ਹ ਦੀ ਹੱਡੀ ਕਿਸਨੂੰ ਕਿਹਾ ਜਾਂਦਾ ਹੈ ?

(i) ਭਾਈਚਾਰਕ ਸਾਕਾਦਾਰੀ

(ii) ਅਗ਼ੜ ਮਿਜਾਜ਼

(iii) ਬਹਾਦਰੀ

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4. ਲੇਖ 'ਉਹ ਕਵੀਸ਼ਰ ਜੋ ਹੁਣ ਨਹੀਂ ਮਿਲਦੇ' ਦਾ ਲੇਖਕ ਕੌਣ ਹੈ ?

(i) ਜਸਵਿੰਦਰ ਸਿੰਘ

(ii) ਦਾਰਾ ਸਿੰਘ

(iii) ਤਾਰਾ ਸਿੰਘ

(iv) ਸੂਬਾ ਸਿੰਘ

5. ਪੰਜਾਬੀ ਵਿਚ ਕਿੰਨੀਆਂ ਸੁਰਾਂ ਹਨ ?

(i) ਛੇ

(ii) ਚਾਰ

(iii) ਤਿੰਨ

(iv) ਇਕ਼

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6. ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਧੁਨੀਆਂ ਕਿੰਨੀ ਪ੍ਰਕਾਰ ਦੀਆਂ ਹਨ ?
   (i) ਦੋ
   (ii) ਚਾਰ
   (iii) ਛੇ
   (iv) ਅੱਠ
7. ਪੰਜਾਬੀ ਕਿਸ ਪਰਿਵਾਰ ਦੀ ਭਾਸ਼ਾ ਹੈ ? पंजाबी प्रिय साहित्य की भाषा है
   (i) ਦ੍ਰਾਵਿੜ
   (ii) ਯੋਰਪੀ
   (iii) [illegible]
   (iv) ਇਰਾਨੀ
8. ਪਾਣਿਨੀ ਨੇ ਕਿਸ ਭਾਸ਼ਾ ਦੀ ਵਿਆਕਰਣ ਰਚੀ ?
   (i) ਵੈਦਿਕ
   (ii) ਸੰਸਕ੍ਰਿਤ
   (iii) ਪੰਜਾਬੀ
   (iv) ਹਿੰਦੀ

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V. ਪਾਠ ਪੁਸਤਕ ਦੇ ਭਾਗ ਦੂਜਾ ਅਤੇ ਤੀਜਾ ਦੇ ਨਿਮਨ ਲਿਖਤ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚੋਂ ਕੋਈ **ਪੰਜ** ਪ੍ਰਸ਼ਨ ਕਰੋ, ਹਰ ਭਾਗ ਵਿਚੋਂ **ਦੋ** ਲਾਜ਼ਮੀ ਹਨ : 2×5=10

(ਪਾਠ ਪੁਸਤਕ ਭਾਗ-ਦੂਜਾ)

1. ਸਭਿਆਚਾਰ ਕੀ ਹੁੰਦਾ ਹੈ ?
2. ਪੰਜਾਬੀਅਤ ਤੋਂ ਕੀ ਭਾਵ ਹੈ ?
3. ਸੰਧਾਰੇ ਵਿਚ ਕੀ ਕੁਝ ਭੇਜਿਆ ਜਾਂਦਾ ਹੈ ?
4. ਉਸਤਾਦ ਕਵੀਸ਼ਰ ਆਪਣੇ ਸ਼ਗਿਰਦਾਂ ਨੂੰ ਕੀ ਗੁਰ ਸਿਖਾਉਂਦੇ ਸਨ ?

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(4) ਨਾਟਕ ਦੀਆਂ ਕਿੰਨੀਆਂ ਝਾਕੀਆਂ ਹਨ ?

(i) ਇਕ

(ii) ਦੋ

(iii) ਤਿੰਨ

(iv) ਚਾਰ

II. ਨਿਮਨ ਲਿਖਤ ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦਿਤੇ ਪੰਜ-ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚੋਂ ਕੋਈ ਤਿੰਨ-ਤਿੰਨ ਕਰੋ। ਉੱਤਰ ਪੰਜ ਲਾਈਨਾਂ ਤਕ ਦਾ ਹੋਵੇ : 9×2=18

(A) 1. ਵੰਝਲੀ ਕਿਸ ਨੂੰ ਕਹਿੰਦੇ ਹਨ ?

2. [illegible] ਕਿਉਂ ਪੁਕਾਰਦੀ ਹੈ ?

3. ਬਿਰਹੋਂ ਦਾ ਕਵੀ ਕਿਸ ਨੂੰ ਕਿਹਾ ਗਿਆ ਹੈ ?

4. ਪਾਸ਼ ਕਿਸ ਧਾਰਾ ਦਾ ਕਵੀ ਹੈ ?

5. ਛਿੰਜ ਕੀ ਹੁੰਦੀ ਹੈ ?

(B) 1. ਕਹਾਣੀ 'ਖੱਬਲ' ਅਨੁਸਾਰ ਖੱਬਲ ਘਾਹ ਕਿਸ ਦਾ ਪ੍ਰਤੀਕ ਹੈ ?

2. ਕਹਾਣੀ 'ਖੱਬਲ' ਅਨੁਸਾਰ ਉਧਾਲੀ ਹੋਈ ਔਰਤ ਦੀ ਹਾਲਤ ਕਿਹੋ ਜਿਹੀ ਸੀ ?

3. ਕਾਕੇ ਨੂੰ ਟਾਲਣ ਲਈ ਕਹਾਣੀ 'ਕੁਲਫੀ' ਦਾ ਮੈਂ ਪਾਤਰ ਕੀ-ਕੀ ਬਹਾਨੇ ਬਣਾਉਂਦਾ ਹੈ ?

4. ਕਹਾਣੀ ਪੇਮੀ ਦੇ ਨਿਆਣੇ ਵਿਚ ਬੱਚੇ ਸੜਕ ਪਾਰ ਕਰਨ ਤੋਂ ਕਿਉਂ ਡਰਦੇ ਹਨ ?

5. ਕਹਾਣੀ 'ਖੱਬਲ' ਅਨੁਸਾਰ ਮੁੱਲਖ ਤਬਾਹ ਹੋ ਜਾਣ ਦੇ ਵਿਚਾਰ ਬਾਰੇ ਬਜ਼ੁਰਗ ਜਵਾਬ ਵਿਚ ਕੀ ਕਹਿੰਦਾ ਹੈ ?

(C) 1.

2.

3.

4.

5.

III. ਹੇਠ ਲਿਖਿ
ਦਾ ਲਿਖੋ

1. ਕ
ਪ੍ਰ

2. ਕ
ਦੱ

3. ਨ

IV. ਨਿਮਨਲਿ

1.

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(C) 1. ਨਾਟਕ 'ਮਾਂ ਦਾ ਡਿਪਟੀਂ ਵਿਚ ਮਾਂ ਦੇ ਡਿਪਟੀ ਤੇ ਕੀ ਭਾਵ ਹੈ ?

2. ਨਾਟਕ 'ਮਾਂ ਦਾ ਡਿਪਟੀਂ ਦੇ ਨਰਾਇਣ ਨੂੰ ਕਿੱਡੀ ਕੁ ਨੌਕਰੀ ਮਿਲਦੀ ਹੈ ? → ਉਹ ਕੁਪਟੇ ਸਾਹਿਬ ਦੀ ਟਿਕੀ ਮਿਲਦੀ ਹੈ।

3. ਨਾਟਕ ਅਨੁਸਾਰ. ਰੀਡੂ ਸ਼ਾਹ ਦੇ ਚਰਿਤਰ ਬਾਰੇ ਲਿਖੋ।

4. ਕੀ ਨਰਾਇਣ ਮਾਂ ਦੀਆਂ ਇਛਾਵਾਂ ਤੇ ਪੂਰਾ ਉਤਰਦਾ ਹੈ ? ਹਾਂ, ਰਿਫੂਰ ਉਸਨੇ ਰਿਸ਼ਤੇ ਵੀ ਜੋੜੇ ਨਵੇਂ ਨਵੇਂ ਮਾਮਲੇ

5. ਵਸਾਵਾ ਸਿੰਘ ਕਿਸ ਪੱਖੋਂ ਕਲਪਦਾ ਹੈ ?

III. ਹੇਠ ਲਿਖਿਆਂ ਵਿਚੋਂ ਕਿਸੇ **ਇਕ** ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਇਕ ਸਫੇ ਤਕ ਦਾ ਲਿਖੋ : 6

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1. ~~ਕਵਿਤਾ ਅਨੁਸਾਰ ਵੀਰੀ ਨਾਰੀ ਦੇ ਪਹਿਲੇ ਪ੍ਰੇਮ ਦਾ ਕੀ~~ ਪ੍ਰਭਾਵ ਗ੍ਰਹਿਣ ਕਰਦਾ ਹੈ ?

2. ਕਹਾਣੀ 'ਕੁਲਫੀਂ ਵਿਚ ਇਕ ਮਜ਼ਦੂਰ ਦੀ ਕਿਹੋ ਜਿਹੀ ਹਾਲਤ ਦੱਸੀ ਗਈ ਹੈ ?

3. ਨਾਟਕ 'ਮਾਂ ਦਾ ਡਿਪਟੀਂ ਵਿਚ ਕੀ ਸੰਦੇਸ਼ ਦਿਤਾ ਗਿਆ ਹੈ ?

ਭਾਗ-ਦੂਜਾ

IV. ਨਿਮਨਲਿਖਿਤ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਜ਼ਰੂਰੀ ਹਨ : 8

1. ਪੰਜਾਬ ਵਿਚ ਕਿੰਨੇ ਦਰਿਆ ਹਨ ?

(i) ਪੰਜ

(ii) ਤਿੰਨ

(iii) ਸੱਤ

(iv) ਦਸ

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371 $\omega = 2\pi f$

Department Of Electronics and Communication
Basic of Electrical Engineering (ECE-101)

MST-I **Allowed Time 1hr**
Max. Marks-15 **Roll no.....**

Note: Write your group no. at the top of answer sheet

Section A(all questions are compulsory)

Q1(a). What do you understand by Active power and Reactive power?
Q1(b) Define maximum power transfer theorem.
Q1(c) Write down the form[illegible] current.
Q1(d) Define KCL and KVL.
Q1(e) The reactance offered by a capacitor to alternating current of frequency 50 Hz is 0.10Ω, if the frequency is increased by 100 Hz , what will be the reactance? 1*5=5

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Section B (do any two questions)

Q2. Define Resonance. Derive the condition for resonance in case of R-L-C series circuit.
Q3. Find the current in 15 Ω resistance using Norton's theorem in Fig. (1).
Q4.(a) Explain the step voltage response of R-C series circuit. (3 marks))
(b) Find the resistance between A and B using star delta transformation in Fig.(2). (2 marks) 2*5=10

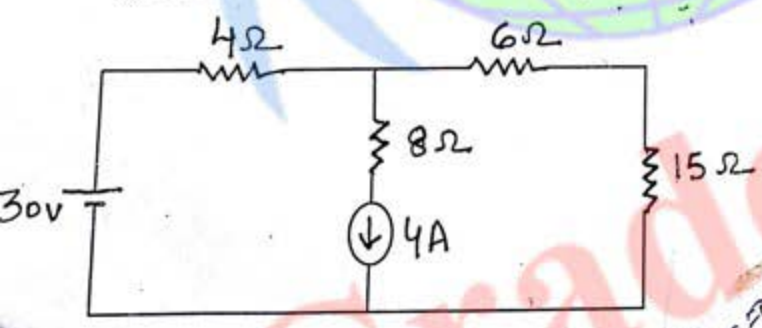

Fig. (1)

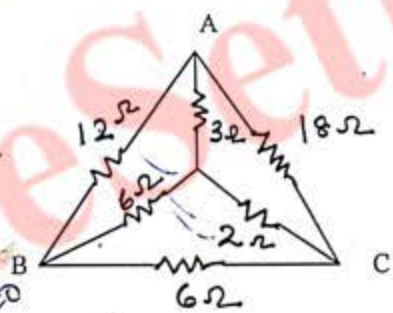

Fig. (2)

$\cos\phi = R/Z$

$\sin(\omega t + \phi$

$\mathcal{E}_{mf} + \mathcal{E}_{VI} = 0$

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MST – 1

ELECTRICAL SCIENCE (ECE 101)

1ST YEAR – SEMESTER - 1

UCoE, PUNJABI UNIVERSITY, PATIALA

TIME: 1 HOUR

MARKS: 15

SECTION – A (5 Marks)

(Attempt all questions)

1. (a) Define the term power factor.
   (b)State Norton theorem with the help of one example.
   (c)What do you mean by Peak factor and Form Factor?
   (d)Explain the term resonance and write down the conditions for resonance in RLC series circuit.
   (e)Find the resistance between A and B(fig:1)

SECTION – B (10 Marks)

(Attempt any2 Questions)

2 Explain the method of measurement of power using Two Wattmeter Method in Three Phase balanced AC system. Also explain how power factor can be measured using Two Wattmeter Method.

3 Find the current in 5 ohm resistance using Superposition theorem and Thevenin's theorem(fig:2)

4 An a.c circuit having a resistance of 10 ohms, inductance of 0.2 Henry and capacitance of 100μF in series is connected across a variable frequency, 50Hz supply. Calculate the following for this circuit: (i) Impedance (ii) Current (iii) Voltage across R, L and C
(iv) Draw the phasor diagram.

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Department of Applied Science

(Punjabi University, Patiala)

Subject: Electrical Science MST #1

Max. Marks: 15
Time: 60 Minute

Section-A (1x5) (All questions are compulsory)

Q1. State Maximum Power Transfer Theorem and with neat sketch?
Q2. Draw the phasor diagram of RC series circuit?
Q3. Define True Power and Power Factor?
Q4. Draw the Equivalent Delta network in Fig 1. Using star delta transformation?
Q5. What is the value of total current if 6Ω resistance, $5\mu F$ capacitor in series are connected with 15V DC supply?

Section-B (2x5) (Attempt any two questions)

Q6. What is Parallel Resonance? Drive the expression for parallel resonance and resonant frequency (f_r)?
Q7. Drive the expression for step voltage response of RC circuit for charging and discharging?
Q8. Using Thevenin theorem find the current flowing through the 6Ω resistor in Fig 2?

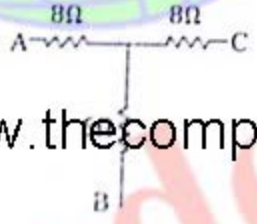

Fig 1

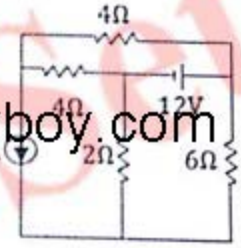

Fig 2

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Basic and Applied Sciences Department

B.Tech 1st Year 1st Semester

Groups (B1 - B12)

125

Time : - 1 Hr MM: - 15

Note : Attempt all questions

1. Q: Explain these: (5x3=15marks)

(a) Explain the Retention volume and Distribution ratio?

(b) Write NMR peaks at high resolution in this CH_3CH_2Cl compound?

(c) Explain, why metals like Cu, Pb *etc* corroded slowly than Na, Ca and Mg?

(d) A water sample contains 204 mg of $CaSO_4$ per litre. Calculate the hardness in terms of $CaCO_3$ equivalent?

(f) Corrosion can be considered as the reverse of the process of metal extraction process. Justify this statement?

2. Q: (a) What are advantages of HPLC over GC-MS? 2 marks

(b) Explain red shift and blue shift in Uv-Visible spectroscopy with examples? 2marks

(c) Which of the following molecules will show IR peaks? 1marks

H_2, HCl, CH_4, CO_2, H_2O

3. Q: (a) How will you distinguish between ethyl alcohol, acetone and acetic acid by NMR spectroscopy? 2 marks

(b) Will the value of absorbance change, if the path length of a beam of light through the sample is doubled and the concentration is made half? Derive this. 2 marks

(c) Why 1,3-pentadiene has higher value of λ_{max} than 1,4-pentadiene in UV spectroscopy? 1marks

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APPLIED CHEMISTRY, Btech 1st year (2nd Sem) MST-I
BAS-103

Time 1hr
ATTEMPT ALL QUESTIONS

MAX.MARKS-15

1. Explain spin-spin splitting with example.
2. Give the cause of corrosion.
3. Give the advantages of HPLC over GC
4. Explain passivation with example.
5. Explain the kinetic of chemical reaction with suitable example.
6. If 50ml of a sample of hard water consumed 15ml of 0.01M EDTA. What is hardness of water?
7. Calculate the value of an Einstein of energy for radiation of W.L 7500A°
8. An Organic Compound absorbs 305nm in Hexane and 309nm in Ethanol. Explain the shift observed?
9. Difference between Ethanol and Ethanal on the basis of IR.

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Basic and Applied Sciences Department
BAS-103, Applied Chemistry
B.Tech Ist Year Ist Semester
Groups (B1-B12)

MM:- 15

Time:- 1Hr
Note:- Attempts all Questions

1. Explain the Flash and Fire points of Lubricants and give methods for their determination? **3 marks**
2. Discuss the kinetics of Hydrogen Chloride reaction? **2 marks**
3. Calculate the potential of the following electrochemical cell at 25°C : **3 marks**
   $Cu(s) \mid Cu^{2+}(aq)(0.50M) \parallel H^{+}(0.01) \mid H_2(0.95atm)$ Pt
   Given: $E^{o}_{cathode}$ =0.00 V and E^{o}_{anode} =0.34 V
4. Write short note on **3 marks**
   (e) Polyurethanes
   (f) Epoxy Resins
5. Give the graph of titration between Strong acid and Strong base with the help of conductometer? **2 marks**
6. What is Quantum Yield and what are reasons for low and high quantum yield? **2 marks**

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MST I: B.Tech. 1st Semester
BAS-103: Applied Chemistry

Time: - 1Hr Note:- Please do mention your group on to the answer sheet Max Marks:- 15

1. What do you meant by BOD and COD values? 2
2. Explain 3
   (a) Break Point Chlorination
   (b) Zeollite Process
3. Explain 3
   (a) Galvanic Corrosion
   (b) Waterline Corrosion
   (c) Corrosion is reverse of extraction 3
4. Discuss
   (a) Flash point and Fire point giving their significance?
   (b) Applications of Lubricants
5. Discuss briefly Conductometric titration by taking the case of strong acid versus strong base? 2
6. Define Electrochemical series and its application 2

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MST I: B.Tech. Ist Semester
BAS-101: Applied Chemistry

Time: - 1Hr **Note:- Please do mention your group on to the answer sheet** **Max Marks:- 15**

1. Explain 3
   (a) Zeolite Process for water softening
   (b) Break Point Chlorination
2. Explain 3
   (a) Galvanic Corrosion
   (b) Waterline Corrosion
   (c) Differential aeration corrosion
3. At 298K, molar conductances at infinite dilution for CH_3COONa, HCl and NaCl at infinite dilution are 91.0, 42.6 and 126.15 Scm^2mol^{-1} respectively. The specific conductance of 0.01 M acetic acid solution is 1.63×10^{-4} Scm^{-1}. Calculate the degree of dissociation at given conc. and also calculate the dissociation constant of acid 3
4. Discuss 3
   (a) Flash point and Fire point giving their significance?
   (b) Saponification Value of lubricant?
5. Discuss in brief?
   (a) Faradays laws of electrolysis
   (b) Scale and sludge
   (c) Oiliness of lubricant

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Section-E

Q 9. (a) What is *standard* hard water?
(b) What is the main purpose of vulcanisation?
(c) What is dry corrosion?
(d) Impure metal corrodes faster than pure metal under identical conditions. Why?
(e) Define blue shift in UV spectroscopy.
(f) Electrode potential of zinc is assigned a negative value whereas that of copper a positive value. Give reason.
(g) What is distribution ratio in chromatography?
(h) What is the significance of determining the pour-point of a lubricant?
(i) Predict for a sample of $CH_3OC_2H_5$: (i) number of peaks (ii) the area under each peak in the NMR spectrum.
(j) How does specific conductance vary with dilution?

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B.Tech 1st year (1ST Sem, Bi-12 Groups) MST-I

APPLIED CHEMISTRY (BAS-103) Max.Marks-15

ATTEMPT ALL QUESTIONS

11. Why O_2 unsuitable as a carrier gas for GLC. 1
12. List all electronic transitions possible for CH_4, CH_3Cl and HCHO. 1
13. How can you distinguish $CH_3CH_2CH_2CHO$ from $(CH_3)_2CHCHO$ by Proton NMR spectroscopy. 1
14. How the performance of a suitable chromatic system can be assessed. 1
15. Corrosion of water-filled steel tanks occurs below the waterline. Give reasons. 1
16. Why Zeolite and Ion Exchange processes are not suitable for the treatment of turbid water? 2
17. What is the difference between atomic and molecular spectroscopy? 2
18. What type of nuclei show NMR spectra? Give two examples. 2
19. Identify the geometric isomers of Stilbene from the values of 294 & 274nm by UV/Visible spectroscopy. 2
20. The densities of aluminium and aluminium oxides are 4×10^3 kgm^{-3} and 2.7×10^3 kg m^{-3} respectively. Describe the characteristics of aluminium oxide film. 2

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Vijay

UNIVERSITY COLLEGE OF ENGINEERING
PUNJABI UNIVERSITY
PATIALA 147001
BAS – 103, APPLIED CHEMISTRY
B.Tech Ist Year IInd Semester
Session: 2013-14

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Time : - 1 Hr MM: - 15

Note : Attempt all questions

Q1 (a) What is the standard reference for measuring chemical shift and why?

(b) Explain why hard water does not produce lather with soap?

(c) Write the stationary phase and mobile phase in TLC.

(d) Why the rusting of iron nail is faster in saline solution than in water? (1 x 4 = 4)

Q2 (a) Explain the NMR spectrum of ethanol. (2)
(b) Describe the instrumentation of IR spectrophotometer (2)
(c) Distinguish between bathochromic shift and hypsochromic shift. (2)

Q3 (a) Write the chemical reactions involved in water softening by lime soda process. (2)
(b)Dicuss the mechanism of hydrogen evolution and oxygen absorption in the electrochemical theory of corrosion. (3)

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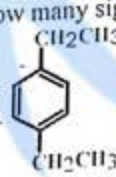
MST-1
2015

MST 1: B.Tech. 2nd Semester
BAS-103: Applied Chemistry

Time:- 1Hr Note:- Please do mention your group on to the answer sheet Max Marks:- 15

1. Why methanol is a good solvent for UV and not for IR? 1
2. How many signals would you expect for the following 1

A 

B CH_3COOCH_3

3. Sharp peaks are seldom observed in UV spectrum. Explain? 1
4. What do you mean by fingerprint region? 1
5. How will you distinguish between following compounds on the basis of IR and NMR spectroscopy? 2
$CH_2=CH-CH_2OH$ and CH_3CH_2CHO
6. Discuss Pilling Bedworth Rule and Passivity of metals? 2
7. Explain Retardation factor and Retention volume in chromatography? 2
8. Are coagulants also used in hot lime-soda process? Give reason. 1
9. Find the temporary and permanent hardness of water containing following impurities in ppm $Ca(HCO_3)_2$ = 10.0, $Mg(HCO_3)_2$ = 8.0, $CaSO_4$ = 12.0 2
10. Discuss 2
i) Corrosion is reverse of extraction. Justify
ii) HPLC

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UNIVERSITY COLLEGE OF ENGINEERING
PUNJABI UNIVERSITY
PATIALA 147001
BAS – 103, APPLIED CHEMISTRY
B.Tech Ist Year IInd Semester
Groups (A1 - A12)

Time : - 1 Hr MM: - 15

Note : Attempt all questions

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Q1 (a) What is the standard reference for measuring chemical shift and why?

(b) Explain why hard water does not produce lather with soap?

(c) Write the stationary phase and mobile phase in TLC.

(d) Why the rusting of iron nail is faster in saline solution than in water? (1 x 4 = 4)

Q2 (a) Explain the NMR spectrum of ethanol. (2)
(b) Describe the instrumentation of IR spectrophotometer (2)
(c) Distinguish between bathochromic shift and hypsochromic shift. (2)

Q3 (a) Write the chemical reactions involved in water softening by lime soda process. (2)
(b)Dicuss the mechanism of hydrogen evolution and oxygen absorption in the electrochemical theory of corrosion. (3)

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Department of Basic and Applied Sciences
Applied Mathematics-II(Common to all groups)

Max. Marks:15 Time:1 hr

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Section A (All questions are compulsory)

Q.1(i) Express $P(x) = 3P_3(x) + 2P_2(x) + 4P_1(x) + 5P_0(x)$ as a polynomial in x, where $P_n(x)$ are Legendre's polynomial of order n.

(ii) Show that $P_n(-x) = (-1)^n P_n(x)$.

(iii) State second shifting theorem.

(iv) Define unit step function and find its Laplace Transform.

(v) Find $L^{-1}(cot^{-1}s)$.

(1*5)

Section B (Attempt any two questions)

Q.2. (i). Find $L^{-1}\left(\frac{s(1+e^{-s\pi})}{s^2+4}\right)$. (2*2.5=5)

(ii) Find the solution to the initial value problem $y'' + 4y' + 4y = 12t^2e^{-t}, y(0) = 0, y'(0) = 0$

Q.3. Find the series solution of $2x^2y'' + xy' - (x^2 + 1)y = 0$ (5)

Q.4. Find the Fourier series expansion of the following periodic function of period 4,

$f(x) = \begin{cases} 2 + x, & -2 \le x \le 0 \\ \cdots & 0 < \cdots < 2 \end{cases}$ (5)

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APPLIED MATHEMATICS-II (BAS-105) DATED 21/4/14 (B.TECH-I)

Common to all the groups-A&B

Note: Attempt three questions. Q.1 is compulsory. Mention your group on the answersheet.

TIME ALLOWED: 1 HR

MAX. MARKS-15

Q.1a) Find $L^{-1}\left(\frac{1}{(S+2)(S+3)}\right)$

b) Show that $J_3(x) = \left(\frac{8}{x^2} - 1\right)J_1(x) - \frac{4}{x}J_0(x)$

c) Express $x^3 + 3x^2 - 2x + 1$ in terms of Legendre's polynomials.

d) Reduce Bessel's equation to Sturm-Liouville's equation.

e) Find Fourier series expansion of $f(x) = x$, $-\pi \le x \le \pi$.

Q.2)Find the series solution of $xy'' + y' - xy = 0$ about $x = 0$.

Q.3)Prove that $nP_n(x) = xP_n' - P_{n-1}'(x)$,where $P_n(x)$ is Legendre's polynomial of order n

Q.4) Find the solution of Initial value problem $ty'' + 2ty' + 2y = 2$, $y(0) = 1$ and $y'(0)$ is arbitrary (2*5)

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SECTION–C
(Compulsory Question)

XI. (a) Discuss why two independent sources of light can never be coherent.

(b) What is critical damping?

(c) What is difference between Fraunhofer and Fresnel diffraction?

(d) What is Brewster's law?

(e) What is population inversion?

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(f) What are Einstein's coefficient?

(g) Discuss the propagation mechanisms of light waves in optical fibre.

(h) What do you mean by zero-point energy?

(i) What is the physical meaning of the wave function?

(j) What is expectation value ? (10×2=20)

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Total Pages : 3

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C-18/2115

APPLIED PHYSICS-I

Paper–101

Sem.–I

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : Attempt any **six** questions, selecting at least three questions each from Sections A and B. Section C is compulsory.

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SECTION—A

1. The amplitude of a simple harmonic oscillator is doubled. How does this affect the time period, total energy and maximum velocity of the oscillator? 5

2. What do you mean by Damped vibrations? Discuss in detail the damped oscillations in a LCR circuit. 2+3=5

3. Give the theory of Newton's ring. Describe the experiment to determine the wavelength of Monochromatic light using Newton's ring? 2+3=5

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4. Distinguish between Fresnel and Fraunhofer class of diffraction. Discuss Fraunhofer's diffraction at a double slit. 2+3=5

5. What do you mean by resolving power of a Telescope? Distinguish between linearly, circularly and elliptically Polarised light. 2+3=5

SECTION—B

6. What is meant by Population inversion and how is it achieved in practice? Derive Einstein relation. 2+3=5

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7. Draw a neat diagram of Helium-Neon laser and describe its method of working. How He-Ne laser is superior to Ruby laser? 4+1=5

8. What is meant by acceptance angle for an Optical fibre? Find out the numerical aperture and acceptance angle of an optical fibre, if the refractive indices for Core and Cladding are 1.6 and 1.5 respectively. 2+3=5

9. What is the physical significance of Wave function? Derive the Schrödinger's time dependent wave equation. 2+3=5

10. Solve the Schrödinger equation for one dimensional motion of a particle in a box of side L and show that its Eigenvalue is inversely proportional to the square of side L. 5

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SECTION—C

11. (i) What is Resonance?

(ii) Write the expression for the average energy of simple harmonic oscillator.

(iii) Derive the momentum operator.

(iv) What do you mean by Numerical aperture?

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(v) Explain the term optical pumping.

(vi) What is Nichol prism?

(vii) What is Wave front?

(viii) What do you mean by Zero point energy?

(ix) What are the conditions for getting sustained interference of light?

(x) Write two properties of Laser beam.

10×2=20

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Total Pages : 3

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APPLIED PHYSICS-I

Paper–101

(Semester–I)

Time : Three Hours] [Maximum Marks : 50

Note : Section C is compulsory. Attempt any *six* questions selecting *three* questions from each Section A and B.

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SECTION–A

I. Define amplitude and period of SHM. A particle executes SHM. Show that its total energy remains constant. (2+3=5)

II. Explain why the oscillations of a physical system die out with time. Discuss in detail the damped oscillations in a LCR circuit. (2+3 =5)

III. Explain the phenomenon of interference in thin film and also explain with theory of Newton's ring experiment to find the wavelength of monochromatic light. (5)

IV. What is Rayleigh criterion of resolution? Derive an expression for the resolving power of a telescope. (2+3=5)

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V. What do you mean by polarisation by double refraction? Describe the construction and working of a Nicol prism. (2+3=5)

SECTION–B

VI. Explain the term 'absorption', 'spontaneous' and 'stimulated' emission of radiation. Obtain a relation between transition probabilities of spontaneous and stimulated emission. (3+2=5)

VII. Explain the concept of coherence in lasers. What are necessary conditions for lasing action. Explain with neat diagram the principle and working of He-Ne laser. *(1+1+3=5)*

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VIII. What is an optical fibre? Define and explain the terms (a) Acceptance angle and (b) Numerical aperture. The refractive indices for core and cladding for a step index fibre are 1.52 and 1.41 respectively. Calculate critical angle and numerical aperture. (3+2 =5)

IX. Derive an expression for the time independent Schrödinger's equation. An electron and proton has the same de Broglie wavelength. Prove that the energy of the electron is greater than that of proton. (3+2=5)

X. Derive expression for the wave function and energy of a particle confined in one-dimensional infinite potential box using Schrödinger wave equation. (5)

XI. (a) D
b

(b) V

(c) V
d

(d) V

(e) V

(f) V

(g)

(h)

(i)

(j)

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Punjabi University, Patiala
Department of Basic & Applied Sciences
I[st] MST (B.Tech.-1st Year), Applied Physics-I

Time: 1 hr. **Max. Marks: 15**

Note: Students must mention their group on the top of answer sheet.

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Q1. (a) Specify the phase difference between two perpendicular vibrations, superposing SHO resulting in a circle.
(b) Why soldiers are asked to break their steps while crossing the bridge?
(c) What is the relation between relaxation time and damping constant?
(d) Why thin films look colored in white light?
(e) Specify expression for thickness of the non-reflecting thin films? (1×5=5)

Q2. Express quality factor for a damped harmonic oscillator in terms of energy lost per oscillation. (3)

Q3. When the movable mirror of Michelson's interferometer is shifted through 0.589 mm, a shift of 200 fringes is observed. What is the wavelength of light used? (2)

Q4. Write the equation of motion for the damped harmonic oscillator. Find its solution and examine the case when the system is lightly damped.

OR

Discuss Fraunhofer diffraction at double slit with the help of diagram. Find the position of maxima and minima. (5)

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Department of Basic and Applied Sciences

Applied Physics – I
Ist MST (September 2017)
(B.Tech - Ist Year)

Time Duration: 1 hour **Max. Marks: 15**

Note: Students must mention their group on the top of answer sheet.

Q1. a) Write an expression for the average energy of a simple harmonic oscillator.

b) What do you mean by [illegible]

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c) Express relaxation time in terms of quality factor.

d) Write the condition for an electrical oscillator to be critically damped.

e) What are the conditions for getting sustained interference of light? (1×5)

Q2 (a) If a mass of 2 kg is suspended from a spring of stiffness constant 30 N/m and the frequency of natural oscillations be $2/\sqrt{3}$ times the frequency of damped oscillations, find the damping constant. (2)

(b) Discuss the working principle of Michelson Interferometer with the help of a diagram. (3)

Q3. Derive the expression representing the resultant of superposition of two perpendicular SHMs of equal frequencies and discuss all possible cases.

OR

Describe Fraunhoffer diffraction at a double-slit and deduce the position of maxima and minima. (5)

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Department of Applied Sciences, Punjabi University, Patiala,

I[st] MST (B.Tech.-I[st] Year),

Time: 1 hr. **Max. Marks: 15**

Note: Students must mention their group on the top of answer sheet.

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Q1.

(a) Compare mechanical and electrical oscillators in terms of corresponding variables of motion.

(b) A simple pendulum has a time period of 2 sec at temperature 25 °C.

(c) When seen by reflected light an excessively thin film appears to be perfectly black. Why?

(d) Write an expression for the resolving power of a telescope.

(e) If a grating has 50000 lines in 5" (five inch), calculate the grating element in cm. (1×5=5)

Q2. The amplitude of an oscillator of frequency 200 per second falls to 1/10 of its initial value after 2000 cycles. Calculate (i) its relaxation time (ii) its quality factor (3)

Q3. Explain how circular fringes are produced in Michelson Interferometer.

Q4. Derive the expression representing the resultant of superposition of two perpendicular SHMs of equal frequencies and discuss all possible cases.

OR

Find the number of secondary minima and maxima in the diffraction pattern formed by a grating of N slits of equal widths.

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UNIVERSITY COLLEGE OF ENGINEERING
PHYSICS THEORY (BAS-101) MST I

Date: 7-11-12 Time: 1 hour

Max. Marks: 15

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1. (a) What are the dimensions of the damping constant?
(b) How relaxation time varies with the mass of the vibrating body?
(c) Why X-rays cannot be diffracted by ordinary diffraction grating?
(d) Specify the condition when a double refracting crystal does not produce double refraction.
(e) Give one example of each of interference by division of wave front and division of amplitude. (1×5=5)

2. (a) Explain how Michelson interferometer is used to measure the thickness of thin transparent sheet. (3)
(b) Show that in a diffraction grating with grating element 1.5×10^{-6} m and light of wavelength 600 nm, third and higher order principal maxima are not visible. (2)

3. Derive the differential equation governing the variation of charge in a damped LCR circuit and describe the case of lightly damped system in detail.

OR

Derive the expression for the intensity distribution in the double slit diffraction and also sketch the complete double slit diffraction pattern (5)

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Department of Basic and Applied Sciences

Applied Physics – I (BAS-101)

2nd MST (November 2017)

(B.Tech - Ist Year)

Time Duration: 1 hour **Max. Marks: 15**

Note: Students must write their Roll No. on the question paper sheet.

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Q1. a) Explain the term optical pumping

b) What do you mean by numerical aperture?

c) Define expectation value.

d) What do you mean by zero point energy of a harmonic oscillator?

e) What is the necessary condition required for the working of a laser? 1x5=5

Q2. Write a note on quantum mechanical tunnelling. (2)

Q3. Differentiate between step index and graded index fibre. If the core index is 1.60 and cladding index is 1.57, what will be the maximum angle allowing light to be guided through the fibre? (3)

Q4. What are the properties of a well behaved wave function? Derive Schrodinger's time independent wave equation.

OR

Explain the construction and working of He-Ne laser. Show the laser transitions using energy level diagram. (5)

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SECTION–B

VI. Use Maxwell-Boltzmann distribution law to prove the theorem of equipartition of energy among various degrees of freedom of the molecules. (5)

VII. Deduce the law of distribution of energy of particles according to Fermi-Dirac statistics. (5)

VIII. What are Miller indices? How are they calculated? Find the Miller indices of a plane that makes an intercepts of 1 on x-axis and 2 on b-axis and is parallel to c-axis. (3+2=5)

IX. What is meant by polarization of a material? Mention the different mechanisms of polarization in dielectrics. (2+3=5)

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X. Derive London equations and explain how these are able to explain the observed experimental facts of superconductivity. (5)

SECTION–C

(Compulsory Question)

XI. (a) What do you understand by gradient of a scalar field?

(b) What are dielectric breakdown and dielectric strength?

(c) Discuss Doppler effect as observed in light?

(d) Show that a particle which travels with speed of light must have a zero rest mass.

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(e) What do you mean by grand canonical ensembles?

(f) What do you understand by thermodynamic probability of a macrostate ?

(g) What is the difference between a Boson and Fermions?

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(h) Find the relation between interplaner spacing and lattice parameter of a crystal system.

(i) Define and explain the Meissner effect.

(j) What are Type-I and Type-II superconductors.

(10×2=20)

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Total Pages : 3

PC-4264/MB

F-24/2058

APPLIED PHYSICS-II

Paper-104

(Semester–II)

Time : Three Hours] [Maximum Marks : 50

Note : Section C is compulsory. Attempt any *six* questions selecting *three* questions from each section A and B.

SECTION–A

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I. What are line and surface integrals of a vector field F ? Show that if V is a vector field and curl V = 0 and div V = 0 then the field satisfies Laplace's equation. (2+3=5)

II. What is displacement current ? Deduce Maxwell's equations for free space. (2+3=5)

III. Solve the wave equation to show that phase velocity of plane electromagnetic waves in non-conducting media is given by $1 / \sqrt{(\mu\varepsilon)}$. (5)

IV. Define time dilation and derive the expression relating the time interval as observed in two inertial frames of references. (5)

V. State and explain the postulates of special theory of relativity. Obtain Einstein's mass energy relation $E = mc^2$. (2+3=5)

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Department of Electronics and Communication Engineering
Punjabi University Patiala
Subject: Basic Electrical Engineering **Code:** ECE-101
MST: II Max. Mark: 15

Note: Write down your roll number and group number at the top of your answer sheet.

Section: A (All questions are compulsory)		
Q1. (A)	What is the role of commutator in DC motor and DC generator?	1
Q1.(B)	Drive an expression for torque developed by a DC motor.	1
Q1.(C)	Draw and explain the phasor diagram of transformer when it is operated under capacitive load.	1
Q1. (D)	List out various losses that takes place in transformer?	1
Q1. (E)	What is the principle of induction motor?	1

Section: B (Do any two Questions)		
Q2.	Draw and explain the characteristics of DC motors	5
Q3.	What do you understand by efficiency of transformer? Derive an expression for maximum efficiency	5
Q4. (I)	Drive the emf equation of a DC generator.	2.5
Q4. (II)	A lap wound DC shunt motor having 80 slots with 10 conductors per slot generates at no load an emf of 400V, when running at 1000rpm. At what speed it be rotated to generate a voltage of 220v on open circuit?	2.5

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NUMERICAL METHODS-BAS 201(MST-II) CIVIL ENGINEERING

Max. Marks:15 Time:1 hr

Section A(All questions are compulsory)

Q.1(i) Write Milne's Predictor -Corrector formulas.
(ii) Derive modified Euler's method.
(iii) Write Newton Cotes formula and derive Simpson's 1/3 rd formula.
(iv) Given that $y_{20} = 2854$, $y_{24} = 3162$, $y_{28} = 3544$, Find y_{25}?
(v) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Trapezoidal Rule. (1*5)

Section B (Attempt any two questions)

Q.2. Given the initial value problem $y' = 1 + y^2$, $y(0) = 0$, Find $y(0.4)$ by Runge-Kutta fourth order method by taking $h = 0.2$. (5)

Q.3. Given $\frac{dy}{dx} = x^2(1 + y)$ and $y(1) = 1$, $y(1.1) = 1.233$, $y(1.2) = 1.548$, $y(1.3) = 1.979$. Evaluate $y(1.4)$ by Adam's Bashforth method. (5)

Q.4. Determine the values of y at the pivotal points of the interval (0,1) if y satisfies the boundary value problem $y^{iv} + 81y = 81x^2$, $y(0) = y(1) = y''(0) = y''(1) = 0$, Take n=3. (5)

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Department of Computer Engineering
Punjabi University, Patiala

B.Tech-III	**M.S.T.-I**	**Subject: DBMS**
Paper: CPE-302		**Time: 1Hr**

Note: **Section A is compulsory. Attempt any two questions in Section B.**

Section – A

1. Explain the difference between Schema and Instance.
2. Name different constraints that can be applied on Generalization.
3. Define the term Range Relation.
4. Let E1 and E2 be two entities in an ER diagram with simple-valued attributes. R1 and R2 are two relationships between E1 and E2, where R1 is one-to-many and R2 is many-to many. R1 and R2 do not have any attributes of their own. What is the minimum number of tables required to represent this situation in the relational model?
   A. 2 B. 3 C. 4 D. 5
5. What is a Lattice,

Section – B

6. Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course:

```
STUDENT(SSN, Name, Major, Bdate)
COURSE(Course#, Cname, Dept)
ENROLL(SSN, Course#, Quarter, Grade)
BOOK_ADOPTION(Course#, Quarter, Book_ISBN)
TEXT(Book_ISBN, Book_Title, Publisher, Author)
```

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Specify the following queries in **relational algebra** on the database schema given.

a. List the number of courses taken by all students named 'John Smith' in Winter 1999 (i.e., Quarter = 'W99').
b. Produce a list of textbooks (include Courses, Book_ISBN, Book_Title) for courses offered by the 'CS' department that have used more than two books.
c. List any department that has all its adopted books published by 'AWL Publishing'.

7. Retrieve the name and address of all employees who work for the 'Research' department using **Domain Relation Calculus** from the following tables.

EMPLOYEE	FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
	John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
	Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
	Alicia	J	Zelaya	999887777	1968-07-19	3321 Castle, Spring, TX	F	25000	987654321	4
	Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
	Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
	Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
	Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
	James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

DEPARTMENT	DNAME	DNUMBER	MGRSSN	MGRSTARTDATE
	Research	5	333445555	1988-05-22
	Administration	4	987654321	1995-01-01
	Headquarters	1	888665555	1981-06-19

using **Tuple Relation Calculus** from the tables given above in Q.7.

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Department of Computer Engineering
B.Tech CE MST-1(Group 12,34,56)

Marks:15 Paper: CPE 302(*Database Management Systems*) Time: 1Hr

Note: Question 1 is compulsory. Attempt total three question each carries 5 marks.

Q.1
a) What are the integrity rules of the relational discuss different constraints in brief.
b) What is the schema, Mapping and instance in database?
c) How do you represent a [illegible] example?
d) Write SQL DDL to implement domain integrity.
e) Explain different constraints applicable on Specialization/Generalization.

Q.2 Let us consider a banking business scenario for developing the ER model. Assume in a city
- There are multiple banks and each bank has many branches. Each branch has multiple customers
- Customers have various types of accounts
- Some customers also had taken different types of loans from these bank branches
- One customer can have multiple accounts and loans

Q.3 What do you means by data model Explain all with suitable Example

Q.4 Consider the following Relations:
Department(DNo, Dname, Loc)
Sales(Order_no, Client_No, Order_date)
Client(Client_no, name, Balance)
a) Create a table employee with attributes EID, EName, Salary, DNo . Apply primary Key on EID attribute. Apply Foreign Key on Ename attribute at table level based upon dname attribute of department table.
b) Display Maximum salaries of Employees department number wise where salary is greater than 16000
c) Retrieve all orders placed by a client named Arun from the sales table.
d) Retrive the name of employees who work in 'Delhi' and 'Chandigarh' and earn more than Rs. 5000.
e) Retrive the name of department whose total salaries paid are more than Rs. 100000.

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MST -2

ELECTRICAL SCIENCE (ECE 101)

1ST YEAR – SEMESTER - 1

UCoE, PUNJABI UNIVERSITY, PATIALA

TIME: 1 HOUR

MARKS: 15

SECTION – A (5 Marks)

(Attempt all questions)

1. (a)Draw the equivalent circuit of single phase transformer.
(b)Write down the emf equation and voltage transformation ratio of single phase transformer.
(c)Write down [illegible] of DC motor.
(d)What is the function of commutator in DC [illegible] action and motoring action.
(e)Distinguish between core type and shell type transformer.

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SECTION – B (10 Marks)

(Attempt ant 2 Questions)

2. How open circuit & test is performed? Draw it's set up and discuss the results obtained from test.

3. A 4 Pole dc shunt generator has a lap connected armature with 480 conductors and is run at 400 rpm. The armature resistance is 0.2Ω and that of shunt field circuit is 50Ω. Calculate the flux/Pole when machine is supplying a load current of 60A at a terminal voltage of 250V.

4. Explain the speed - armature current , torque-armature current, speed torque characteristics of a DC Series motor and DC shunt motor.

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University College of Engineering, Punjabi University, Patiala
Mid Semester Test-II, Industrial Engineering (MCE-304)
Third year Mech. Engg. (5th Semester)

Note: Question 1 is compulsory. Do any two from the rest.

Ques.1. a. What is Lead time and Reorder point? 2
b. What is Setup cost? 1
c. Define PMTS & MTM. 2

Ques.2. Describe functions of PPC in detail. Differentiate between Loading and Scheduling. 5

Ques.3. What are various costs involved in inventory control. Explain ABC & VED systems of inventory control. 5

Ques.4. Explain Work Study. What is Standard time?

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NUMERICAL METHODS-BAS 201(MST-I) CIVIL ENGINEERING

Max. Marks:15 Time:1 hr

Section A(All questions are compulsory)

Q.1(i) Find the percentage error if 625.483 is approximated to three significant figures.

(ii) Give a comparison of iterative methods.

(iii) Show that $x_{n+1} = \frac{1}{2}x_n\left(3 - \frac{x_n^2}{a}\right)$ has second order convergence near $\sqrt{a}$.

(iv) Using Newton Raphson method find the [illegible] correct to three decimal places.

(v) Find a real root of the equation $x\,log_{10}x = 1.2$ by Regula Falsi method correct to two decimal places.

(1*5)

0.8284

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Section B (Attempt any two questions)

Q.2. State and prove the sufficient condition for the convergence of iterations in Iteration method. (5)

Q.3. Use Newton Raphson method to solve the equations $x = x^2 + y^2$, $y = x^2 - y^2$ correct to two decimals, starting with the approximation (0.8,0.4) (5)

Q.4. Find a real root of the equation $\cos x = 3x - 1$ correct to three decimal places using Secant method. (5)

625.483

625.48

625.5

41.024

0.024511

35.5008

3.45969

cosx-3x+1

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Numerical Methods-BAS 201 (CE & CIVIL-IV)

Time: 1 hr

Max Marks:15

Section A (All Questions are compulsory)

Q. I (i) Show that eigen values of a skew-Hermitian matrix are either zero or purely imaginary.

(ii) Discuss Modified Euler's Method.

(iii) Given that $\log_{10}2 = 0.3010$, $\log_{10}3 = 0.4771$, $\log_{10}7 = 0.8451$, find the value of $\log_{10}33$.

(iv) Find all the eigen values of $\begin{bmatrix} 4 & 2 & 2 \\ 2 & 5 & 1 \\ 2 & 1 & 6 \end{bmatrix}$ using Jacobi Method. (1+1+1+2)

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Section B (All Questions are compulsory)

Q. II Solve $\frac{dy}{dx} = \frac{1}{x+y}$, given is y(0) = 1 for y(0.1) and y(0.2), using Runge-Kutta method of fourth order.

Q. III From the following table of values of x and y, obtain dy/dx and d^2y/dx^2 for x = 1.6

X:	1.0	1.2	1.4	1.6	1.8	2.0	2.2
Y:	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250.

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DEPARTMENT OF COMPUTER ENGINEERING, PUNJABI UNIVERSITY, PATIALA

SUBJECT: System Programming
Time: 1 hour

Class: 3CE
Maximum marks: 15

Section- A

1. Difference between USING and BALR instruction. (1)
2. Difference between system programming and application programming. (2)
3. Define macro instruction. (1)
4. Write various advantages and disadvantages of Assembly language. (1)

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Section –B (do any two)

5. Explain general machine structure with diagram and also write its features. (5)
6. Draw flow chart for pass 1 and pass 2 assembler and explain them. (5)
7. Draw flow chart for pass 1 and pass 2 macros and explain them. (5)

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Roll No. .....

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

(Punjabi University, Patiala)

B.Tech (2nd Semester – 1st Year)

BASIC ELECTRONICS (ECE 203)

MST # II

Time allowed: 1 Hour

Maximum Mark

SECTION – A ***(Attempt all questions)***

1. (A) Convert $(1110)_2$ to Grey Code.
   (B) Simplify the following Boolean expression: $(Y\bar{Z} + \bar{X}U)(X\bar{Y} + Z\bar{U})$
   (C) State & prove De-Morgan's theorem.
   (D) What is the difference between a latch and flip-flop?
   (E) Express $(-28)_{10}$ in signed 7 bit 2's complement form. (5 x

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SECTION – B ***(Attempt any two questions)***

2. (A) Design & explain 4:1 MUX in detail. Also discuss the various applications of Multiplexers.
   (B) Explain SR flip-flop in detail. What is the basic limitation of SR flip-flop?
3. (A) What is the need of modulation in communication system?
   (B) Draw neat well labelled block diagram of superheterodyne radio receiver.
4. Compare AM & FM Modulation Schemes.

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Department of Electronics and Communication
Basic Electronics (ECE-102)

Allowed Time 1 hr
Roll no.....

MST-II
Max. Marks-15
Note: Write your group no. at the top of answer sheet

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Section A (All questions are compulsory)

Q1. (a) What is modulation index of AM and FM?
(b) Draw the block diagram of communication system.
(c) Define the DE Morgan's theorem.
(d) Convert 1011 BCD to Gray code.
(e) Encode the 1101 into 7 bit even parity hamming code. **1*5=5**

Section B (Do any two questions)

Q2. Explain the block diagram of radio transmitter and reception system in detail .
Q3. Design 16:1 multiplexer
Q4 (a) Write the application of encoder and decoder.
(b)Explain J-K flip flop. **2*5=10**

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Department of Electronics and Communication Engineering

(Punjabi University, Patiala)

Subject: Basic Electronics MST #2 **Max. Marks: 15**
Time: 60 Minutes

Section-A (1x5) (All questions are compulsory)

Q1. a) What is race around condition? How it is removed? 1
b) How antenna height is reduced using modulation? 1
c) Simplify Boolean Expression 1

$$\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + \bar{A}BC + \bar{A}B\bar{C} + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C} + ABC$$

d) State De-Morgan's theorem? 1
e) Difference between FET and BJT? 1

Section-B (2x5) (Attempt any two questions)

Q2. a) Define MUX? Explain 8:1 MUX with neat Block Diagram? 2
b) Explain the Operation and VI characteristics of Enhancement type MOSFET? 3

Q3. a) Explain Superheterodyne Receiver with Block Diagram? 3
b) Write the Difference between AM and FM? 2

Q4. a) Draw and explain the voltage divider biasing method 3
b) A Broadcast radio transmitter radiates 10KW, when the modulation percentage is 60, how much this carrier power? 2

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Basic Electronics-102
Semester-II

CC:D4.843

Time allowed: 3 Hours. Max Marks:50

Note: Attempt one question each from Sections A,B,C and D carrying 10 marks each and the entire Section E consisting of ten short answer type questions carrying 01 mark each.
Use of calculator is allowed.

Section-A

1. a) What do you mean by rectifier efficency and ripple factors as applied to a rectifier. Derive expressions for the same in case of full wave rectifier.

b) A fullwave rectifier supplies a load of 1 KΩ. The a.c. voltage applied to the diodes is 220-0-220 volt rms. If diode resistance is neglected, calculate

i) average d.c. voltage
ii) average d.c. current and
iii) ripple voltage (rms)

2. a) Describe a zener diode. Distinguish between zener breakdown and avalanche breakdown.

b) What do you mean by clipping circuit? Describe P-N diode clipping circuits.

Section-B

3. a) Draw the circuits of transistor amplifier in CB and CE configuration. Discuss the comparison of their important characteristics.

b) A CE transistor amplifier has input resistance of 100Ω and output resistance [illegible] if current gain factor is 90.

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4. a) Describe construction, working and characteristics of MOSFET.

b) Draw the output characteristics of JFET and explain how it works as a voltage controlled device.

Section-C

5. a) What is flip flop? Explain the principle of operation of S-R flip flop with truth table.

b) Prove the following identity using Boolean algebra and Demorgan's theorem.

$$\overline{AB + BC + CA} = \bar{A}\bar{B} + \bar{B}\bar{C} + \bar{C}\bar{A}$$

6. a) What is an encoder? Draw the logic circuit of decimal to BCD encoder and explain its working.

b) Prove the following Boolean identity:-

$$ABC + \bar{A}\bar{B}C + \bar{A}BC + AB\bar{C} + \bar{A}\bar{B}\bar{C}$$
$$= \bar{A}\bar{B} + B(A + C)$$

Section-D

7. a) What do you mean by a word "communication" in general? Explain an electronic communication systems block diagram.

b) Define frequency modulation. Derive the expression for instantaneous amplitude of FM wave. Define modulation index.

8. a) Explain how modulation makes possible to transmit several modulating signals over a common channel.

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b) Compare AM with FM with special reference to power requirements signed to noise ratio and bandwidth required.

Section-E

9. Explain briefly:-

i) What is PIV of a diode in a rectifier circuit?
ii) Can we measure potential barrier with the help of multimeter? Justify youranswer.
iii) What is the practical importance of voltage regulation in power supplies?
iv) What is the [illegible]
v) What do you mean by feedback in amplifiers?
vi) Why gate current in zero amperes for a JFET transistor?
vii) How can a decoder be used as a demultiplexer?
viii) Write down the rules for binary subtraction.
ix) Define a communication channel and name different types of communication channels.
x) Define: Modulation Index of AM

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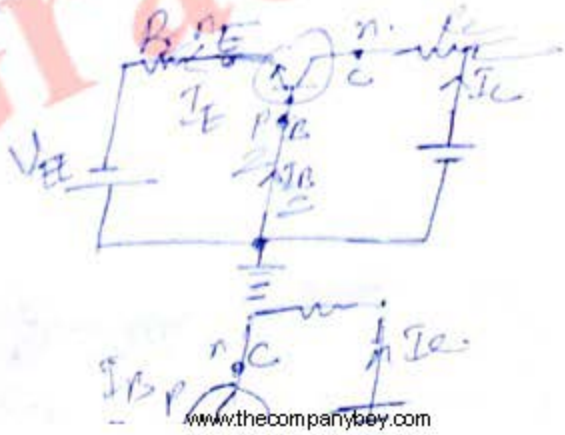

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Total Pages : 3

PC-5941/MR

M-35

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COMMUNICATION SKILL – 101

Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *Six* questions in all. Select *three* questions each from Section A and B. Q. No. IX of Section C is compulsory.

SECTION–A

I. Write a brief note on the significance of Communication in professional Organization.

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II. What are the basic purposes of reading ? Enumerate.

III. Discuss the elements of Effective writing.

IV. Discuss the important kinds of Business letters. (3×5=15)

SECTION–B

V. Explain the process of listening.

VI. Do as directed (Do any *five*) :

(a) Sita has given me her pen. (Change the voice)

(b) "Book". (Use as a noun and a verb)

(c) She told me to come. (Change into negative)

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(d) I said to Anmol, "Did you go to meet your friend ?"
(Change the narration)

(e) I am satisfied by your behaviour.
(Correct the sentence)

(f) Give the full form of the abbreviation of 'P.M.'

VII. Discuss the process of Group discussion.

VIII. Write a comprehensive note on Speech mechanism.
(3×5=15)

SECTION–C
(Compulsory Question)

IX. Attempt all the questions.

(a) How many channels of communication are there ? Enumerate.

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(b) Enlist the various kinds of reading ?

(c) Give one-word for each of the following :

(i) A person who can neither read nor write.

(ii) Method of sending messages without the help of a wire.

(d) What is Agenda and how is it different from Memorandum ?

(e) What are Feedback skills ?

(f) Do as directed :

(i) She worked hard. (Change into Past perfect tense)

(ii) I know him well. (Change the voice)

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(g) Use the following homonyms in your own sentences to make their meanings clear :

Plain, plane.

Knew, new.

(h) Explain the effective oral presentation skills.

(i) Highlight the components of an effective talk.

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(j) Give phonetic transcription of the following words :

Great, wood. (2×10=20)

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P3

Department of Basic and Applied Sciences, Punjabi University, Patiala (2 MST)
Sub: Communication Skills (HSS 101) Semester: 2nd Group A1-12
Date:..... Roll no..... M.M: 15
Time: 1 hour
Note: Mention the group name on the top of the answer sheet.

1. Discuss the various types of Meeting. **(1x5= 5 marks)**
2. What are the advantages of Group Discussion?
3. Define Feedback.
4. Interchange the negative sentence into affirmative sentence
   (a) [illegible]
   (b) [illegible]
5. Change into indirect
   (b) "Try to sleep", she said to James. (.5)
6. Phonetically transcribe the following words:
   (a) Judge (b) Church **(3 marks)**

1. What are the effective skills of speaking? **(3 marks)**
2. What are the salient features of a well written note? **(2 marks)**
3. You are applying for the post of System Manager in a company engaged in producing computer software. Prepare your resume for the said post. **(5 marks)**

OR

Classify the consonantal sounds on the basis of the Manner of Articulation.

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U.C.O.E, PUNJABI UNIVERSITY, PATIALA (2nd MST)

Sub: Communication Skills (HSS 101) **Semester: 1st** **Group B1-12**

Time: 1 hour **Max. Marks: 15**

Note: Mention the group number on the top of the answer sheet.

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I. Do as directed:

1. List the long vowels along with their phonetic symbol.
2. Change the active into the passive voice:
   (a) The police have caught the robber. (b) They will attend the conference.
3. Give one word substitution for the following:
   (a) A paper written by hand (b) A speech made without preparation.
4. What do the following words stand for?
   (a) UNICEF (b) VAT (b) /'tʃɜ:tʃ/
5. Do the phonetic transcription of: (a) Atom (b) Church **(1x5= 5 marks)**

II. What are the characteristics of a good report? **(3 marks)**

III. Define the following: **(2 marks)**

(a) Agenda of the meeting (b) Memorandum

IV. Draft a covering letter along with your resume, in response to an advertisement for the post of an executive engineer, in *The Tribune* dated Jan 2, 2012. Invent the necessary details.

OR

Classify the consonantal sounds according to the place of articulation. **(5 marks)**

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Department of Basic and Applied Sciences, Punjabi University

MST II - Communication Skills HSS 101

M.M-15 Time: 1 hour

I Attempt all short notes:

1. What are the linguistic barriers to communication?
2. Differentiate between Note Taking and Note Making.
3. What are the minutes of a Meeting?
4. What are the characteristics of Feedback?
5. Do Phonetic Transcription: a. Father b. Some (1x5=5)

II Discuss the various levels of Listening. (2)

III What are the methods of Note taking from Reading? (3)

IV Classify the consonantal sounds according to the Place of Articulation. (5)

Or

Draft a Job Application Letter for the Post of Executive Engineer in a Multi National Company. Invent the necessary details.

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Department of Basic and Applied Sciences, Punjabi University, Patiala (MST II)

Sub: Communication Skills (HSS 101) Group B-1-12 Date.....

Note: Mention the group name on the top of the answer sheet.

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1. Define Phonetics.
2. Discuss the guidelines for effective Group Discussion.
3. What is an Agenda ?
4. (a) They all loved each other (Correction of sentence)
   (b) He was too weak to walk (Removal of too) **(1x5= 5 marks)**
5. Phonetically transcribe the following words: **(3 marks)**
   a) Van (b) Judge
6. Define the minutes of a meeting? Discuss its significance? **(2 marks)**
7. What are the effective skills of oral presentation?
8. You are applying for the post of System Manager in a company engaged in producing computer software. Prepare your resume for the above said post. **(5 marks)**
   OR Discuss in detail about the various organs of speech.

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Tied

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Department of Computer Sci. & Engg.,
Punjabi University, Patiala
[illegible] Data Structures
First Mid Semester Test

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Time: 1 hour **MM: 15**

Q1 a) Explain the difference between bubble sort and selection sort algorithm? (1)

b) Five items: A, B, C, D and E are pushed into a stack, one after the other starting from A. The stack is popped four times and each element is inserted into a queue. Then two elements are deleted from the queue and pushed back on the stack. Now one item is popped from the stack. Which is the popped item? (2)

c) Differentiate between stacks and queues (1)

d) What are linear and non-linear data structures? (1)

Attempt any 2 questions (each question carries 5 marks)

1. State the algorithm for insertion and deletion in circular queue.
2. Explain Binary search algorithm with the help of an example.
3. Sort given elements using Quick sort: 134, 178, 63, 44, 211, 90, 80, 11

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Department of Mechanical Engineering, Punjabi University, Patiala
MCE -151 Engineering Graphics
End Semester Examination, April 2015
B. Tech. Ist Year - Group A
(SET-II)

Time Allowed: 2 Hours **Max. Marks: 50**

Note: Section A is compulsory. Attempt any three questions from Section B.

Section A (2 x 10 = 20)

Q.1 (i)	In fourth quadrant, the top view and front view both lie _____ (above/below) X-Y line.
(ii)	In first angle projection, the left hand side view is drawn on the _____ side of front view.
(iii)	If the line is inclined with HP and parallel to VP, its true length will be obtained in ___VP___ plane.
(iv)	When a line is perpendicular to HP, its ___[illegible]___ trace will coincide with its ___[illegible]___ view.
(v)	When a plane lamina is perpendicular to a reference plane, its projection on that plane is ___[illegible]___.
(vi)	A solid bounded by four equilateral triangular faces is called ___[illegible]___.
(vii)	A cylinder lying on HP with its axis perpendicular to it; is cut by an AIP, such that the AIP does not meet the top and bottom surface of cylinder, the true shape of a section is a _____ (circle / parabola)
(viii)	The section lines are evenly spaced and inclined at ___[illegible]___ to the reference line.
(ix)	Parallel line method is used for development of _____ (prisms / pyramids).
(x)	The isometric scale is constructed at an angle of ___30°___ degrees, while the true scale is constructed at an angle of ___45°___ degrees to the reference line.

Section B (10 x 3 = 30)

Q. 2	A straight line AB 65 mm long makes an angle of 30° to the HP and 45° to the VP. End A is 20 mm in front of VP and 30 mm above HP. Draw the projection of the line AB and locate its HT & VT.
Q. 3	The projectors of the line AB are 55 mm apart. End A is 25 mm below HP and 30 mm behind VP. End B is 35 mm above HP and 45 mm in front of VP. Find the true length of the line using auxiliary plane method. Also find the inclinations of the line with HP and VP.
Q. 4	A cone of 35 mm base diameter and 60mm height has its axis inclined at 30° to HP and the plan of the axis is inclined at 45° to VP. Draw the projections of the solid.
Q. 5	A right regular hexagonal pyramid, side of base 25 mm and height 65 mm, rests on its base in HP with one of its base edges parallel to VP. A section plane perpendicular to the VP and inclined to the HP at 45° bisects its axis. Draw the sectional top view and true shape of the cut section.
Q. 6	Draw the isometric projections of the pentagonal prism, base edge 30mm and axis length 55mm, resting on one of its rectangular faces on the ground.

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

End Semester Examination, April 2015

B. Tech. Ist Year - Group A

(SET-I)

Time Allowed: 2 Hours **Max. Marks: 50**

Note: Section A is compulsory. Attempt any three questions from Section B.

Section A (2 x 10 = 20)

Q.1 (i)	In first angle projection, the object is placed between the _____ and the plane of projection.
(ii)	When a line is parallel to H.P. and inclined to V.P., its front view will reveal its _____ (True length/Shortened length/Enlarged length).
(iii)	The apparent angles of inclination are always _____ than the true angles of inclination.
(iv)	The intersection of a plane with the VP is called _____ (VT / HT).
(v)	The auxiliary front view of an object is obtained on _____ (AIP / AVP).
(vi)	An oblique solid is one which has its axis _____ (perpendicular / inclined) to its base.
(vii)	When a sphere is cut by a section plane, the true shape of the section is _____.
(viii)	The sectional views are used to visualize the _____ details of the objects.
(ix)	Radial line method is used for development of _____ (prism / pyramid).
	The three forms of axonometric projections are isometric _____ and _____ projections.

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Section B (10 x 3 = 30)

Q. 2	A straight line PQ 50 mm long makes an angle of 30° to the HP and 40° to the VP. End P is 15 mm in front of VP and 25 mm above HP. Draw the projections of the line AB and locate its HT & VT.
Q. 3	The projectors of the line AB are 60 mm apart. End A is 25 mm above HP and 30 mm in front of VP. End B is 35 mm below HP and 45 mm behind VP. Find the true length of the line using auxiliary plane method. Also find the inclinations of the line with HP and VP.
Q. 4	A regular pentagonal pyramid of 30 mm base edge and axis height 55mm rests on one of its edges on HP with its base inclined at 30° to HP and the plan of the axis is inclined at 45° to VP. Draw the projections of the solid.
Q. 5	A cone with diameter of the base 40 mm and height 50 mm rests on its base on HP. A section plane inclined at 30° to HP and perpendicular to VP cuts the axis of cone 20mm below the vertex. Draw the sectional top view and true shape of the cut section.
Q. 6	Draw the isometric projections of the hexagonal prism, base edge 25mm and axis length 50mm, resting on one of its rectangular faces on the ground.

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

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End Semester Examination, Nov 2015

B. Tech. Ist Year - Group B

(SET-II)

Time Allowed: 2 Hours **Max. Marks: 50**

Note: Section A is compulsory. Attempt any three questions from Section B.

Section A (2 x 10 = 20)

Q.1 (i)	In third angle projection, the left hand side view is drawn _____ X-Y line. (Above, Below)
(ii)	A line is inclined to HP and parallel to VP the front view of the line is _____ to X-Y line. (Parallel, Inclined, Perpendicular)
(iii)	The HT of a line is 10 mm above X-Y line; the point is _____VP. (Behind, In front of)
(iv)	The front view of a plane lamina is true shape, the plane lamina is _____ to HP. (Parallel, Perpendicular)
(v)	Draw the projections of a point Q in HP and 40 mm in front of VP. Distance from profile plane is 10 mm.
(vi)	A pentagonal pyramid is a solid which is bounded by five _____ surfaces and one _____ surface and a vertex. (Triangular, Rectangular, Pentagonal)
(vii)	Draw the representation for a short break line.
(viii)	A right square pyramid is cut by an AIP; the plan of the resulting figure shows the _____ shape. (True/ Apparent)
(ix)	The development of a right pentagonal pyramid consists of five _____triangles. (Right angle, Isosceles, Acute angle)
(x)	In drawing an isometric projection of a sphere the radius is taken in _____ scale. (Isometric/True)

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Section B (10 x 3 = 30)

Q. 2	A straight line AB 60 mm long makes an angle of 30° to the HP and 45° to the VP. End A is 20 mm in front of VP and 30 mm above HP and end B is in third quadrant. Draw the projection of the line AB and locate its HT & VT.
Q. 3	The distance between the end projectors of a straight line CD is 80 mm. The end C is 60 mm above HP and 15 mm in front of VP, while end D is 10 mm above HP and 50 mm in front of VP. A point P situated on a projector at a distance of 25 mm from the projector through C is 70 mm above HP and 70 mm in front of VP. Find the shortest distance of point P from Line CD.
Q. 4	A right circular cylinder of 40 mm base diameter and 60mm height rests on HP on its base rim such that the axis is inclined at 45° to HP and the top view of the axis is inclined at 40° to VP. Draw the projections of the solid.
Q. 5	A hexagonal prism of base side 25 mm and height 50 mm is resting on HP on its base with two edges of the base parallel to VP. It is cut by AIP inclined at 45° to HP passing through a point of axis 40 mm above base. Draw the sectional top view and true shape of the cut section.
Q. 6	Draw the isometric projections of a sphere of diameter 40 mm resting centrally on the top of a frustum of a square pyramid of height 50 mm, base side 60 mm and top side 40 mm.

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Department of Mechanical Engineering, Punjabi University, Patiala

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First House Test, March 2015

B. Tech. Ist Year (SET-I)

Time Allowed: 1 Hour **Max. Marks: 15**

Q.1	Answer the following five questions:	
(i)	If a point lies in the VP, its front view lies on XY line. (True / False)	01
(ii)	A plane perpendicular to both HP and VP is called _____ plane .	01
(iii)	The system of projection in which the top view of an object is drawn above its front view is the _____ angle projections.	01
(iv)	True inclinations of an oblique line are always _____ than the apparent inclinations.	01
(v)	If a plane is parallel to VP and perpendicular to HP, its true shape will be visible in _____ (front / top / profile) view.	01
	Draw any two out of the following three questions:	
Q. 2	End A of line AB is 20mm above HP and lies in VP. The front view of the line is inclined at 30° to XY line, while the top view is inclined at 45° to XY line. The view from top measures 60 mm. Draw the projections of the line, find its true length, θ, Φ, HT and VT.	05
Q. 3	End A of line AB is 10 mm in front of VP, and 30 mm above HP. End B is 35 mm in front of VP and 15 mm above HP. Distance between end projectors is 60 mm. Draw the projections of the line and find its true length θ and Φ using auxiliary plane method.	05
Q. 4	A square lamina ABCD of 25 mm side, lies on one of its sides in HP with the plane of lamina inclined at 45° to HP. The side on which it rests on HP is also inclined at 30° to VP. Draw the projections of lamina.	05

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DEPARTMENT OF MECHANICAL ENGINEERING, PUNJABI UNIVERSITY PATIALA

ENGINEERING GRAPHICS, MCE-151

B-TECH 1ST YEAR MST-1 (GROUP B6 TO B12)

Date 15-10-2013 Maximum Marks - 15 Time: 2PM TO 3PM

NOTE: Attempt All Questions from Section A, Do Any Two From Section B

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SECTION-A (1x5=5)

a) In orthographic projection, projectors are parallel and _____ to plane of projection.

b) When a line is _____ to VP. It will not have VT.

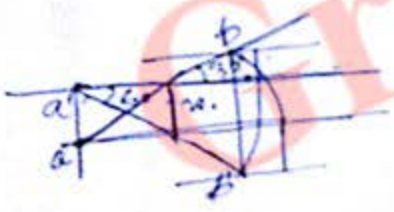
c) Show the representation of cutting plane line.

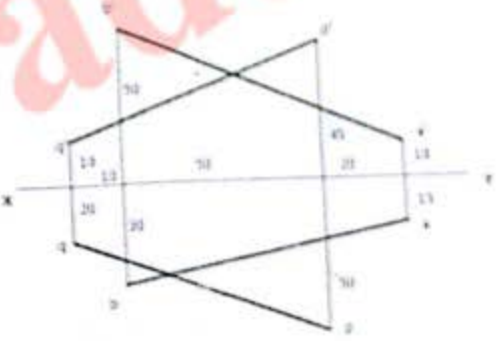
d) When a plane is perpendicular to VP and HP, the _____ view shows the true shape and size.

e) Included angle of a pentagon _____ degree.

SECTION-B (2x5=10)

1. A line AB 50mm long is in VP and makes an angle of 30° to HP. Point A is 20mm above HP. Draw projection of the line.
2. The top view of a line AB measures 60mm and makes an angle of 45° with reference line. A is in VP and H.T of the line is 20mm in front of VP. The elevation is inclined at 30° to XY. Draw the projections, find true length and inclination with HP and VP. Also locate VT.
3. The center line of two pipes AB and PQ are shown in fig, find the shortest distance between the two lines by auxiliary plane method.





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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics
First House Test, March 2018
B. Tech. Ist Year Group A (SET-I)

Time Allowed: 1 Hour **Max. Marks: 15**

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Q.1	**Answer the following in equivalent:**	
(i)	In first angle projection, the point view of a line which is perpendicular to VP is obtained _____ the X-Y line. (Above, Below)	01
(ii)	In _____ angle projection, both the top and front views of an object are drawn above the X-Y line.	01
(iii)	Name the principle planes.	01
(iv)	The angle of inclination of a line parallel to VP and inclined to HP is 30°. The line is inclined to profile plane at _____. (30° / 60° / 90°)	01
(v)	The one end of a line is in HP. The HT coincides with _____ view. (Front/Top/ None of these)	01
	Draw any two out of the following three questions:	
Q. 2	The length of the top view of a line AB parallel to VP and inclined at 45° to HP is 50mm. End A of the line is 12 mm above HP and 25 mm in front of VP. Draw the projections of the line and find its true length.	05
Q. 3	A line AB, 90 mm long, is inclined at 30° to the H.P. Its end A is 12 mm above the H.P. and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the top view of AB and determine its inclination with the V.P. using rotation of line method. Also locate Traces HT and VT of line AB.	05
Q. 4	A rectangular lamina of size 50mm x 30 mm side rests on its shorter edge on the HP. The lamina makes an angle of 45° to the HP and the side on which it rests makes 30° to the VP. Draw the projections of the lamina.	05

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

First House Test, March 2015

B. Tech. Ist Year (SET-II)

MST-1
2015
(Ay to Ay) (2nd set)

Time Allowed: 1 Hour

Max. Marks: 15

Q.1	**Answer the following five questions:**	
(i)	In first angle projection system, the right hand side view of an object is drawn on _____ side.	01
(ii)	In orthographic projections, it is imagined that the observer looks at an object from _____ distance from the object.	01
(iii)	If the front view of a line is parallel to the XY line its true length is shown in _____ view.	01
(iv)	The horizontal trace of a line exists when the line is _____ (parallel / inclined) to HP.	01
(v)	If a rectangular lamina is parallel to the profile plane, its front view and top views will appear as _____ (straight line / rectangle) and _____ (straight line / rectangle) respectively.	01
	Draw any two out of the following three questions:	
Q. 2	The front view of the line AB measures 55 mm and is inclined at 45° to XY line, while the top view is inclined at 30° to XY line. End A of line AB is 15 mm above HP and 25 mm in front of VP. Draw the projections of the line, find its true length, θ, Φ, HT and VT.	05
Q. 3	End D of line DE is 25 mm in front of VP, and 20 mm above HP. End E is 35 mm in front of VP and in HP. Distance between end projectors is 55 mm. Draw the projections of the line and find its true length θ and Φ using auxiliary plane method.	05
Q. 4	A rectangular lamina ABCD of 45 mm x 25 mm sides, lies on one of its shorter sides in HP with plane of the lamina inclined at 30° to HP. The side on which it rests on HP is also inclined at 45° to VP. Draw the projections of lamina.	05

Side view

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Department of Mechanical Engineering, Punjabi University, Patiala

MCE -151 Engineering Graphics

First Mid-Semester Test, Sept 2017

B. Tech. Ist Year, 1st Sem (Group B)

Time Allowed: 1 Hour **Max. Marks: 15**

NOTE: Section A is compulsory. Attempt any two questions from Section B.

Q.1	**Section A; Answer the following five questions with pen only**	
(i)	In the fourth angle projection, the elevation is ---Below--- the XY line and the top view is ---Below--- the XY line. (Above, Below)	01
(ii)	The true angle of a line with a reference plane is Smaller than the apparent angle of the line with the same reference plane. (Greater than, Smaller than, Equal to)	01
(iii)	The distance between a line and a point is found by _____ method. Auxiliary	01
(iv)	A plane lamina is inclined to VP and perpendicular to HP. The front view of the lamina gives ---P.V.--- (Edge View, Projected view, True shape) of the lamina.	01
(v)	The opposite ends of a line are in first and third quadrants. The HT and VT of the line _____. (lie on the projections, lie on the extensions of the projections, can't be found)	01
	Section B; Draw any two out of the following three questions.	
Q. 2	The end A of a line AB is 20 mm above HP. The front view of the line is 60 mm long and inclined at 50° to XY line. The top view of the line is inclined at 45° to XY line. The HT of the line is 15 mm in front of VP. Draw the projections of the line; find its true length, inclinations with HP and VP using the rotation method.	05
Q. 3	A straight line CD has its end C 10 mm above HP and 35 mm in front of VP and end D is 25 mm below HP and 20 mm behind VP. The distance between the end projectors of the line is 50 mm. Draw the projections of the line. Determine its true length and inclinations with HP and VP using the auxiliary plane method.	05
Q. 4	A rectangular lamina of 50 mm by 30 mm is resting on HP on its shorter side such that the lamina is inclined to HP at an angle of 45° and side on which it rests on HP inclined at 30° to VP. Draw the projections of the lamina.	05

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(g) Derive Best case and worst case efficiency of quick sort algorithm.

(h) List out the advantages of Heap sort.

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(i) State the principal of Backtracking.

(j) Define Approximation and Randomised Algorithms.

(2×10=20)

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Roll No. Total Pages : 3

CC : D 3.980

3493/NR

C–20/2115

ALGORITHM ANALYSIS AND DESIGN

Paper–303

Sem.–V

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt one question from each Section A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark.

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SECTION–A

1. Write down the algorithm of Merge Sort and apply the algorithm to sort the following array :

   A = [35, 40, 1, 18, 19, 23, 0, 5, 3, 21, 14] in descending order.

2. (a) Define Heap. Construct a heap for the list 11, 18, 16, 15, 13, 8, 7 by the bottom-up algorithm.

   (b) Design an efficient algorithm for finding and deleting an element of the smallest value in a heap and determine its time efficiency. 10

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SECTION–B

3. Describe the design steps in Prim's algorithm to construct minimum spanning tree with example.

4. Describe various steps of Dijkstra's algorithm to calculate the single-source shortest path in a weighted graph. 10

SECTION–C

5. Apply the Branch and Bound algorithm to solve the Traveling Salesman problem. Use suitable graph.

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6. Apply the Backtracking algorithm to solve the following:

   (a) 8 queens problem

   (b) Subset-sum problem. 10

SECTION–D

7. Derive lower bounds for any sorting algorithm that sorts by comparisons of Keys.

8. Explain various phases of non-deterministic algorithm with example. 10

SECTION–E

9. (a) Define *Time Complexity* and *Space Complexity* of an algorithm.

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(b) Define Greedy approach.

(c) State the Best-case and Worst-case analysis for Linear search.

(d) List out any two drawbacks of Binary search algorithm.

(e) Compare NP-hard and NP-complete problems.

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(f) Define Divide and Conquer strategy.

(g) Define Approximation algorithm.

(h) Define Optimal binary search tree.

(i) List out the disadvantage of Merge sort.

(j) Define Knapsack problem. 10×1

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Total Pages : 3

PC-4003/NR

G-1/2116

ALGORITHM ANALYSIS AND DESIGN–303

(Semester–V)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION–A

I. Explain all the mathematical notations used for the analysis of an algorithm.

II. Explain the Merge sort algorithm. Analyse its efficiency.

III. List the characteristics of Greedy algorithm.

IV. Write a pseudo code for divide and conquer algorithm for finding the position of the largest element in an array of numbers.

V. Explain Strassen's matrix multiplication. Evaluate it's efficiency. (5×3=15)

SECTION–B

VI. Design an algorithm to solve the travelling salesman problem using Dynamic programming.

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VII. What are the features of branch and bound algorithms? Discuss in detail.

VIII. Apply and explain the backtracking method to solve Hamiltonian circuit problem.

IX. What are NP-complete and NP-hard problems ? Explain briefly with examples.

X. Solve the following instance of 0/1 knapsack problem given the knapsack capacity is W = 5 using Dynamic programming:

Items : 1, 2, 3, 4

Weights : 2, 1, 3, 2

Prices : 12, 10, 20, 15. (5×3=15)

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SECTION–C

XI. (a) What is an algorithm?

(b) Compare the orders of growth of n^l/2 and 2^n.

(c) Define Optimal Binary Search Tree.

(d) Define divide and conquer strategy.

(e) Derive time complexity of Dijkstra's algorithm for single source shortest distance problem.

(f) Compare the efficiency of Kruskal's algorithm and prim's algorithm to construct minimum spanning tree.

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(d) Information security using RSA.

(e) Importance of data encryption standards.

(f) Virtual private network.

(g) Code integrity.

(h) Message digest.

(i) Need for ethical hacking.

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(j) Data integrity. (10×1=10)

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305

Total Pages : 3

PC-10770/MR

O-19/2056

NETWORK SECURITY-315

Semester-VI

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *four* questions selecting *one* question from each Section A, B, C and D. Section E is compulsory.

SECTION – A

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I. (a) Highlight the primary challenges of Information security. 5

(b) Write note on Cryptaanalysis of Monolythic Cyphers. 5

II. (a) Differentiate between Stream and Block cipher. 4

(b) Present a brief description of the classical encryption techniques. 6

SECTION – B

III. What are Advance Encryption Standards ? Discuss the selection process for AES. 5+5

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IV. (a) Illustrate the Merkle-Hellman Knapsacks algorithm by taking a suitable example. 6

(b) Compare public key and symmetric key algorithms in the perspective of their security issues. 4

SECTION – C

V. (a) What is a message digest algorithm ? Exemplify the creation of hash value through MD5 algorithm. 8

(b) How Denial of Service attack originates ? 2

VI. Present a detailed overview of the network security issues. 10

SECTION – D

VII. (a) Comment on different secure mail protocols used to ensure e-mail security. 6

(b) Enlist the objectives of ethical hacking. 4

VIII. Write note on Hactivism, RSA encryption, Web Server. (4+4+2)

SECTION – E

(Compulsory Question)

IX. Write short notes on the following :

(a) Vernam Cipher.

(b) Differentiate signature functions and hash function

(c) Cracker.

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Roll No. ..

Total Pages : 4

4313/NB

H-10/2117

COMPUTER GRAPHICS

Paper-412

Semester-VII

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

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SECTION—A

1. Differentiate the raster scan and random scan display techniques used for graphics display devices. Explain these techniques and their use for different computer graphics applications. 5

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Roll No. ..... Total No. of Page

PC 10762-M

O-19/2056

COMPUTER GRAPHICS–308

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

1. Write down and explain midpoint circle drawing algorithm. Assume 10 cm as radius and co-ordinate origin as the Center of the circle. 10

2. (a) Distinguish between random and raster scan displays. 5

   (b) Explain the following devices :

   (i) Image scanners

   (ii) Plotters. 5

SECTION–B

3. Derive the transformation matrices for the following transformations :

   (a) Reflection about X-axis

   (b) Reflection about Y-axis

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(c) Reflection about origin

(d) Reflection about line Y = X

(e) Reflection about Y = -X. 10

4. Show that the reflections in the line y = x and the line y = -x can be performed by a scaling operation followed by rotation. 10

SECTION–C

5. Show why the Sutherland-Hodgeman clipping algorithm will only work for convex clipping regions. 10

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6. A cube is defined by 8 vertices, A (0,0,0), B (2,0,0), C (2,2,0), D (0,2,0), E (0,0,2), F (2,0,2), G (2,2,2), H (0,2,2). Find the final co-ordinates after it is rotated by 45 (degree) around a line joining the point (2,0,0) and (0,2,2). 10

SECTION–D

7. Explain the properties of the Bezier and B spline curves. 10

8. What are the steps required to shade an object using Phong shading algorithm ? Explain. 10

SECTION–E

9. (a) Write any two line attributes. 1

(b) Differentiate between window and viewport. 1

(c) What do you mean by the shading of objects ? 1

(d) What is the viewing transformation ? 1

(e) What is line clipping ? Explain. 1

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(f) Define:

(i) View reference point

(ii) View plane normal. 1

(g) For large polygons the flood fill algorithm may fail, why? What could be the method to avoid this? 1

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(h) Explain the working of the raster scan monitors. 1

(i) What is aspect ratio ? What is its importance ? 1

(j) Distinguish between Phong and Gouraud shading. 1

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2. Discuss the midpoint algorithm for scan converting a circle. Compare it with other circle generation techniques. 5

3. Reflect a diamond shaped polygon whose vertices are A(–1, 0), B(0, –2, C(1, 0) and D(0, 2) about :

   (a) Horizontal line y = 2

   (b) Vertices line x = 2. 5

4. What is the scan line method for area filling ? Discuss in detail. 5

5. What are composite transformations and how are these useful in Computer graphics applications ? Discuss these with suitable examples. 5

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SECTION—B

6. Explain Sutherland Hodgeman algorithm for polygon clipping in detail. 5

7. What is the use of projections for display of real scenes or objects on display screen ? Discuss and differentiate different types of projections in Computer graphics. 5

8. How visible surf
in display of ima
visible surface

9. What is the imp
in Computer gr
method for su

10. Discuss the pro
How these are

11. Write short
(i) Defin
devic
(ii) What
Grap
(iii) Wha
for
(iv) Wh
Bo

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8. How visible surface detection algorithms are useful in display of images ? Discuss A-Buffer method for visible surface detection in detail. 5

9. What is the importance of surface rendering process in Computer graphics ? Discuss Gouraud shading method for surface rendering. 5

10. Discuss the properties of Bezier and B-Spline curves. How these are useful in Computer graphics. 5

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SECTION—C

11. Write short notes on the following : 10×2=20

(i) Define resolution and aspect ratio of display device.

(ii) What is the use of light pen in Computer Graphic applications ?

(iii) What are the limitations of DDA algorithm for Line generation ?

(iv) What is the difference between Flood fill and Boundary fill algorithms for region filling ?

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(v) What are Homogeneous coordinates and how are these useful in Composite transformations ?

(vi) How the lines to be clipped are selected in Cohen-Sutherland line clipping algorithm ?

(vii) What are viewing transformations and what is their use in Computer graphics ?

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(viii) What are the basic three dimensional geometric transformations ?

(ix) What are the principle vanishing points in perspective projections ?

(x) What are the limitations of Z-buffer method for visible surface detection ?

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Total No. of Pages : 3

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PC 2663-NR

C-11/2114

ELECTRO-MAGNETIC FIELD THEORY–203

Semester–III

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– (1) Attempt *five* questions, selecting any *one* from each of the Section A, B, C and D.

(2) Section E is compulsory.

(3) All questions carry equal marks.

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SECTION–A

1. (a) Derive Poisson equation.

   (b) Find $\hat{E}$ at point P(1, 1, 1) due to four identical 3 nC point charges located at A(1, 1, 0), B(–1, 1, 0), C(–1, –1, 0) and D(1, –1, 0).

2. (a) Derive an expression for potential difference between two concentric spheres of radii 'a' and 'b' (b > a), if the outer sphere of the inner sphere is charged with Q. Apply Gauss's Law.

   (b) Derive the conditions at a boundary between two perfect dielectrics.

SECTION–B

3. (a) Derive the boundary conditions for Magnetic field at the boundary of two Media.

   (b) Obtain the expression for the force experienced by a current carrying conductor kept in magnetic field.

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4. (a) Find an expression for the magnetic ux density at the centre of a circular current loop of radius R and carrying a current of I amp.

(b) Find self and mutual inductance of a parallel wire transmission line.

SECTION–C

5. Derive wave equations for wave propagation in a conducting medium. Discuss the features of uniform plane wave.

6. (a) A wave is incident from Air on to a perfect conductor normally. Evaluate the reflection coefficient.

(b) What is meant by polarization of a wave ? Explain with the help of a neat diagram, the terms mechanical plane wave travelling along x direction.

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SECTION–D

7. Derive fields for TE wave in parallel plate waveguide. Derive the cut off frequency for TE guided modes.

8. Explain the Smith chart in detail. With a suitable example, show that Smith chart can be used for impedance matching also.

SECTION–E
(Compulsory)

9. Write in short :

(a) Give the physical interpretation of group and phase velocity in relation to speed of light.

(b) The VSWR of a lossless transmission line is 5. Find the magnitude of reflection coefficient.

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(c) Differentiate between conduction and displacement current.

(d) Show that $\sqrt{\frac{\mu}{\varepsilon}}$ has the dimensions of impedance.

(e) State and explain Stoke's theorem.

(f) Show that the voltage $V(x, t) = A \cos(\omega t + \theta)e^{j\beta x}$ satisfies the transmission line equation for a uniform lossless line if $\beta = \omega\sqrt{LC}$.

(g) Under what condition will reflection and transmission coefficients be real ?

(h) Define electromotive force. How it is different from electric potential ?

(i) Explain difference between [illegible]

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Numerical Methods-BAS 201 (ME & ECE-III)

Max Marks:15 **Time: 1 hr**

Section A (All Questions are compulsory)

Q. I (i) Write relation between shift operator and backward operator.
(ii) Define initial value Problem and Boundary value Problem.
(iii) Express Modified Euler formula as a R-K method of 2nd order.
(iv) Write Stirling's formula of interpolation for first derivative.
(v) Derive Improved Euler's method. 5*1=5

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Section B (Attempt any Two questions)

Q. II Given $\frac{dy}{dx} = \frac{y-x}{y+x}$ with y(0) = 1. Find y(0.1) and y(0.2) using Runge-Kutta method of fourth order.

Q. III The distance covered by an athlete for the 50 meter race is given in the following table:

Time(sec) :	0	1	2	3	4	5	6
Distance(m):	0	2.5	8.5	15.5	24.5	36.5	50

Determine the speed of the athlete at t=5 sec.correct to two decimals.

Q. III Derive Simpson's 3/8th rule and hence find $\int_0^6 \frac{e^x}{1+x}\,dx$. 2*5=10

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Department of Computer Science and Engineering
Punjabi University, Patiala

B. Tech. – 4th Year (7th-sem) **MST-I** **Subject:- OOAD (Theory)**
Time: 1hour (10:00-11:00) am **MM: 15** **Date: 21, sept, 2015**
Examiners: Mrs. Harpreet Kaur and Dr. Dhavleesh rattan

SECTION A

Q1:

b) What is the purpose of sequence diagram?
b) What is difference between a node and a component?
c) Define Aggregation and Generalization.
d) Differentiate between static and dynamic behaviour.
e) What is the role of interfaces?

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SECTION B

Q2: Explain in detail the concept of Association and its types with suitable example.

Q3: Write a short note on:

c) Rational Unified Approach.
OR
d) Building Blocks of UML

Q4: What is the purpose of Use-Case Model? Discuss various relationships used in Use-case diagram with example.

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Department of Computer Engineering, Punjabi University, Patiala

B. Tech. – 4th Year (7th sem CE), MST-2, OOAD using UML (Theory), 1hour, MM: 15, 28 Nov, 2016

Q1: What are different types of interaction diagrams? Show their equivalence.

Q2: Show with diagrams only

a) Realization relationship b) Data flow diagram with data stores

Q3: What is object design? Explain in detail the steps of object design.

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Q4: Quiz (For continuous evaluation) State True or False:

a) Rearranging the computation for greater efficiency happens in design optimization during object design.
b) Delegation is used to share implementation.
c) There can be more than one association connecting the same classes.
d) Dependencies are only used when the relationship one is modeling is not structural.
e) Deployment diagram is one of the UML's structural diagrams.
f) Components can be used to model adaptable systems.
g) Every object has a lifetime.
h) Activity diagrams can be used to model the workflow as well as an operation.
i) Flow of control by organization is collaboration diagram.
j) Sequence diagrams and collaboration diagrams are semantically equivalent

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DEPARTMENT OF MECHANICAL ENGINEERING
PUNJABI UNIVERSITY, PATIALA

MST- 2(6th Semester) **REFRIGERATION & AIR CONDITIONING** (MCE-308)

Time Allowed: 1 Hour

Max. Marks: 15

Note: **Section-B** is **Compulsory** and attempt any **Two** question from **Section-A**. Use of **P-h chart**, **psychrometry chart** and **table** is allowed.

SECTION-A

Q:1 List the various types of condensers. Explain any one condenser in detail. (5)

Q:2 What is the function of [illegible] in vapour compression refrigeration system. Explain the working of Thermostatic Expansion Valve. (5)

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Q:3The atmospheric air at 30°C DBT and 75% RH enters a cooling coil at the rate of 200 m^3/min.The coil dew point temperature is 14°C and by pass factor of coil is 0.1. Determine (a) Temperature of the air leaving the cooling coil (b) Sensible heat factor (SHF). (5)

SECTION-B

Q:4 **(a)** List the various types of evaporators.

(b) Show (i) Sensible cooling (ii) Heating and humidification, processes on the psychrometric chart.

(c) Explain (i) Dew point temperature (ii) Relative humidity. (1 +2 +2)

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Roll No. .....

Total No. of Pages : 4

PC 10767-MR

O-19/2056

SOFTWARE PROJECT MANAGEMENT–313

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: Attempt *four* questions selecting *one* question each from Sections A, B, C and D. Section E is compulsory.

SECTION–A

1. What do you mean by Project Stakeholders? Explain each kind of stakeholder with proper example. 10

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2. Discuss the steps followed for identifying Project Infrastructure and analyze the Project Characteristics. 10

SECTION–B

3. (a) As you move outward along the process flow path of the spiral model, what can you say about the software that is being developed or maintained ?

   (b) Create a critical path network on activity node for the below table. Identify the critical path for the project network after calculating the parameters of CPM as well. Calculate the free float also.

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Activity	Immediate Predecessor	Duration (in Months)
A	–	2
B	–	6
C	–	4
D	B	3
E	A	6
F	A	8
G	B	3
H	C,D	7
I	C,D	2
J	E	5
K	F,G,H	4
L	F,G,H	3
M	I	13
N	J,K	7

3+7

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4. Discuss the waterfall model, the linear sequential model and prototyping model in detail. 10

SECTION–C

5. What is the role of Configuration Management System in Develop Project Management Plan, during Project Integration Management ? Discuss. 10

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6. (a) Suppose a project is to be completed in one year at the cost of $ 1,00,000. After three months, you realize that the project is 30% complete at a cost of $ 40,000. Assess the performance of the project.

(b) Explain different techniques used for collection of data. 6+4

SECTION–D

7. What do you mean by Risk in Software Project Management ? Explain the framework for dealing with risk. 5+5

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8. Explain the Risk Planning steps which you can follow after identifying the major risks and allocated priorities to them. 10

SECTION–E

9. (a) What do you mean by Time Variance (TV) ?

(b) Why does delaying a task on critical path delay the whole project ?

(c) Differentiate between LOC and FP. Which one is better and why ?

(d) What is the significance of Resource Calendar ?

(e) What is the usage of PERT technique ?

(f) What do you mean by Cost Variance ?

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(g) What is the usage of backward pass reference to activity network ?

(h) What do you mean by budgeted cost of work scheduled ?

(i) What is the purpose of Product Flow Diagram ?

(j) What is the purpose of Agile methods ? $10 \times 1 = 10$

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MM.15 Subject: System Modeling & Simulation (CPE-403) Date:

Note: Section-A [illegible] Section-B MST-I

4CE12, 4CE34, 4CE56

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Section-A

1. Write any two advantage of simulation. (1)
2. Define poisson process. (1)
3. What is stochastic system model? (1)
4. Write the properties of Pseudo-random numbers. (2)

Section-B (5 marks each)

5. Explain the steps involved in simulation study. (5)
6. What is inverse transformation method? Explain how it is used for producing non-uniformly distributed random numbers for exponential distribution. (5)
7. Describe various tests used for testing the pseudo-random numbers. (5)

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Total Pages : 3

PC-4022/NR

G-2/2116

WIRELESS AND MOBILE COMMUNICATION–403

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

I. (a) What are HSCSD, GPRS, EDGE, WLAN, and bluetooth?

(b) Explain GSM architecture. (5,5)

II. (a) What are advantages of 3G networks?

(b) What is WLL? (5,5)

SECTION–B

III. (a) Name the techniques used to improve the coverage and capacity of a cellular system. Explain any *one* of them.

(b) What are the basic propagation mechanisms which impact the propagation in mobile communication system ? Explain any *two* of them. (5,5)

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IV. (a) What is the difference between cell splitting and cell sectoring?

(b) What are different types of hand offs? Explain the hand off operation with suitable diagram. (5,5)

SECTION–C

V. (a) What are the different factors that influence small scale fading?

(b) What is the difference between pure and slotted ALOHA? What is the maximum throughput that can be achieved in slotted ALOHA? (5,5)

VI. (a) Compare the characteristics of CDMA and SDMA.

(b) Discuss in brief about [illegible]

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SECTION–D

VII. (a) Discuss block diagram of IS-95 reverse link.

(b) What is TDMA ? Discuss cell capacity of a TDMA system. (5,5)

VIII. (a) Discuss system and protocol structure of 802.16 standard.

(b) What is a combiner analysis ? (7,3)

SECTION–E

IX. Answer the following question in short :

(a) What are narrow band systems ?

(b) What is large scale fading ?

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(c) What is CSMA ?

(d) What is WiFi ?

(e) What is frequency hopped multiple access ?

(f) Why is detection difficult in wireless scenario ?

(g) What is the difference between 1G and 2G ?

(h) What are adhoc networks ?

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(i) What is selective retransmission ?

(j) What is PAN ? (1×10=10)

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660)1989(3.01
1980
900

374 $\frac{1989}{660} \times 10^{-9}$
$= 3.09 \times 10^{-9}$

MST II (APPLIED PHYSICS-I) EAS-101

Time Allowed: one hour MM: 15

Please mention your Group at the Top of answer sheet.

NOTE: All questions are compulsory.

Q1. (i) What is a Rayleigh criterion for resolving power of an optical instrument?
(ii) What is the name of host material in Ruby laser?
(iii) What is the role of Canada balsam in Nicol prism?
(iv) What is the role of the cladding in the optical fibre?
(v) What do you mean by optic axis of a crystal used to produce polarized light? (1×5=5)

Q2. (a). What do you mean by numerical aperture of optical fibre? Drive its expression in term of acceptance angle. (3)
(b). A grating has 1100 lines ruled on it. What is the difference between two wavelengths that just appear resolved in the first order spectrum in the region of wavelength $\lambda = 660$ nm. (2)

Q3. Discuss Fraunhofer diffraction at a double slit with the help of diagram. Find the position of maxima and minima.
or
Explain the principle and working of He-Ne laser with proper diagrams. (5)

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VIII. Explain penetration testing. (5)

IX. Explain attack and penetration tools, in brief. (5)

X. Explain ethical hacking process in detail. (5)

SECTION–C

(Compulsory Question)

XI. (a) Explain network reconnaissance. (2)

(b) Explain the term forensics. (2)

(c) Explain the terms foot printing. (2)

(d) Explain virus. (2)

(e) Define cyber terrorism. (2)

(f) Explain Web jacking. (2)

(g) Who are ethical hackers'? (2)

(h) Define cyber security. (2)

(i) What is phishing? (2)

(j) What are Trojans? (2)

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H-10/2117

CYBER SECURITY-411

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B carrying 5 marks each, and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION–A

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I. Discuss various types of threats in computer system. (5)

II. Explain digital signatures. (5)

III. Explain Denial of Services attack. (5)

IV. Explain Email spoofing and email bombing. (5)

V. Explain DNS enumeration. (5)

SECTION–B

VI. Discuss, in brief, IT Act. (5)

VII. Explain need for ethical hacking. (5)

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Department of Computer Engineering
Punjabi University

403

CPE-411: CYBER SECURITY
MST-1

Time: 1 Hour

M.M.: 15

Note: Section-A is compulsory. Attempt any two questions from section-B.

Section-A

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Q1: (a) Explain the Blue Whale game challenge? (3*5=15)
(b) Explain Wanna-cry Ransom-ware?
(c) What is Cyber space and explain various cyber threats?
(d) What is Digital signature and data protection?
(e) Explain E-mail bombing in detail. Why the code is preferably written in python language?

Section-B

Q2: (a) Explain different type of key loggers. (2)
(b) Explain Application program Ethics. (3)
Q3: (a) Explain the working of DNS lookup? (2)
(b) What are social engineering tools/methods for identity theft ? (3)
Q4: (a) What are the general motives behind Data diddling? (2)
(b) Explain different steps in mobile forensic? (3)

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ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ।
ਪੇਪਰ ਪੰਜਾਬੀ

ਸਮਾਂ : 1 ਘੰਟਾ ਕੁੱਲ ਅੰਕ : 10

ਭਾਗ ਪਹਿਲਾ : ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। 4 × 1 = 4

1. 'ਅੱਜ ਆਖਾਂ ਵਾਰਿਸ ਸ਼ਾਹ ਨੂੰ' ਕਵਿਤਾ ਵਿਚ ਕਿਸ ਘਟਨਾ ਦਾ ਜ਼ਿਕਰ ਹੈ?
(ੳ) ਮੇਲੇ ਦਾ (ਅ) ਵਿਛੜਣ ਦਾ (ੲ) ਵੰਡ ਵੇਲੇ ਦਾ (ਸ) ਹੀਰ ਰਾਂਝੇ ਦੇ ਕਿੱਸੇ ਦਾ

2. ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ ਨੂੰ ਕਿਸ ਕਵੀ ਵਜੋਂ ਜਾਣਿਆ ਜਾਂਦਾ ਹੈ?
(ੳ) ਧਾਰਮਿਕ ਕਵੀ (ਅ) ਵਿਰਹੋਂ ਦਾ ਕਵੀ (ੲ) ਪ੍ਰਕ੍ਰਿਤੀ ਦਾ ਕਵੀ (ਸ) ਹਾਸਰਸ ਕਵੀ

3. ਲੋਕਧਾਰਾ ਲਈ ਲੋਕਵੇਦ ਸ਼ਬਦ ਦੀ ਵਰਤੋਂ ਕਿਸ ਨੇ ਕੀਤੀ?
(ੳ) ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ (ਅ) ਕਰਨੈਲ ਸਿੰਘ ਥਿੰਦ (ੲ) ਵਣਜਾਰਾ ਬੇਦੀ (ਸ) ਸੁਰਾ ਸਿੰਘ

4. 'ਉਹ ਕਵੀਸ਼ਰ ਜੋ ਹੁਣ ਨਹੀਂ ਮਿਲਦੇ' ਲੇਖ ਕਿਸ ਕਿਤਾਬ ਵਿਚੋਂ ਲਿਆ ਗਿਆ ਹੈ?
(ੳ) ਲਹਿਰਾਂ ਦੇ ਹਾਰ (ਅ) ਮੇਰਾ ਪਿੰਡ (ੲ) ਮੂਨ ਦੀ ਅੱਖ (ਸ) ਅਲੋਪ ਹੋ ਰਹੇ ਚੇਟਕ

ਭਾਗ ਦੂਜਾ : ਕੋਈ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰੋ। 1 × 2 = 2

1. ਛੀਟ ਵਰਨ ਤੋਂ ਕੀ ਭਾਵ ਹੈ?
2. ਨਾਸਕੀ ਧੁਨੀਆਂ ਤੋਂ ਕੀ ਭਾਵ ਹੈ? ਉਦਾਹਰਨਾਂ ਸਹਿਤ ਦੱਸੋ। 1 × 4 = 4

ਭਾਗ ਤੀਜਾ : ਕੋਈ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰੋ।

1. ਕਚ ਸੂਤਕ ਕਵਿਤਾ ਦਾ ਕੇਂਦਰੀ ਭਾਵ ਸਪਸ਼ਟ ਕਰੋ।
2. 'ਤੀਆਂ' ਨਿਬੰਧ ਦਾ ਸਾਰ ਲਿਖੋ।

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8. (a) Compare the deferred and immediate-modification versions of the log-based recovery scheme in terms of ease of implementation and overhead cost. 5

(b) What is meant by locking point ? Explain with example. 5

SECTION–E

9. (i) What are advantages of RDBMS ? 1

(ii) What is meant by foreign key ? How it is implemented ? 1

(iii) What do you mean by serializability ? 1

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(iv) What is the use of having clause ? Give its syntax. 1

(v) What is meant by outer join ? Give example. 1

(vi) What is the need of checkpoint ? 1

(vii) Write short note on integrity of data and consistency of data. 1

(viii) What is third normal form ? 1

(ix) Differentiate between functional dependence and fully functional dependence. 1

(x) Write short note on DCL. 1

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Roll No. .....59.....

Total No. of Pages : 6

CC : D 3.980

PC 3492-NR

C-20/2115

DATABASE MANAGEMENT SYSTEM–302

Semester–V

Time Allowed : Three Hours] [Maximum Marks : 50

Note :– Attempt *four* questions selecting *one* question from each Section A, B, C and D. Section E is compulsory.

SECTION–A

1. (a) What are the problems of Hierarchical Model ? Explain with examples. 5

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(b) What are the problems of File Based Systems ? 5

2. (a) A university registrar's office maintains data about the following entities :

(i) Courses, including number, title, credits, syllabus and prerequisites.

(ii) course offerings, including course number, year, semester, section number, instructor(s), timings and classroom.

(iii) students, including student-id, name and program.

(iv) instructors, including identification number, name, department and title.

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Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. 5

(b) Explain rules to convert E-R diagram to tables with example. 5

SECTION–B

3. (a) Study the following database carefully and normalize the database.

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Name	License	Offense	Fine	Date	Challan_No
Ajay	L100	Parking	50	10.10.05	1000
Raj	L101	Red Light	100	12.10.05	1001
Ajay	L102	Red Light	100	13.10.05	1002
Rahat	L103	Backing-in	75	14.10.04	900
Raj	L101	Splitting	50	15.10.05	1003

(i) Identify the functional dependence in the above database.

(ii) Indicate the final tables after 1NF, 2NF, 3NF and so on if applicable. Clearly indicate all the intermediate steps followed during process of normalization. 6

(b) What are objectives of normalization ? 4

4. (a) Explain referential and entity intergrity rules with examples. 4

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4. (a) Explain referential and entity intergrity rules with examples. 4

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(b) The relation below provides some sample data for an agency called Hotel Services that supplies part-time/ temporary staff to hotels within the Strathclyde region. The relation lists the number of hours worked by each staff at various hotels. The relation is first normal form (1NF). Assuming that a contract is for one hotel only but a staff may work in more than one hotel on different contracts.

Normalize the database by indicating all intermediate steps :

Contracts

NIN	Contract No.	Hours	eName	hNo.	hLoc
1135	C1024	16	Smith.J	H25	East Kilbride
1057	C1025	16	Green.D	H4	Glasgow
1068	C1024	28	Green.D	H25	East Kilbride
1135	C1025	16	Smith.J	H4	Glasgow
1057	C1026	25	Green.D	H15	Glasgow
1088	C1027	25	Crowe.M	H25	East Kilbride

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SECTION–C

5. (a) Consider the following relational schema :

Staff (staffNo, name, dept, skillCode)

Skill (skillCode, description, chargeOutRate)

Project (projectNo, startDate, endDate, budget, projectManagerStaffNo)

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Booking (staffNo, projectNo, dateWorkedOn, timeWorkedOn)

where : Staff contains staff details and staffNo is the key.

Skill contains descriptions of skill codes (e.g. Programmer, Analyst, Manager, etc,) and the charge out rate per hour for that skill; the key is skillCode.

Project contains project details and projectNo is the key.

Booking contains details of the date and the number of hours that a member of staff worked on a project and the key is staffNo/projectNo.

Formulate the following queries using SQL :

(i) For all projects that were completed in 1994, list the staff name, project number and the date and number of hours worked on the project, ordered by staff name, within staff name by the project number and within project number by date.

(ii) How many staff have the skill 'Programmer' ?

(iii) List all projects that have at least two staff booking to it.

(iv) Write Syntax for creation of table for Booking table.

(v) Delete the records where chargeOutRate > 100.

(vi) Drop primary key constraint from staff table. 6

(b) What are relational algebra operators ? Explain with examples. 4

6. (a) Consider the following database :

Emp(empno, ename, job, sal, deptno)

Dept(Deptno, dname)

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Write SQL queries to perform the following :

(i) Find the name of employees whose salary is greater than the average salary of department number 10.

(ii) Find the name of employee getting highest salary.

(iii) Find the name of employees having two "s" in their name.

(iv) Find the ename and corresponding dname.

(v) Create table Dept with appropriate constraints

(vi) To display all constraint names applied on table dept. 6

(b) Consider the following relations :

First(A, B, C) Second(B, C)

(i) Write the equivalent expression of First Join Second in relational algebra.

(ii) Can Union operation be performed between First and Second.

(iii) What are the resulted columns for First Divide Second ?

4

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SECTION–D

7. (a) Explain in detail the internal action performed by DBMS for the following transaction :

Read(A,a)

a:=a-1000

Write(A,a)

Read(B,b)

b:=b+1000

Write(B,b)

5

(b) What are the problems of binary lock ?

5

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3162 286

CC = D 4.889

Total Pages : 3

PC-2673/NR

C-11/2114

STRENGTH OF MATERIALS–203

(Semester–III)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all. Select *one* question each from Section A, B, C and D. Q. No. IX of Section E is compulsory. All questions carry equal marks.

SECTION–A

I. Write short notes on the following :

(a) Shear strain and Shear stress.

(b) Proof resilience.

(c) Concept of Equilibrium.

(d) Thermal stress and strains. 10

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II. Define Young's modulus. Find the Young's modulus of a brass rod of diameter 45 mm and of length 300 mm which is subjected to a tensile load of 60 kN when the extension of the rod is equal to 0.3 mm. 10

SECTION–B

III. A simply supported beam of length 8 m, carries point load of 4 kN and 10 kN at a distance of 3 m and 6 m from the left end. Draw the shear force and bending moment diagram for the beam. 10

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IV. Prove that $T/J = f_s/R = C\theta/l$,

where T = Torque, J = Polar moment of Inertia, f_s = Shear stress, R = Radius of shaft, C = Modulus of rigidity, θ = Angle of twist, l = Length of shaft. 10

SECTION–C

V. Prove that $M/I = f/y = E/R$,

where M = Bending moment, I = Moment of inertia, f = Bending stress, y = Distance of outer most layer from central axis, E = Young's modulus, R = Radius of curvature. 10

VI. A horizontal beam AB is freely supported at A and B, 10 m apart and carries a uniformly distributed load of 15 kN/m run (including its own weight). A clockwise moment of 160 kN-m is applied to the beam at C, 5 m from the left hand support A. Calculate the slope of beam at C, if $EI = 50 \times 10^3$ kN-m^2. 10

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SECTION–D

VII. A plane element of a body is subjected to a compressive stress of 300 MPa in x-x direction and a tensile stress of 200 MPa in the y-y direction. Each of the above stresses is subjected to a shear stress of 150 MPa such that when it is associated with the compressive stress, it tends to rotate the element in anticlockwise direction. Find graphically or analytically, the normal and shear stress on a plane inclined at an angle of 30° with the x-x axis. 10

VIII. Explain t
sketches.

IX. Answe
(a) V
(b) V
(c)
(d)
(e)
(f)
(g)
(h)
(i)
(j)

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VIII. Explain the various types of theories of failure with neat sketches. 10

SECTION–E

(Compulsory Question)

IX. Answer in brief :

(a) What is Hooke's Law ?

(b) What is True strain ?

(c) Define Point of contraflexure.

(d) Define Section modulus.

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(e) Define the terms 'Slope' and 'Deflection'.

(f) What is Slenderness ratio ?

(g) Explain the concept of principal planes.

(h) Define the term 'Equivalent length of column'.

(i) What is Bulk modulus of material ?

(j) What is Poisson's ratio ? 1×10=10

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Roll No.

Total No. of Pages : 3

CC : D 4.888

PC 2661-NR

C-11/2114
ELECTRONIC DEVICES–201
Semester–III

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt *four* questions, selecting *one* question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal weightage.

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SECTION—A

1. (a) Discuss the behaviour of the *pn* junction both when forward and reversed biased with suitable diagrams.

   (b) Explain the tunnelling phenomenon in tunnel diodes. Draw its V-I characteristics.

2. (a) Explain the working of the negative clipper with circuit diagram.

   (b) Show that maximum efficiency of a full wave rectifier is 81.2%.

SECTION—B

3. (a) Sketch the Common Base (CB) input output characteristics of a npn BJT. Explain and indicate the various regions of operation.

   (b) What do you mean by the thermal runaway of a transistor ?

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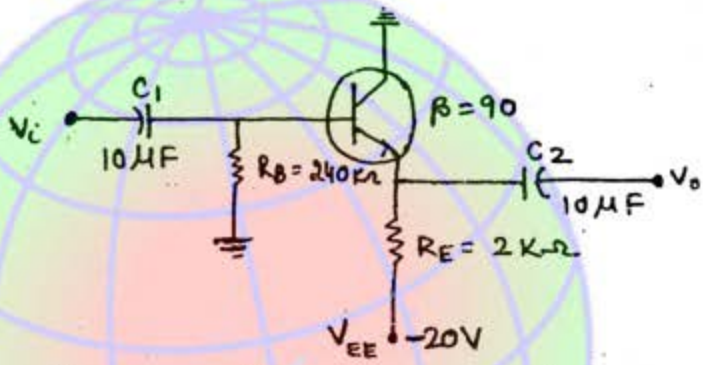
4. (a) Define h-parameters. Draw the h parameter equivalent circuit of a transistor.

(b) How will you classify the amplifiers ?

SECTION—C

5. (a) Determine the V_{CEQ} and I_E for the following network :



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(b) What do you understand by the stabilization of the operating point of a transistor ?

6. (a) Explain the constructional details and working of n-channel JFET. Draw its characteristics.

(b) Explain and sketch the basic construction and characteristics of a n-channel enhancement type MOSFET.

SECTION—D

7. (a) Draw the circuit of a full wave SCR single phase rectifier. How it controls the output ? Explain with wave diagrams.

(b) What is an integrated circuit ? Classify the various types of ICs.

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8. (a) Explain the construction of a TRIAC and discuss its V-I characteristics.

(b) What are the advantages and limitations of integrated circuits ?

SECTION—E

9. Explain briefly :

(a) What is the difference between JFET and a transistor ?

(b) Why is the collector wider than emitter ?

(c) Differentiate between a clipper and clamper circuit.

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(d) SCR is made of silicon and not germanium, why ?

(e) The ac load line of a transistor amplifier is steeper than its dc load line, why ?

(f) What are the advantages of the SCR over mechanical switch ?

(g) Differentiate between the voltage amplifier and power amplifier.

(h) The voltage divider biasing is most widely used, why ?

(i) Most of the transistors are npn type and not pnp, why ?

$5 \times 1 = 5$

$4 \times 1\frac{1}{4} = 5$

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B-13/2113

Electrical Science-101

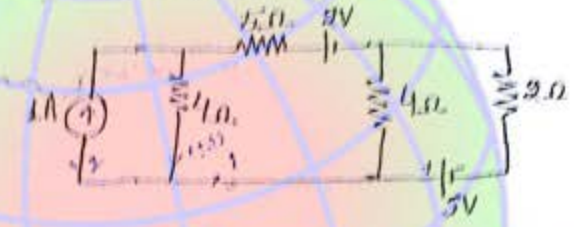
Semester-I

Time allowed: 3 Hours. Max.Marks:59

Note: Attempt four questions selecting one question each from Sections A,B,C and D. Section E is compulsory. All questions carry equal marks.

Section-A

1. a) Find current and voltage across 2Ω resistor in following circuit using Kirchhoff's law.



b) Discuss the delta to star conversion with suitable example.

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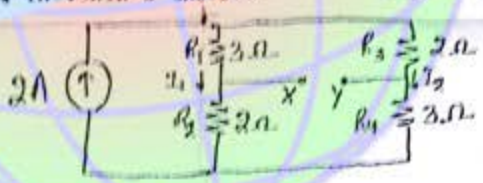
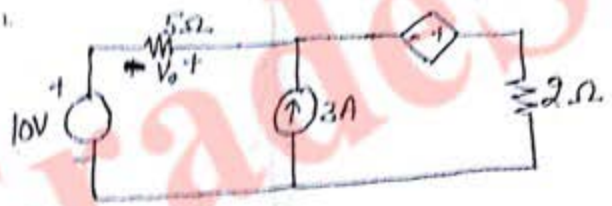
2. a) In the network shown below, find V_{x-y} and R_{in} (across X-Y) using Thevenin's theorem



b) Find the current in 2Ω resistance in the network shown below using Norton theorem



Section-B

3. a) Calculate the impedance and power factor of R-C circuit
b) How to calculate resonant frequency in R/C circuit? Explain.

4. Discuss three wattmeter method and two wattmeter method of balanced load for measuring power in 3-Phase circuits.

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5. Discuss the voltage drop and phasor diagram of transformer on lead. Also draw and explain its equivalent circuit.

6. Explain the open circuit and short circuit test on single phase transformer.

Section-D

7. Discuss in detail the working principal and construction of electrical machines. Also write down the characteristics of DC motors.

8. Explain various methods forstarting single phaseinduction motors.

Section-E

9. Explain in brief:-

i) [illegible]
ii) What do you mean by dependent sources?
iii) Explain Norton's Theorem.
iv) Write down the steps to solve a network using Norton theorem.
v) What is power factor?
vi) Why we use sinusoidal form of Alternating voltage in network analysis?
vii) Draw the phasor diagram of purely inductive circuit for current and voltage.
viii) Write down the characteristics of Ideal transformer.
ix) Draw the series equivalent of a parallel circuit.
x) Write down the function of commutator in electric machines.

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Electrical Science

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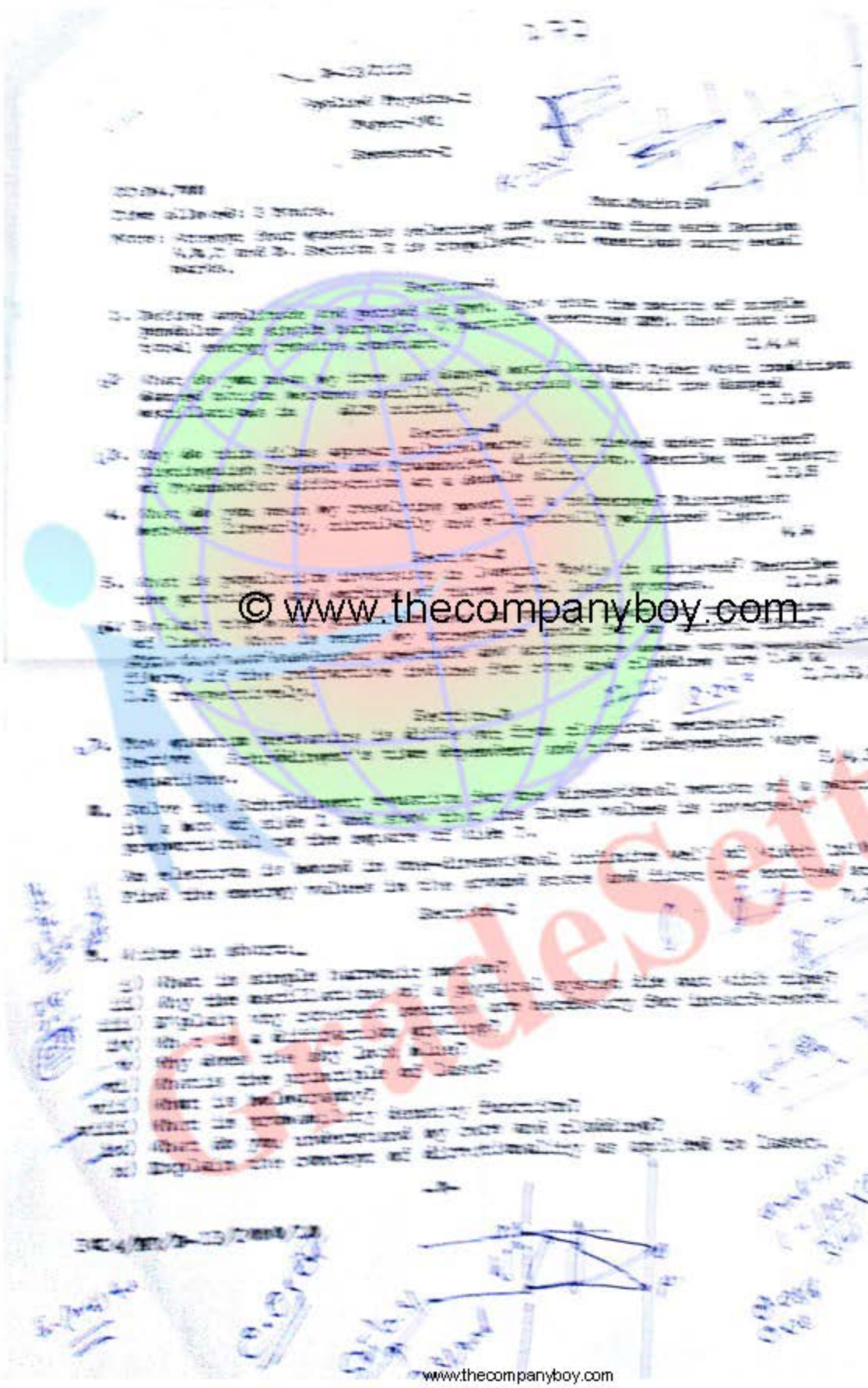

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CC = D 3.980

Total Pages : 3

PC-3494/NR

C-20/2115

THEORY OF COMPUTATION – 304

(Semester–V)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Sections A, B, C and D carrying 10 marks each, and the entire Section E consisting of 5 short answer type questions carrying 2 marks each.

SECTION–A

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I. (a) Explain the following with examples :

(i) Sets.

(ii) Relations. (5)

(b) Draw a NFA for L= a*(bb / ba)* b. (5)

II. (a) Construct a DFA accepting the following language over the alphabet {0,1}

(ab/(aba)*)*. (5)

(b) Compare and contrast Mealy and Moore machine with example. (5)

SECTION–B

III. (a) Prove that L = {ww ^{r}} (where r represents reverse) is not a regular language. (3)

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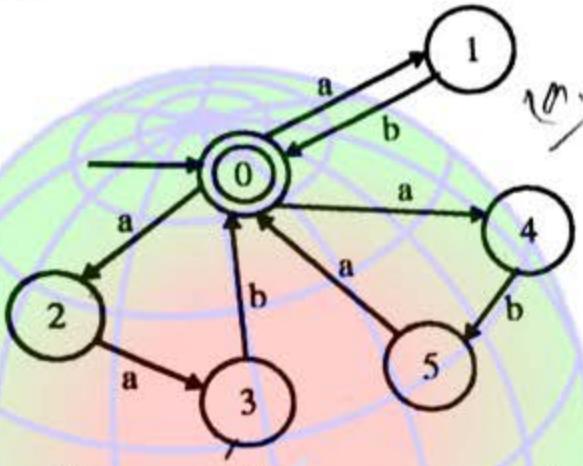
(b) Give the regular expression for string ending in 'aa' or 'bb' for $\Sigma = (a, b)$. (2)

(c) Prove that regular expression is closed under concatenation and intersection. (5)

IV. (a) Minimize the following DFA. (5)



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(b) Explain Chomsky classification of languages. (5)

SECTION–C

V. (a) Discuss any *two* normal forms with examples. (6)

(b) Prove that following grammar is ambiguous:

$S \rightarrow 0$; $S \rightarrow 0A1$; $S \rightarrow 01S1$; $S \rightarrow 0AA1$; $S \rightarrow 1S$. (4)

VI. (a) Convert the following Context free grammar into Chomsky Normal Form:

$S \rightarrow e/a/b/aSa/bSb$. (5)

(b) Explain Ambiguity and parse tree with example. (5)

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SECTION–D

VII. (a) What are Deterministic Push Down Automata? Explain with example. (6)

(b) What are Turing machines? Explain with example. (4)

VIII. (a) Discuss cellular automata with example. (4)

(b) Construct Pushdown automata that accept the language :

$L = \{a^n b^{2n} \quad \text{for } n \geq 1\}$ (6)

SECTION–E

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IX. (a) Give two applications of pumping lemma for regular expressions. (2)

(b) Find all strings in following language having length less than four :

$L = ((0+1)^* \, 1(0+01)^*)$. (2)

(c) Differentiate between deterministic and non-deterministic finite automata. (2)

(d) Give *two* applications of the finite automata. (2)

(e) Give CFG for {w | w starts and ends with the same symbol} for Σ = (a, b). (2)

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B.Tech 2 yr
MST II
Computer Architecture
Computer Engineering

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Section A (Attempt any 5) 1*5

Q.1 What do you mean by pipeline?
Q.2 Draw a microinstruction format
Q.3 What is Flynn's classification
Q.4 What is cache coherence?
Q.5 What is the role of control memory in micro program control unit?

Section B (Attempt any 2) 5*2

Q.6 Discuss DMA controller with a diagram
Q.7 Explain micro program sequencer.
Q.8 An instruction is stored at location 300 with its address field at location 301. The address field has the value 400. A processor register R1 contains the number 200. Evaluate the effective if the addressing mode of the instruction is (a) direct (b) immediate (c) relative (d) register indirect (e) index with R1 as the index register

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CE MST 1

TIME: 1hr

Marks: 15

Computer Peripheral Devices CPE-210

*Attempt any 2 from section B. Section A is compulsory.

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SECTION A

Write in brief about following:

1. Common faults of hard disk and their diagnosis (1)
2. Raster Scan vs Vector Graphics (2)
3. SCSI vs IDE (2)

SECTION B

1. Explain different types of i/o buses with details. (5)
2. Discuss:
   a) Device Drivers b) Local Bus (2.5*2)
3. Explain different types of display devices with their working principles (5)

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Department of Computer Engineering
B.Tech CE MST-1(Group 12,34,56)

Marks: 15 **Paper: CPE 302(*Database Management Systems*)** **Time: 1Hr**

Note: Question 1 is compulsory. Attempt any two of the remaining questions. Each carries 5 marks.

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Q.1
a) What are the integrity rules of the relational discuss different constraints in brief.
b) What is the schema, Mapping and instance in database?
c) How do you represent a category/union type using EER diagram with the help of an example?
d) Write SQL DDL to implement domain integrity.
e) Explain different constraints applicable on Specialization/Generalization.

Q.2 Let us consider a banking business scenario for developing the ER model. Assume in a city
There are multiple banks and each bank has many branches. Each branch has multiple customers.
Customers have various types of accounts.
Some customers also had taken different types of loans from these bank branches
One customer can have multiple accounts and loans

Q.3 What do you means by data model? Explain all with suitable Example

Q.4 Consider the following Relations

Department(DNo, Dname, Loc)
Sales(Order_no, Client_No, Order_date)
Client(Client_no, name, Balance)

a) Create a table employee with attributes EID, EName, Salary, DNo . Apply primary Key on EID attribute. Apply Foreign Key on Ename attribute at table level based upon dname attribute of department table.
b) Display Maximum salaries of Employees department number wise where salary is greater than 16000
c) Retrieve all orders placed by a client named Arun from the sales table.
d) Retrive the name of employees who work in 'Delhi' and 'Chandigarh' and earn more than Rs. 5000.
e) Retrive the name of department whose total salaries paid are more than Rs. 100000.

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312

Dept. of Computer Engg.

(CPE-305) Microprocessor &Assembly Languages(MALP) CE-3rd year(6th Semester)

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M.M.15

Section A is compulsory. Attempt any two ques each from Section B

Section-A(1*5=5M)

1. Define
   a) Tri-State Logic
   b) Instruction Format
   c) State Transition Diagrams
   d) Memories
   e) Difference between Address Bus And Data Bus

Section-B(2*5=10M)

2. What is Machine Cycle . Illustrate the concept of opcode fetch and read cycle in detail w.r.t an example.
3. Explain the concept of Addressing modes in detail with suitable examples.
4. A) Explain the concept of stack with its operations in detail(3M)
   b) Diff. between PUSH & POP and LXI and MVI (2M)

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Roll No. .....

Total No. of Pages : 2

CC : D 4. 925

PC 5972-MR

O-18/2055

VISUAL PROGRAMMING—206

(Common Paper CE and Civil Engg. Semester—IV)

Time Allowed : Three Hours] [Maximum Marks : 50

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Note :- The candidates are required to attempt one question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION—A

1. (a) Explain conditional statements available in Visual Basic.

   (b) How can you pass variables to some function with and without using global variables ? 5,5

2. (a) What are various data types in Visual Basic ?

   (b) Discuss date and time functions. Display date and time in a form. 4,6

SECTION—B

3. (a) How do you add and remove items from a listbox ?

   (b) Write a procedure to create MDI applications. 5,5

4. (a) What are the controls that provide choice to the user ?

   (b) Write a procedure to set the properties of command button control. 5,5

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SECTION—C

5. (a) What are advantages and disadvantages of using graphics method as compared to controls method ?

   (b) What are different data access options ? 5,5

6. (a) What are the different ways to declare and instantiate an object ?

   (b) What are the differences between linked object and embedded object ? What OLE automation ? 5,5

SECTION—D

7. (a) How do you put a picture in a database ?

   (b) What is ODBC ?

   (c) What is the difference between DBMS and RDBMS ? 3,3,4

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8. (a) What is an entity and what does E-R diagram indicate ?

   (b) What is DML and how is it different from DDL ? 5,5

SECTION—E

9. Explain a brief note on the following :

   (a) Which files are saved when you save a project ?

   (b) How can you check to see if a file exists ?

   (c) What is SQL ?

   (d) What is an object ?

   (e) What are properties ?

   (f) How can you move a file ?

   (g) What is the use of ScrollBar control ?

   (h) What is subschema ?

   (i) What is an event ?

   (j) What are forms ? 10

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MST-II

Operating Systems (CPE-203), B.Tech (3rd Sem.)

Department of Computer Engineering

Max. Marks: 15 Time: 1 hour

Section –A (Attempt all Questions, each carry one mark)

1. Define the terms seek time and latency time.
2. Define the directory structure.
3. Explain any one technique of free space management.
4. What do you understand from thrashing?
5. Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames.
   a. How many bits are there in the logical address?
   b. How many bits are there in the physical address?

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Section –B (Attempt any two questions)

Q6. (a) What is file? List the file attributes and the operations that can be performed on files. (2)

(b) Explain the different types of secondary storage allocation methods. (3)

Q7. Name and describe the four page replacement algorithms with examples. (5)

Q8. What is disk scheduling? Explain the different scheduling algorithms with examples. (5)

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Roll No. .....

Total No. of Pages : 2

CC : D 3.980

PC 3496-NR

C-20/2115

SOFTWARE ENGINEERING–306

Semester–V

Time Allowed : Three Hours] [Maximum Marks : 50

Note:– Attempt *five* questions in all selecting at least *one* question each from Sections A, B, C and Section D and the entire Section E.

SECTION–A

1. What do you mean by the term 'Software Engineering' ? Discuss the evolution of software engineering. Why Engineering approach to software development ? 10

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2. What are the central problems in Software requirement specification ? What are the basic activities performed during the requirement phase ? Discuss the characteristics of Software Requirement Specification. 10

SECTION–B

3. What is software configuration management ? Why is it important ? Write a detailed note on the various activities performed in the software configuration management. 10

4. Discuss the following in detail :

(a) Project scheduling 5

(b) Team structure. 5

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SECTION–C

5. Define term "Modularization". Why a system designed with high cohesion and low coupling is desired ? Also discuss in brief various types of cohesions. 10

6. Write short notes on the following :
   (a) Abstraction 5
   (b) Polymorphism. 5

SECTION–D

7. What do you mean by structured programming ? Discuss various constructs of structured programming giving examples. Also give the advantages and disadvantages of structured programming. 10

8. What is the difference between black box testing and white box testing ? Discuss two methods of white box testing in detail. 10

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SECTION–E

9. (a) What are the characteristics of software ? 1
   (b) What are the disadvantages of waterfall model ? 1
   (c) What is risk ? 1
   (d) What are the disadvantages of COCOMO model ? 1
   (e) Discuss the merits of SEI Capability Maturity Model. 1
   (f) What do you mean by structured design methodology ? 1
   (g) Define class and object. 1
   (h) What is inheritance ? List various types of inheritance. 1
   (i) What are the advantages of using standard programming styles ? 1
   (j) Differentiate between top down and bottom up approaches to coding. 1

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Dept. of CE, PhUniv'... B.Tech-III (CE) MST-I CPE-306 SOFTWARE ENGINEERING
Time: 1 hour Date: 14 Sept'15 MM: 15

Q1 a. Differentiate between project, process and product.
b. What are the components of SRS?
b. Describe the role of 'Software Configuration Management Process'.
c. Differentiate between Top-Down and Bottom-Up techniques of process cost estimation.
e. List 5 software quality attributes.

Attempt any two questions:

Q2 Which development process model would you follow in following projects? Justify. Explain the steps of development you'd follow.
a. A highly [illegible] system. Identify potential hazards in such system.
b. An online inventory management system for automobile parts.

Q3 Perform structured analysis for the requirements of an on-line social networking site.

Q4 Estimate the cost and development time of a database system for an office automationproject.
Project = organic (a=3.2, b = 1.05, c=0.38),
Estimated sizes of 4 modules to be implemented:

data entry	0.8 KLOC
data update	0.8 KLOC
query	1.0 KLOC
report generator	1.4 KLOC

Efforts are rated as follows (all others nominal, 1.0):

cost drivers	level	EAF
complexity	high	1.15
storage	high	1.06
experience	low	1.13
prog capabilities	low	1.17

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DEPARTMENT OF COMPUTER ENGINEERING

SEMESTER 5TH, YEAR 3RD

MM:15

PAPER: System Programming

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SECTION -A

Q1 What is a Macro Call. Explain it with suitable example.....(1)

Q2 MDTC Stands for ----------?.....(1)

Q3 What is a Linker?.....(1)

Q4 What are the Different types of Operating system?.....(1)

SECTION –B (DO ANY TWO)

Q5 Differentiate between Compiler and Interpreter.....(5)

Q6 Cost=Start-Finish+100.Explain it with 4 phases of Compiler.....(5)

Q7 Name the different Loading Schemes and Explain them in Detail.....(5)

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Dept. of CE,Pbi Univ. B.Tech-III(CE) MST-1 CPE-301 System Programming

Time:1 hr MM:15

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Q1. A Difference between MAR and MBR
B Advantage of machine language over other languages
C why linking is needed once the program is translated?
D Difference between application programming and system programming. 2*1=2 1*3=3

Q2. Attempt any two questions
A What is assembler? Explain pass1 and draw MOT table.
B Write an assembly language program using literals. Expain use of literals.
C What are Pseudo ops. Explain their use and POT table with example.(program and corresponding POT) 5*2=10

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CC = D 3.980

Total Pages : 3

PC-3494/NR

C-20/2115

THEORY OF COMPUTATION – 304

(Semester–V)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Sections A, B, C and D carrying 10 marks each, and the entire Section E consisting of 5 short answer type questions carrying 2 marks each.

SECTION–A

I. (a) Explain the following with examples :

(i) Sets.

(ii) Relations. (5)

(b) Draw a NFA for L= a*(bb / ba)* b. (5)

II. (a) Construct a DFA accepting the following language over the alphabet {0,1}

(ab/(aba)*)*. (5)

(b) Compare and contrast Mealy and Moore machine with example. (5)

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SECTION–B

III. (a) Prove that L = {ww ^{r}} (where r represents reverse) is not a regular language. (3)

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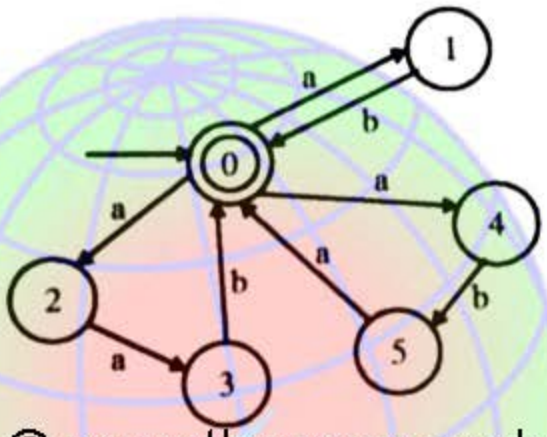
(b) Give the regular expression for string ending in 'aa' or 'bb' for $\Sigma = (a, b)$. (2)

(c) Prove that regular expression is closed under concatenation and intersection. (5)

IV. (a) Minimize the following DFA. (5)



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(b) Explain Chomsky classification of languages. (5)

SECTION–C

V. (a) Discuss any *two* normal forms with examples. (6)

(b) Prove that following grammar is ambiguous:

$S \rightarrow 0$; $S \rightarrow 0A1$; $S \rightarrow 01S1$; $S \rightarrow 0AA1$; $S \rightarrow 1S$. (4)

VI. (a) Convert the following Context free grammar into Chomsky Normal Form:

$S \rightarrow e/a/b/aSa/bSb$. (5)

(b) Explain Ambiguity and parse tree with example. (5)

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SECTION–D

VII. (a) What are Deterministic Push Down Automata? Explain with example. (6)

(b) What are Turing machines? Explain with example. (4)

VIII. (a) Discuss cellular automata with example. (4)

(b) Construct Pushdown automata that accept the language :

$L = \{a^n b^{2n} \quad \text{for } n \geq 1\}$ (6)

SECTION–E

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IX. (a) Give two applications of pumping lemma for regular expressions. (2)

(b) Find all strings in following language having length less than four :

$L = ((0+1)^* 1(0+01)^*)$. (2)

(c) Differentiate between deterministic and non-deterministic finite automata. (2)

(d) Give *two* applications of the finite automata. (2)

(e) Give CFG for $\{w \mid w$ starts and ends with the same symbol$\}$ for $\Sigma = (a, b)$. (2)

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Department of Computer Engineering, Punjabi University, Patiala
B.Tech-III (CE) CPE-305 Theory of Computation
First Mid Semester Test

Time: 1 hour **MM: 15**

Q1 a) Write Applications of Theory of computation.
b) Construct a Grammar G for the language over {a, b} which generates strings beginning with b.
c) State Arden's Theorem.
d) Chomsky hierarchy of grammar
e) Write a R.E for the set of Strings of 0's and 1's whose 7th Symbol from the right end is 1.

1*5

Attempt any 2 questions (each question carries 5 marks)

Q2 Construct a DFA equivalent to:

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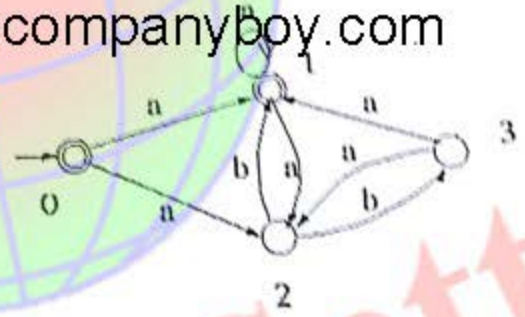

Q3 Construct a Moore machine equivalent to the Mealy machine M defined by following table:

Present State	Next State			
	a=0		a=1	
	state	output	state	output
→ q_1	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

Q4 Prove that $P + PQ^*Q = a^*bQ^*$ where $P = b + aa^*b$ and Q is any regular expression.

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Dated: - 16/11/2015

Department of Computer Engineering, Punjabi University, Patiala
B.Tech-III (CE) CPE-305 Theory of Computation
Second Mid Semester Test

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Time: 1 hour **MM: 15**

Q1 a) Define Derivation Tree and yield of tree.
b) Define unit production and how to remove unit production in a CFG
c) Give the instantaneous description of Turing Machine
d) Define ambiguous Grammar. Give example for the same.
e) Give definition of CNF. 1*5

Attempt any 2 questions:

Q2. Design PDA for $\{wcw^T \mid w=\{a,b\}^*\}$ 5
Q3. Design Turing Machine of $\{1^n2^n3^n \mid n >=1\}$ 5
Q4. Find a grammar in GNF equivalent to the grammar 5
E -> E + T | T T -> T * F | F F -> (E) | a

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MM.15 **Subject: Visual Programming** Date:09-03-2015

Note: *Section-A is compulsory & attempt any two questions from Section-B* MST-I

B.Tech-Part-II (4th sem) Branch: 2CE, 2CVL

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Section-A (1 mark each) **(5*1=5 marks)**

Q1.

a. Difference between Radio Button and Check Box.
b. How controls are grouped in VB.
c. Define Immediate Window.
d. Write down the difference between implicit and explicit declaration.
e. Why VB is called even driven language?

Section-B (5 marks each) **(5*2=10 marks)**

Q2. List down various data type available in Visual programming and give suitable example.

Q3. Difference between List Box and Combo box. Discuss their commonly used properties & methods.

Q5. List various types of common dialog control available in vb 6.0. Explain any one of them with their properties.

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MM.15

Subject: Visual Programming 344

Date:09-03-2015

Note: *Section-A is compulsory & attempt any two questions from Section-B*

MST-I

B.Tech-Part-II (4th sem)

Branch: 2CE, 2CVL

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Section-A (1 mark each) **(5*1=5 marks)**

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b. How controls are grouped in VB.
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Total Pages : 2

PC-4320/NB

H-10/2117

WIRELESS & MOBILE COMMUNICATION–403

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Section C is compulsory. Attempt any *six* questions selection *three* questions from each section A & B.

SECTION–A

I. What is handoff? What are its types? Explain the process of handoff.

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II. Explain the various losses that hinder the signal performance in wireless communication.

III. Explain with block diagram the OSI model of GSM.

IV. What do you mean by cochannel and adjacent channel interference? Explain in detail with example.

V. Explain Free space propagation model. (3×5=15)

SECTION–B

VI. Differentiate between Pure ALOHA and slotted ALOHA multiple access techniques.

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VII. What are the factors that influence small-scale fading? Explain in detail.

VIII. Define Pseudo-noise sequence. Write the difference between DSSS and FSSS.

IX. Discuss the detection algorithms along with its applications.

X. Discuss 802.11 wireless systems. Make a detailed comparison between 3G and 4G wireless systems.

(3×5=15)

SECTION–C

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XI. (a) What do you mean by UMTS?

(b) Write down the advantages of cell splitting.

(c) Define frequency reuse.

(d) What do you mean by diffraction in wireless communication?

(e) What is Pseudo-noise sequences?

(f) What are the diversity techniques?

(g) What are the types of small-scale fading?

(h) What are the features of FDMA?

(i) What are the services provided by IEEE 802.11 ?

(j) Draw the block diagram of IS-95 forward link.

(10×2=20)

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Roll No. ..... 283 Total No. of Pages : 3

CC : D 4.889

PC 2672-NR

C–11/2114
BASIC THERMODYNAMICS–202
Semester–III

Time Allowed : Three Hours] [Maximum Marks : 50

Note :- The candidates are required to attempt *one* question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrying *1* mark each.

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SECTION—A

1. (a) Prove that internal energy is property of the system. 5

   (b) What is difference between work transfer and heat transfer ? 5

2. Derive the steady flow energy equation for an open system. 10

SECTION—B

3. (a) What is difference between heat and internal energy ? 3

   (b) Define specific heat at constant volume and constant pressure. 3

   (c) Why free expansion involves zero work transfer ? 4

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4. (a) A fluid undergoes a reversible adiabatic compression from 0.5 MPa, 0.2m³ to .05m³ according to law $PV^{1.3}$ = constant. Determine the change in enthalpy, internal energy, entropy, heat transfer and work done during the process. 5

(b) Prove equivalence of Kelvin Planck and Clausius Statement. 5

SECTION—C

5. Find the relation for air standard efficiency of Dual Cycle. 10

6. In an air standard diesel cycle, the compression ratio is 16 and at the beginning of isentropic compression, the temperature is 15° C and pressure is 0.1 MPa. Heat is added is till the temperature at the end of constant pressure process is 148° C. Calculate :

(i) Cut off ratio

(ii) Heat supplied

(iii) Cycle efficiency

(iv) m.e.p. 10

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SECTION—D

7. (a) Steam initially at 1.5 Mpa and 300° C expands reversibly and adiabatically in a steam turbine to 40° C. Determine the work output of turbine per kg of steam. 5

(b) Steam initially at 0.3 MPa, 250° C is cooled at constant volume :

(i) At what temperature it will become saturated vapour.

(ii) Heat transferred per kg of steam in cooling from 250° C to 80° C at constant volume. 5

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8. (a) Find the relation for entropy change during a polytropic process. 5

(b) Explain Adiabatic saturation process. 5

SECTION—E

9. Explain in brief :

(i) What is Sensible heating ?

(ii) What is Psychrometrics ?

(iii) What is an air standard cycle ?

(iv) What is an Equation of state ?

(v) What are Saturation states ?

(vi) What does Clausius inequality signify ?

(vii) Define the term co-efficient of performance.

(viii) What is PMM 1 ? Why is it impossible ?

(ix) What are intensive and extensive properties ?

(x) What are cyclic heat engines ? 1×10=10

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Department of Mechanical Engineering, Punjabi Univ., Patiala

Roll No.: _____

DYNAMICS OF MACHINES (MCE-302)

B.Tech. (Mech.) – III (Jul. – Dec. 2014) MST - 1

Date of Exam.: 01.10.2014 Centre: I Time: 10:00-11:00 AM

Time allowed: 1 hour **NOTE:** Section A is compulsory. Attempt any two questions from section B. MM: 15.

SECTION - A

$= (R_A)^2 - R^2\cos^2\phi - R\sin\phi$

Q. 1 Give brief answers to the following questions:

(a) For an involute drawn on a base circle of R_b=50mm, calculate pressure angle at radius, R = 60mm. (D12)

(b) A profile corrected gear (x = -0.2) has 60mm PCD and module = 4. Calculate the thickness of teeth at PCD.

(c) Calculate the maximum length of path of contact for two involute gears having PCDs 30 and 50 mm each and pressure angle Φ = 22°.

(d) Determine the pitch-cone angles of two mitre bevel gears (Σ=90°), which are giving a velocity ratio of 1:2

(e) Calculate maximum secondary force for a 2-cylinder in-line engine having n = 4, mass of each piston m = 0.5kg, crank radius, r = [illegible] Assume the engine to be running at [illegible] 1x5

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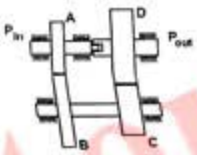
SECTION – B

Q. 2 In the reverted gear train shown in figure, gears A and B have a module of 3 mm while gears C and D have module of 4mm. The overall reduction required is 1/9, which is to be achieved in two equal steps of 1/3 each. Determine the number of teeth on all four gears if the centre distance between the shafts is 240mm.



Q. 3 In a V-2 engine having 2α = 90°, the mass of each piston is 1kg, crank radius = 70mm, length of connecting rods = 200mm. The connecting rods weigh 1.5 kg each and have their cg at 80mm from the big end. The weight of rotating parts of each crank is 5 kg. If the engine is running at 2000rpm, determine the magnitude of aggregate primary forces for the pair of pistons. Also determine the mass of balancing weight to be attached opposite to each crank pin at a radius of 100mm for complete balancing of primary and centrifugal forces.

Q. 4 Draw a neat diagram and derive the relations between tangential force (F_t), radial thrust (F_r) and axial thrust (F_a) in a helical gear having transverse pressure angle Φ_t, normal pressure angle Φ_n and the helix angle α. Also derive the relationship between the pressure angles, as measured in transverse and normal planes. Determine these forces for a helical gear having PCD=100mm, Φ_N = 20°, α = 15° if it is transmitting 50HP at 2000 rpm. 5x2

GradeBetter

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Department of Computer Engineering

Punjabi University, Patiala.

MST-I

COMPUTER NETWORKS (CPE-207), B.Tech (4th Sem. CE)

Max. Marks: 15 **Time: 1 Hour**

Section –A (Attempt all Questions, each carry one mark)

1. What is the significance of Nyquist theorem in Data communication?
2. What are the factors that determine whether a computer network is a LAN or WAN?
3. What are the advantages of Broadcast connection over Point-to-Point connection?
4. Consider a noiseless channel with bandwidth 3000 Hz transmitting a signal with four signal levels. Calculate its maximum bit rate.
5. Compare circuit switching and Packet switching and also list their application area.

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Section –B (Attempt any two questions)

6. Draw a hybrid topology with a ring backbone and three bus networks. (5)
7. Write down the responsibilities of Network Support layers in OSI Model. (5)
8. Explain the TCP/IP protocol suite model in detail. (5)

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SECTION–D

7. What are the inbuilt and user defined functions ? How are they implemented ? Explain. 10

8. What are triggers ? What are their types ? Explain their uses. 10

SECTION–E

9. (a) Differentiate between DDL and DML. 1

(b) Discuss problems arising out of poor database design. 1

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(c) How you can convert EER diagram to tables ? 1

(d) What are the advantages and disadvantages of database systems ? 1

(e) Why is data replication useful in Distributed Databases ? 1

(f) What are the advantages of distributed database system ? 1

(g) What is client server model ? 1

(h) Is recursion supported in PL/SQL ? IF yes, then how ? 1

(i) Distinguish between integrity and security. 1

(j) What is data dictionary ? 1

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Roll No. .]

Total No. of Pages : 2

PC 9359-MB

G-4/2057

RDBMS USING SQL & PL/SQL—307

Semester—VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note :–The candidates are required to attempt 3 questions each from Sections A & B carrying 5 marks each and the entire Section-C consisting of 10 short answer types questions carrying 2 marks each.

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SECTION—A

1. Discuss, with example, generalization and specialization in ER model. 5
2. Explain DBMS architecture. 5
3. Discuss the role of procedures and functions in PL/SQL. 5
4. Discuss advantages and important features in PL/SQL. 5
5. Discuss EER to relational mapping. 5

SECTION—B

6. Discuss various control measures in database security. 5
7. Discuss deadlock avoidance in detail. 5
8. Discuss various types of locks in concurrency control. 5
9. Discuss schedules of transactions in DBMS. 5
10. Discuss various types of triggers in DBMS. 5

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SECTION—C

11. (i) Define distributed database. 2

(ii) What is entity in ER model ? 2

(iii) What is the role of DBA ? 2

(iv) Define primary key. 2

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(v) Define attribute in ER model. 2

(vi) Name any four data types in PL/SQL ? 2

(vii) What are records in PL/SQL ? 2

(viii) Define triggers. 2

(ix) Define tuple. 2

(x) Define data replication in distributed database. 2

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525

Roll No. .

Total No. of Pages : 3

PC 10761-MR

O-19/2056

RDBMS USING SQL AND PL/SQL–307

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

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Note: The candidate will be required to attempt one question each from Sections A, B, C and D carrying 10 marks each and the entire Section E consisting of 10 short answer type questions carrrying 1 mark each.

SECTION–A

1. Explain the client-server architecture in detail. 10

2. Discuss database security control measures. 10

SECTION–B

3. Consider the schema given below:

   Branch-schema (Branch-name, asset, Branch-city)

   Customer-schema (Customer name, street, customer-city)

   Deposit-schema

   (Branch-name, account-number, customer-name, balance)

   Borrow-schema

   (Branch-name, loan-number, customer-name, amount)

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Client-schema (Customer-name, banker-name).

Write the SQL statements for the following :

(i) Find all customers who have a balance of over Rs. 1000.

(ii) Write the query to find the clients of banker Patel and the city they live in.

(iii) Write a statement to find all the customers who have a loan amount of more than Rs. 1200.

(iv) Write a statement to find all the customers whose name starts with "R" and who have a balance of more than Rs. 10,000. 10

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4. Explain the following in context of SQL :

(i) Exists

(ii) Having

(iii) Order by

(iv) On delete cascade

(v) Intersect

(vi) Correlated queries. 10

SECTION–C

5. What are the nested blocks ? Explain with example. 10

6. (a) What are cursors ? Explain their types. 7

(b) Discuss creation and scope of a variable. 3

7. What are the i... implemented ?

8. What are trig...

9. (a) Differe...

(b) Discus...

(c) How y...

(d) What ... system

(e) Why i...

(f) What ...

(g) What ...

(h) Is rec...

(i) Distri...

(j) Wha...

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Total Pages : 3

PC-4236/NB

H-1/2117

COMMUNICATION SKILLS–101

(Semester–I)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *three* questions each from Section A and B, and the entire Section-C.

SECTION–A

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I. Define Communication, and discuss the types and channels of communication.

II. Discuss the importance of Reading, and elaborate on the purposes of reading.

III. Enlist Writing skills, and discuss the elements of effective writing.

IV. Do as directed :

(a) Write one-word substitutes :

Man who has more than one wife at a time.

One who believes in a single God.

The art of making fireworks.

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(b) Write the full form of any *four* of the following abbreviations :

PTO, LL.B., Ph.D., MBBS, SOS, r.p.m., NRI, GST.

V. A computer company has after receiving the order, raised the price of computers. Write a business letter cancelling your order. (3×5=15)

SECTION–B

VI. Discuss the process of listening, and explain the various kinds of listening.

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VII. Do as directed :

(a) Change the voice : My uncle gave me this watch.

(b) Change the narration : He said, "Yesterday I was not well."

(c) Change the sentence in negative : It is sunny day today.

(d) Combine two simple sentences into one complex sentence :

He has failed. Everybody knows it.

(e) Correct the sentence : I prefer coffee than tea.

VIII. Make a list of speaking skills, and discuss speech mechanism.

IX. How are Audio-visual aids helpful in a presentation ?

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X. What preparations will you make to conduct a meeting to launch a new product of daily use ? (3×5=15)

SECTION–C

XI. Write short notes on all the following :

(a) Significance of Communication in Life.

(b) Semantic gap.

(c) Strategies of Reading.

(d) Resume.

(e) Report-writing.

(f) Barriers to Listening.

(g) Feedback skills.

(h) Effective talk.

(i) Oral presentation skill.

(j) Group discussion. (10×2=20)

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B-17/2654

Basic Electronics-102
Semester-II

(2)BD4.843

Time allowed: 3 Hours. Max Marks:50

Note: Attempt one question each from Sections A,B,C and D carrying 10 marks each and the entire Section E consisting of ten short answer type questions carrying 01 mark each.
Use of calculator is allowed.

Section-A

1. a) What do you mean by rectifier efficency and ripple factors as applied to a rectifier. Derive expressions for the same in case of full wave rectifier.

   b) A fullwave rectifier supplies a load of 1 K.Ω . The a.c. voltage applied to the diodes is 220-0-220 volt rms. If diode resistance is neglected, calculate

   i) average d.c. voltage
   ii) average d.c. current and
   iii) ripple voltage (rms)

2. a) Describe a zener diode. Distinguish between zener breakdown and avalanche breakdown.

   b) What do you mean by clipping circuit? Describe P-N diode clipping circuits.

Section-B

3. a) Draw the circuits of transistor amplifier in CB and CC configuration. Discuss the comparison of their important characteristics.

   b) A CE transistor amplifier has input resistance of 100Ω and output resistance of 6KΩ. Determine the voltage gain and power gain if current gain factor is 90.

4. a) Describe construction, working and characteristics of MOSFET.

   b) Draw the output characteristics of JFET and explain how it works as a voltage controlled device.

Section-C

5. a) What is flip flop? Explain the principle of operation of S-R flip flop with truth table.

   b) Prove the following identity using Boolean algebra and Demorgan's theorem.

$$\overline{AB + BC + CA} = \left[\overline{A}\,\overline{B} + \overline{B}\,\overline{C} + \overline{C}\,\overline{A}\right]$$

6. a) What is an encoder? Draw the logic circuit of decimal to BCD encoder and explain its working.

   b) Prove the following Boolean identity:-

$$A\bar{B}C + \bar{A}\bar{B}C + \bar{A}BC + AB\bar{C} + \bar{A}\bar{B}\bar{C} = \bar{A}\bar{B} + B(A + C)$$

Section-D

7. a) What do you mean by a word "communication" in general? Explain an electronic communication systems block diagram.

   b) Define frequency modulation. Derive the expression for instantaneous amplitude of FM wave. Define modulation index.

8. a) Explain how modulation makes possible to transmit several modulating signals over a common channel.

PTO

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Department Of Computer Engineering

MST-II

Analysis and Design of Algorithms CPE-303

Max.Marks 15

B.Tech IIIrd Year CE (All Groups)

Section-A (All are compulsory)

1) Explain the concept of dynamic programming.

2) Name the method used to solve All pairs shortest path problem and give its formula.

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3) Tell the main difference between greedy method and dynamic programming.

4) Define comparison trees.

5) Define the concept of Previous Checking in Branch and Bound method.

Section-B (Do any 1 question)

6) What is Dynamic Programming. Solve all pairs shortest path . Show each and every step (1+4 marks).

7) What is branch and bound method . Solve 0/1 knapsack problem using it . Show each and every step (1+4 marks).

Section-C (Do any 1 question)

8) What is dynamic programming. solve travelling salesperson problem using it . Show each and every step (1+4 marks).

9) Draw comparison trees for sorting three items . explain with help of an example. (2+3 marks)

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Department Of Computer Engineering MST-II

Analysis and Design of Algorithms CPE-303 Max.Marks-15

B.Tech IIIrd Year CE (All Groups)

Section-A (All are compulsory)

1) Explain the concept of dynamic programming.
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3) Tell the main difference between greedy method and dynamic programming.
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Section-B (Do any 1 question)

6) What is Dynamic Programming. Solve all pairs shortest path. Show each and every step.(1+4 marks)
7) What is branch and bound method . Solve 0/1 knapsack problem using it . Show each and every step.(1+4 marks)

Section-C (Do any 1 question)

8) What is dynamic programming. solve travelling salesperson problem using it . Show each and every step.(1+4 marks)
9) Draw comparison trees for sorting three items . explain with help of an example. (2+3 marks)

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University College of Engineering, Punjabi University, Patiala

Max Marks:15

1st Internal test

Time allowed:1 hour

B.Tech- III(CE), Semester 5, (Groups I to VI)

CPE-303 ANALYSIS AND DESIGN OF ALGORITHMS

SECTION-A (All are compulsory)

1) Write down all the running time cases of merge sort.
2) Write down various algorithmic techniques. Mention atleast four.
3) Write down the application areas of algorithms.
4) What does O (1) mean.
5) Minimum spanning tree exists for what kind of graphs

SECTION –B (Do any two)

6) Search the item=69 from the given set of elements using Binary Search showing step by step procedure.

[illegible]

7) Explain the concept of divide and conquer in steps. Explain the difference between Prim's and Kruskal's algorithm. (2+3 marks)

8) Write down the pseudocode for dijkstra algorithm. Explain dijkstra algorithm with help of an example. Write down the purpose of dijkstra algorithm. (2+2+1 marks)

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Department Of Computer Engineering MST-II

Analysis and Design of Algorithms CPE-303 Max.Marks-15

B.Tech IIIrd Year CE (All Groups)

Section-A (All are compulsory)

1) Explain the concept of dynamic programming.
2) Name the method used to solve All pairs shortest path problem and give its formula.
3) Tell the main difference between greedy method and dynamic programming.
4) Define comparison trees.
5) Define the concept of [illegible]

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Section-B (Do any 1 question)

6) What is Dynamic Programming. Solve all pairs shortest path . Show each and every step.(1+4 marks).
7) What is branch and bound method . Solve 0/1 knapsack problem using it . Show each and every step.(1+4 marks).

Section-C (Do any 1 question)

8) What is dynamic programming. solve travelling salesperson problem using it . Show each and every step.(1+4 marks).
9) Draw comparison trees for sorting three items . explain with help of an example. (2+3 marks).

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SECTION–B

III. Discuss the convergence of the following series :

(a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} \sin \frac{1}{n}$

(b) $\sum_{n=1}^{\infty} x^{n+1} (\log (n+1))^9$

(5+5)

IV. (a) State and prove Weierstrass's M-test for uniform convergence of a series.

(b) Test the uniform convergence of $\sum_{n=1}^{\infty} r^n \sin nx$, for all real r and $0 < r < 1$.

(5+5)

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SECTION–C

V. (a) Find the possible Taylor's or Laurent series expansion of the function $f(z) = \frac{1}{(z+1)(z+2)^2}$ in the region $|z-1| < 2$.

(b) Prove $\int x^{-\nu} J_{\nu+1}(x)\, dx = -x^{-\nu} J_{\nu}(x) + c$; $J_{\nu}(x)$ is a Bessel's function of first kind.

(5+5)

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VI. Prove the following for Legendre polynomials :

(a) $\int_{-1}^{1} x P_n(x) P_{n-1}(x)\, dx = \frac{2n}{4n^2 - 1}, \quad n = 1, 2, \ldots$

(b) $P'_n(-1) = (-1)^{n-1}\, n(n+1)/2.$

(5+5)

SECTION–D

VII. Evaluate

(a) $L\left\{\int_0^t \frac{e^t \sin t}{t}\, dt\right\}.$

(b) $L^{-1}\left\{\frac{1}{s^3 (s^2 + a^2)}\right\}.$

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Here L and L^{-1} stands for Laplace transforms and its inverse respectively.

(5+5)

VIII. (a) Obtain the Fourier series for the function

$$f(x) = \begin{cases} 0, & -\pi < x < 0 \\ x^2, & 0 \le x < \pi. \end{cases}$$

Hence deduce that

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots \infty = \frac{\pi^2}{6}.$$

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(b) Find the Fourier series expansion of

$$f(x) = \pi + x, \; -\pi < x < \pi.$$

Hence decuce that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \cdots \infty.$$

(5+5)

SECTION–E

IX. Do as directed

(a) What is an exact differential equation ?

(b) Determine Wronskian of 1, sin x, cos x for all $x \in (0, \infty)$.

(c) What is integrating factor of the

$$M(x, y)dx + N(x, y)dx = 0$$

if M, N are homogeneous functions of degree n ?

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(d) Is the series $\sum_{n=1}^{\infty} \left(\frac{1}{n}\right)^{\left(1+\frac{1}{n^2}\right)}$ convergent ?

(e) State Cauchy convergence criterion for convergence of sequences.

(f) Write the Legendre's differential equation.

(g) Show that $J_n(x)$ is even function for even integer n.

(h) State Second shifting theorem for Laplace transformations.

(i) Is the Inverse Laplace transformation linear ? Justify.

(j) Write Fourier coefficients for Fourier expansion of $f(x)$ in $[-l, l]$ if $f(x)$ is odd function. (1×10=10)

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CC = D 4.843

Total Pages : 4

PC-10785/MR

O-17/2054

APPLIED MATHEMATICS–II

Paper : BAS-105

Semester–II

Time : Three Hours] [Maximum Marks : 50

Note : The candidates are required to attempt *one* question each from section. A, B, C and D carrying 10 (ten) marks each, and the entire Section E of 10 (ten) short answer type questions carrying 1 (one) mark each.

SECTION–A

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I. (a) Solve $\frac{d^2y}{dx^2} + y - 2\frac{dy}{dx} = e^x$.

(b) Apply method of variation of parameters to solve $y'' + y = \sec x$. (5+5)

II. Solve

(a) $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = \log x \sin(\log x)$.

(b) $x^3 \frac{d^3y}{dx^3} - 3x\frac{dy}{dx} + 3y = 16x + 9x^2 \log x,\ x > 0$. (5+5)

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(b) The relation below provides some sample data for an agency called Hotel Services that supplies part-time/ temporary staff to hotels within the Strathclyde region. The relation lists the number of hours worked by each staff at various hotels. The relation is first normal form (1NF). Assuming that a contract is for one hotel only but a staff may work in more than one hotel on different contracts.

Normalize the database by indicating all intermediate steps :

Contracts

NIN	Contract No.	Hours	eName	hNo.	hLoc
1135	C1024	16	Smith.J	H25	East Kilbride
1057	C1025	16	Green.D	H4	Glasgow
1068	C1024	28	Green.D	H25	East Kilbride
1135	C1025	16	Smith.J	H4	Glasgow
1057	C1026	25	Green.D	H15	Glasgow
1088	C1027	25	Crowe.M	H25	East Kilbride

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SECTION–C

(a) Consider the following relational schema :

Staff (staffNo, name, dept, skillCode)

Skill (skillCode, description, chargeOutRate)

Project (projectNo, startDate, endDate, budget, projectManagerStaffNo)

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8. (a) Compare the deferred and immediate-modification versions of the log-based recovery scheme in terms of ease of implementation and overhead cost. 5

(b) What is meant by locking point ? Explain with example. 5

SECTION–E

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9. (i) What are advantages of DCBMS ? 1

(ii) What is meant by foreign key ? How it is implemented ? 1

(iii) What do you mean by serializabilty ? 1

(iv) What is the use of having clause ? Give its syntax. 1

(v) What is meant by outer join ? Give example. 1

(vi) What is the need of checkpoint ? 1

(vii) Write short note on integrity of data and consistency of data. 1

(viii) What is third normal form ? 1

(ix) Differentiate between functional dependence and fully functional dependence. 1

(x) Write short note on DCL. 1

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Roll No. .....

Total No. of Pages : 6

CC : D 3.980

PC 3492-NR

C-20/2115
DATABASE MANAGEMENT SYSTEM–302
Semester–V

Time Allowed : Three Hours] [Maximum Marks : 50

Note :– Attempt *four* questions selecting *one* question from each Section A, B, C and D. Section E is compulsory.

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SECTION–A

1. (a) What are the problems of Hierarchical Model ? Explain with examples. 5

   (b) What are the problems of File Based Systems ? 5

2. (a) A university registrar's office maintains data about the following entities :

   (i) Courses, including number, title, credits, syllabus and prerequisites.

   (ii) course offerings, including course number, year, semester, section number, instructor(s), timings and classroom.

   (iii) students, including student-id, name and program.

   (iv) instructors, including identification number, name, department and title.

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Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. 5

(b) Explain rules to convert E-R diagram to tables with example. 5

SECTION–B

3. (a) Study the following database carefully and normalize the database :

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Name	License	Offense	Fine	Date	Challan_No
Ajay	L100	Parking	50	10.10.05	1000
Raj	L101	Red Light	100	12.10.05	1001
Ajay	L102	Red Light	100	13.10.05	1002
Rahat	L103	Backing-in	75	14.10.04	900
Raj	L101	Splitting	50	15.10.05	1003

(i) Identify the functional dependence in the above database.

(ii) Indicate the final tables after 1NF, 2NF, 3NF and so on if applicable. Clearly indicate all the intermediate steps followed during process of normalization. 6

(b) What are objectives of normalization ? 4

4. (a) Explain referential and entity intergrity rules with examples. 4

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Department of Computer Sci. & Engg.,
Punjabi University, Patiala
B.Tech-II (CSE) CPE-208 Data Structures
First Mid Semester Test

Time: 1 hour MM: 15

Q1 a) Explain the difference between bubble sort and selection sort algorithm? (1)
b) Five items: A, B, C, D and E are pushed into a stack, one after the other starting from A. The stack is popped four times and each element is inserted into a queue. Then two elements are deleted from the queue and pushed back on the stack. Now one item is popped from the stack. Which is the popped item? (2)
c) Differentiate between stacks and queues (1)
d) What are linear and non-linear data structures? (1)

Attempt any 2 questions (each question carries 5 marks)

1. State the algorithm for insertion and deletion in circular queue.
2. Explain Binary search algorithm with the help of an example.
3. Sort given elements using Quick sort: 134, 178, 63, 44, 211, 90, 80, 11

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Punjabi University, Patiala

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MST-1 (B.Tech 3rd [illegible]) **Marks:15**

Subject: Relational Database Management Systems **Paper: CPE 307** **Time: 1Hr**

Note: Question 1 and 2 are compulsory. Attempt a total of three questions. Each question carries 5 marks.

Q.1 Write short note on the following:

a) What is Data Dictionary? 1
b) Differentiate between a procedure and a function. 1
c) Explain Package with syntax. 2
d) Differentiate between row and statement triggers. 1

Q.2 What is a join? Explain different types of joins in detail. (5)

Q.3 Write a procedure in PL/SQL that increments the salary of all the employees of a given department in Employee table by a given amount. Also show how to invoke this procedure.(5)

Q4. Create a Database Trigger that keeps track of the changes that are made on a table and stores the values that are updated or deleted in another table.(5)

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Department of Computer Engineering
Punjabi University, Patiala

MST-1 (B.Tech 3CE_12,34,56) **Marks:15**
Subject: Relational Database Management Systems **Paper: CPE 307** **Time: 1Hr**
Note: Question 1 and 2 are compulsory. Attempt a total of three questions. Each question carries 5 marks.

Q.1 Write short note on the following:
a) What is Data Dictionary? 1
b) Differentiate between a procedure and a function. 1
c) Explain Package with syntax. 2
d) Differentiate between row and statement triggers. 1

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Q.2 What is a join? Explain different types of joins in detail. (5)

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Linux Bind DNS →
BIND (Berkely terms Internet Name Domain)
is popular · Software for translating domain
names into · Ip addresses & usually found on
Linux servers

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MST-1 (B.Tech 3C[illegible]) Marks:15
Subject: Relational Database Management Systems Paper: CPE 303 Time: 1Hr
Note: Question 1 is compulsory. Attempts any three questions. Each question carries 5 marks.

Q.1 Write short note on the following:

a) Data Abstraction
b) Embedded SQL
c) DAC
d) PL/SQL %Rowtype and %type
e) Data Allocation

Q.2 Explain with the help of suitable examples how to map EER model constructs into corresponding relations.

Q.3 What is a Distributed Database? Explain the different types of Distributed Databases. Explain the architecture of Distributed Databases with the help of suitable diagrams.

Q4. Explain Pl/SQL block structure. How is it different from SQL? Write a PL/SQL block to find whether the given number is prime or not.

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Activity	Immediate Predecessor	Duration (in Months)
A	–	2
B	–	6
C	–	4
D	B	3
E	A	6
F	A	8
G	B	3
H	C,D	7
I	C,D	2
J	F	5
K	F,G,H	4
L	F,G,H	3
M	I	13
N	J,K	7

3+7

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4. Discuss the waterfall model, the linear sequential model and prototyping model in detail. 10

SECTION–C

5. What is the role of Configuration Management System in Develop Project Management Plan, during Project Integration Management ? Discuss. 10

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6. (a) Suppose a project is to be completed in one year at the cost of $ 1,00,000. After three months, you realize that the project is 30% complete at a cost of $ 40,000. Assess the performance of the project.

(b) Explain different techniques used for collection of data. 6+4

SECTION–D

7. What do you mean by Risk in Software Project Management ? Explain the framework for dealing with risk. 5+5

8. Explain the Risk Planning steps which you can follow after identifying the major risks and allocated priorities to them. 10

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SECTION–E

9. (a) What do you mean by Time Variance (TV) ?

(b) Why does delaying a task on critical path delay the whole project ?

(c) Differentiate between LOC and FP. Which one is better and why ?

(d) What is the significance of Resource Calendar ?

(e) What is the usage of PERT technique ?

(f) What do you mean by Cost Variance ?

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(g) What is the usage of backward pass reference to activity network ?

(h) What do you mean by budgeted cost of work scheduled ?

(i) What is the purpose of Product Flow Diagram ?

(j) What is the purpose of Agile methods ? $10 \times 1 = 10$

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Roll No. .....

Total No. of Pages : 4

PC 10767-MR

O-19/2056

SOFTWARE PROJECT MANAGEMENT–313

Semester–VI

Time Allowed : Three Hours] [Maximum Marks : 50

Note: Attempt *four* questions selecting *one* question each from Sections A, B, C and D. Section E is compulsory.

SECTION–A

1. What do you mean by Project Stakeholders ? Explain each kind of stakeholder with proper example. 10

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2. Discuss the steps followed for identifying Project Infrastructure and analyze the Project Characteristics. 10

SECTION–B

3. (a) As you move outward along the process flow path of the spiral model, what can you say about the software that is being developed or maintained ?

(b) Create a critical path network on activity node for the below table. Identify the critical path for the project network after calculating the parameters of CPM as well. Calculate the free float also.

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Time: One Hr. | University College of Engineering, Computer Engineering, Punjabi University Patiala | MM : 35

Subject: Theory of Computation (CPE-304)

B. Tech. C.E. 5th Semester

Note: Attempt all questions of Section A and any two questions from Section B

Section A

Q I	a)	What are the various applications of finite automata?	1
	b)	Define the following concepts formally 1) Language over an alphabet 2) Pumping Lemma statement	2
	c)	Write down the closure properties of regular language	3

Section B

QII	a)	Construct a DFA to accept all strings containing even number of zero's and ones.wee	2
	b)	Differentiate between Moore and Mealy automaton.	3
QIII	a)	Construct a regular expression corresponding to following transition table	

δ/€	0	1
→ q1	q2	q3
q2	q3	q2
q3	q1	q2

B) State the relationship between finite automata and regular language. 2

QIV a) Convert into DFA 4

δ/€	a	b
→ q0	{q0,q1}	{q2}
q1	{q0}	{q1}
(q2)	ϕ	{q0,q1}

b) Define extended transition function. 1

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Department Of Computer Engineering

University College of Engineering
Computer Engineering, Punjabi University Patiala
Subject: Theory of Computation (CPE-304)
B. Tech. C.E. 5th Semester

Time: One Hr MM = 15

Note	Attempt all questions of Section A and any two questions from Section B	
	Section A	
Q I	a) Difference between PDA and DFA/NFA	1
	b) Define the following concepts formally:	
	1) Parse Tree	1
	2) GNF	1
	3) Ambiguous Grammer	1
	4) Instantaneous description of Turing Machine	1
	Section B	
QII	a) Design Turing Machine that accepts the language $\{1^n 2^n 3^n \mid n>=1\}$	5
QIII	Design a PDA for grammer G={V,Є,P,S} where V={S} Є= {A,B,C} P is defined as S → aSa , S→bSb, S→c	5
QIV	Convert the following grammer into GNF S→ aAs , S→ a , A→SbA, A→SS, A→ba	5

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Department Of Computer Engineering

University College of Engineering
Computer Engineering, Punjabi University Patiala
Subject: Theory of Computation (CPE-304)

Time: One Hr B. Tech. C.E. 5th Semester MM = 15

Note	Attempt all questions of Section A and any two questions from Section B	
	Section A	
Q I	a) Difference between PDA and DFA/NFA.	1
	b) Define the following concepts formally:	
	1) Parse Tree	1
	2) GNF	1
	3) Ambiguous Grammer	1
	4) Instantaneous description of Turing Machine	1
	Section B	
QII	a) Design a turing machine that accepts the language	5
QIII	Design a PDA for grammer G={V,∈,P,S} where V={S} ∈= {A,B,C} P is defined as S → aSa , S→bSb, S→c	5
QIV	Convert the following grammer into GNF S→ aAs , S→ a , A→SbA, A→SS, A→ba	5

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Department Of Computer Engineering MST-II

Analysis and Design of Algorithms CPE-303 Max.Marks-15

B.Tech IIIrd Year CE (All Groups)

Section-A (All are compulsory)

1) Explain the concept of dynamic programming.
2) Name the method used to solve All pairs shortest path problem and give its formula.
3) Tell the main difference between greedy method and dynamic programming.
4) Define comparison trees.
5) Define the concept of Previous Checking in Branch and Bound method.

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Section-B (Do any 1 question)

6) What is Dynamic Programming. Solve all pairs shortest path. Show each and every step.(1+4 marks)
7) What is branch and bound method . Solve 0/1 knapsack problem using it . Show each and every step.(1+4 marks)

Section-C (Do any 1 question)

8) What is dynamic programming. solve travelling salesperson problem using it . Show each and every step.(1+4 marks)
9) Draw comparison trees for sorting three items . explain with help of an example. (2+3 marks)

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University College of Engineering, Punjabi University, Patiala

Max Marks:15

1st Internal test

Time allowed:1 hour

B.Tech- III(CE), Semester 5, (Groups I to VI)

CPE-303 ANALYSIS AND DESIGN OF ALGORITHMS

SECTION-A (All are compulsory)

1) Write down all the running time cases of merge sort.
2) Write down various algorithmic techniques. Mention atleast four.
3) Write down the application areas of algorithms.
4) What does O (1) mean.
5) Minimum spanning tree exists for what kind of graphs

SECTION –B (Do any two)

6) Search the item=69 from the given set of elements using Binary Search showing step by step procedure.

[illegible]

7) Explain the concept of divide and conquer in steps. Explain the difference between Prim's and Kruskal's algorithm. (2+3 marks)

8) Write down the pseudocode for dijkstra algorithm. Explain dijkstra algorithm with help of an example. Write down the purpose of dijkstra algorithm. (2+2+1 marks)

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Department Of Computer Engineering MST-II

Analysis and Design of Algorithms CPE-303 Max.Marks-15

B.Tech IIIrd Year CE (All Groups)

Section-A (All are compulsory)

1) Explain the concept of dynamic programming.
2) Name the method used to solve All pairs shortest path problem and give its formula.
3) Tell the main difference between greedy method and dynamic programming.
4) Define comparison trees.
5) Define the concept of [illegible]

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Section-B (Do any 1 question)

6) What is Dynamic Programming. Solve all pairs shortest path . Show each and every step.(1+4 marks).
7) What is branch and bound method . Solve 0/1 knapsack problem using it . Show each and every step.(1+4 marks).

Section-C (Do any 1 question)

8) What is dynamic programming. solve travelling salesperson problem using it . Show each and every step.(1+4 marks).
9) Draw comparison trees for sorting three items . explain with help of an example. (2+3 marks).

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Department Of Computer Engineering

MST-II

Analysis and Design of Algorithms CPE-303

Max.Marks 15

B.Tech IIIrd Year CE (All Groups)

Section-A (All are compulsory)

1) Explain the concept of dynamic programming.

2) Name the method used to solve All pairs shortest path problem and give its formula.

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3) Tell the main difference between greedy method and dynamic programming.

4) Define comparison trees.

5) Define the concept of Previous Checking in Branch and Bound method.

Section-B (Do any 1 question)

6) What is Dynamic Programming. Solve all pairs shortest path . Show each and every step (1+4 marks).

7) What is branch and bound method . Solve 0/1 knapsack problem using it . Show each and every step (1+4 marks).

Section-C (Do any 1 question)

8) What is dynamic programming. solve travelling salesperson problem using it . Show each and every step (1+4 marks).

9) Draw comparison trees for sorting three items . explain with help of an example. (2+3 marks)

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DEPARTMENT OF COMPUTER ENGINEERING, PUNJABI UNIVERSITY, PATIALA

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SUBJECT: Artificial Intelligence Class: 4CE

Time: 1 hour Maximum marks: 15

Section- A

1.Define a) Production System. (1)
b) State Space Search (1)
c) Heuristic Search (1)
d) Resolution (1)

2. Write advantages and disadvantages of AI. (1)

Section –B (do any two)

3. Discuss five AI techniques with suitable example. (5)
4. Differentiate between various knowledge representation techniques. (5)
5. Define Intelligent Agents and also explain different types of intelligent agents. (5)

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Department of Computer Engineering
Artificial Intelligence (CPE - 404)
BTech 4th year

Max Marks:15 **Time:1hr** **Date: 19th Nov, 2015**

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1. (5*1=5)

(a) List any five application areas of neural networks in computer science.

(b) How feature extraction is done in voice recognition?

(c) Write the syntax and suitable example of array lambda functions.

(d) "Statistical reasoning is a powerful tool for reasoning with uncertainty is the probability theory and probabilistic techniques." Justify.

(e) Draw a well labeled diagram depicting the major components of voice recognition system.

2. Write any ten differences between Procedural Knowledge and Declarative knowledge. (5)

3. Explain any five LISP basic manipulation functions with the help of suitable examples. (5)

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DEPARTMENT OF COMPUTER ENGINEERING, PUNJABI UNIVERSITY, PATIALA

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SUBJECT: Artificial Intelligence Class: 4CE
Time: 1 hour Maximum marks: 15

Section- A

1. Define a) Production System. (1)
   b) State Space Search (1)
   c) Heuristic Search (1)
   d) Resolution (1)
2. Write advantages and disadvantages of AI. (1)

Section –B (do any two)

3. Discuss five AI techniques with suitable example. (5)
4. Differentiate between various knowledge representation techniques. (5)
5. Define Intelligent Agents and also explain different types of intelligent agents. (5)

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Department of Computer Engineering
MST-I (B.Tech 4th year/7th Semester)
Subject: Artificial Intelligence (CPE-404)

All the questions are compulsory

Q.1 Discuss the various knowledge representation approaches with suitable examples. **(3 marks)**

Q.2 List the various production system characteristics **(3 marks)**

Q.3 *State whether the following statements are true or false:* **(3 marks – 1 mark each)**

a. The first requirement of good control strategy is that it does not cause motion.

b. A heuristic function maps from problem state description to measures of desirability.

c. Real world facts can be represented as logical propositions written as well formed formulas (wffs).

Q.4 *Fill in the blanks with most appropriate answer:* **(2 marks – ½ mark each)**

An ..... is anything that can be viewed as ..... its environment through .....
and acting upon the environment through ..... .

Q.5 Match the following concepts (on left side) with corresponding description (on right side): **(4 marks – 1 mark each)**

a. Hard AI
b. Genetic Algorithm
c. Specific Purpose Problem
d. A* Search Approach

(i) Guarantees to find minimal cost solution if admissible heuristic exists
(ii) Exploits only definite feature
(iii) Inspired by evolutionary biology
(iv) Refers to the machines that approaches or supersede human intelligence

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Department of Computer Engineering

Artificial Intelligence (B.Tech. 7th Sem.) Subject Code: CPE-404

First question is compulsory and attempt any two from the remaining.

1. Describes the various constructs of LISP language. Also differentiate between recursion and iteration in LISP.
2. Explain the use of neural networks in decision making with the help of suitable example.
3. Differentiate between procedural and declarative knowledge.
4. Draw a well labeled diagram of pattern recognition system. Explain with the help of suitable case study.

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B.Tech-III(CE), Dept. of CE, Pbi. Univ. Pta. MST-I CPE-309 COMPILER DESIGN
Time: 1 hour Date: 24.02.2016 MM: 15

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1.
   a. Do left factoring in the following grammar:
      A → aBcC | aBb | aB | a
      B → ε
      C → ε
   b. Name two compiler construction tools.
   c. Write a short note on 'cousins of a compiler'?
   d. List the functions of a pre-processor.
   e. List the various error recovery strategies for a lexical analysis. 5*1

2. Explain in detail the process of compilation. Illustrate the output of each phase of compilation for the input "a = (b+c) * (b+c) * 2". 5

ATTEMPT ANY ONE OF QUESTION 3 AND 4

3. Construct a table-based LL(1) predictive parser for the following grammar:
   G = {bexpr, {bexpr, bterm, bfactor}, {not, or, and, (,), true, false}, P} with P:
   bexpr → bexpr or bterm | bterm
   bterm → bterm and bfactor | bfactor
   bfactor → not bfactor | (bexpr) | true | false 5

4. (a)Show the steps of shift reduce parser to parse the string:(a, a) using following grammar:
   S → (L) | a
   L → L,S| S 3
   (b) Explain the conflicts during shift-reduce parsing with example. 2

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DEPARTMENT OF ECE
PUNJABI UNIVERSITY, PATIALA
B.TECH 2nd year (3rd Semester)
EMFT (ECE-203)
MST-1(Centre -II)

Date of exam: 15.9.15 Time: 1hr

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Note: Section A is compulsory and attempt only TWO questions from Section -B

Section –A

1. Write the Maxwell Equations in Differential Form For the static field
2. Transform the following in to the spherical coordinate

$$A = ya_x - xa_y + za_z$$

3. Write down the expression for Laplacian operator in cylindrical coordinate
4. Discuss the effect of dielectric on the capacitance.
5. What is the physical significance of divergence of a vector field

Section –B

6. Explain in detail the boundary conditions at the electric interface
7. State and prove Gauss law and Ampere's law.
8. a. Discuss the energy stored in the magnetic field.
   b. Two homogenous linear and dielectric media have an interface at x=0. x<0 describe medium 1with $\mu_{r1} = 2$ and $H_1 = 150a_x - 400a_y + 350$ A/m and x>0 describe medium 2 with $\mu_{r2} = 5$. Find B_1, H_2, B_2

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Total Pages : 3

PC-4022/NR

G-2/2116

WIRELESS AND MOBILE COMMUNICATION–403

(Semester–VII)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

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SECTION–A

I. (a) What are HSCSD, GPRS, EDGE, WLAN, and bluetooth?

(b) Explain GSM architecture. (5,5)

II. (a) What are advantages of 3G networks?

(b) What is WLL? (5,5)

SECTION–B

III. (a) Name the techniques used to improve the coverage and capacity of a cellular system. Explain any *one* of them.

(b) What are the basic propagation mechanisms which impact the propagation in mobile communication

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IV. (a) What is the difference between cell splitting and cell sectoring?

(b) What are different types of hand offs? Explain the hand off operation with suitable diagram. (5,5)

SECTION–C

V. (a) What are the different factors that influence small scale fading?

(b) What is the difference between pure and slotted ALOHA? What is the maximum throughput that can be achieved in slotted ALOHA? (5,5)

VI. (a) Compare the characteristics of CDMA and SDMA.

(b) Discuss in brief about the Rayleigh distribution. (5,5)

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SECTION–D

VII. (a) Discuss block diagram of IS-95 reverse link.

(b) What is TDMA ? Discuss cell capacity of a TDMA system. (5,5)

VIII. (a) Discuss system and protocol structure of 802.16 standard.

(b) What is a combiner analysis ? (7,3)

SECTION–E

IX. Answer the following question in short :

(a) What are narrow band systems ?

(b) What is large scale fading ?

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(c) What is GSMA ?

(d) What is WiFi ?

(e) What is frequency hopped multiple access ?

(f) Why is detection difficult in wireless scenario ?

(g) What is the difference between 1G and 2G ?

(h) What are adhoc networks ?

(i) What is selective retransmission ?

(j) What is PAN ? (1×10=10)

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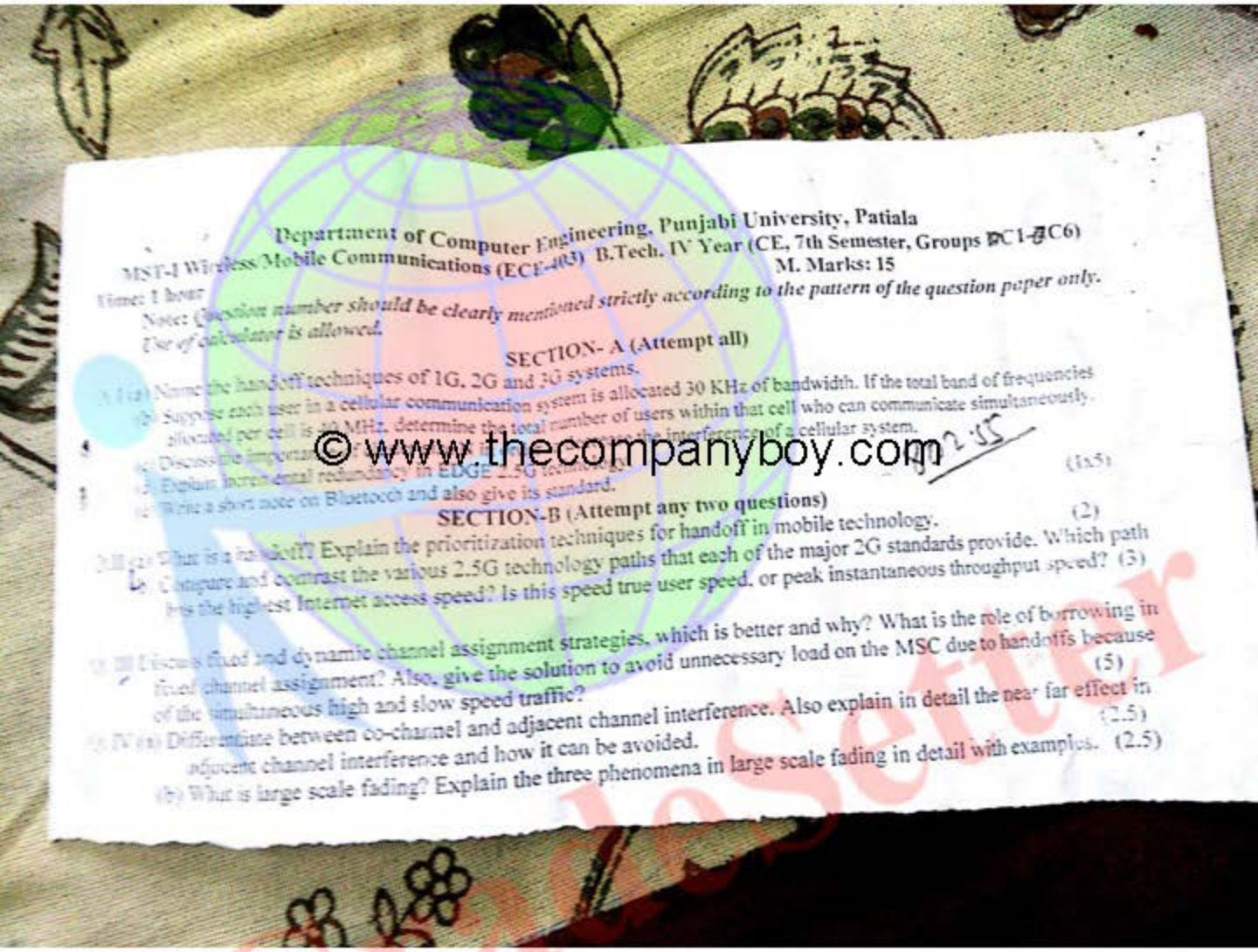

Department of Computer Engineering, Punjabi University, Patiala

MST-I Wireless Mobile Communications (ECE-403) B.Tech. IV Year (CE, 7th Semester, Groups PC1-PC6)

Time: 1 hour M. Marks: 15

Note: *Question number should be clearly mentioned strictly according to the pattern of the question paper only.*
Use of calculator is allowed.

SECTION- A (Attempt all)

1. (a) Name the handoff techniques of 1G, 2G and 3G systems.
(b) Suppose each user in a cellular communication system is allocated 30 KHz of bandwidth. If the total band of frequencies allocated per cell is 30 MHz, determine the total number of users within that cell who can communicate simultaneously.
(c) Discuss the importance of [illegible] to reduce the interference of a cellular system.
(d) Explain incremental redundancy in EDGE 2.5G technology. (1x5)
(e) Write a short note on Bluetooth and also give its standard.

SECTION-B (Attempt any two questions)

2. (a) What is a handoff? Explain the prioritization techniques for handoff in mobile technology. (2)
(b) Compare and contrast the various 2.5G technology paths that each of the major 2G standards provide. Which path has the highest Internet access speed? Is this speed true user speed, or peak instantaneous throughput speed? (3)

3. (a) Discuss fixed and dynamic channel assignment strategies, which is better and why? What is the role of borrowing in fixed channel assignment? Also, give the solution to avoid unnecessary load on the MSC due to handoffs because of the simultaneous high and slow speed traffic? (5)

4. (a) Differentiate between co-channel and adjacent channel interference. Also explain in detail the near far effect in adjacent channel interference and how it can be avoided. (2.5)
(b) What is large scale fading? Explain the three phenomena in large scale fading in detail with examples. (2.5)

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Department of Computer Engineering, Punjabi University, Patiala

MST-I Wireless/Mobile Communications (ECE-403) B.Tech. IV Year (CE, 7th Semester, Groups CC1-CC6)

Time: 1 hour **M. Marks: 15**

Note: Question number should be clearly mentioned strictly according to the pattern of the question paper only.
Use of calculator is allowed.

SECTION- A (Attempt all)

Q. I (a) Name the handoff techniques of 1G, 2G and 3G systems.
(b) Suppose each user in a cellular communication system is allocated 30 KHz of bandwidth. If the total band of frequencies allocated per cell is 40 MHz, determine the total number of users within that cell who can communicate simultaneously.
(c) Discuss the importance of cluster size N in order to decrease the interference of a cellular system.
(d) Explain incremental redundancy in EDGE 2.5G technology.
(e) Write a short note on Bluetooth and also give its standard. (1x5)

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SECTION-B (Attempt any two questions)

Q.II (a) What is a handoff? Explain the prioritization techniques for handoff in mobile technology. (2)
(b) Compare and contrast the various 2.5G technology paths that each of the major 2G standards provide. Which path has the highest Internet access speed? Is this speed true user speed, or peak instantaneous throughput speed? (3)

Q. III Discuss fixed and dynamic channel assignment strategies, which is better and why? What is the role of borrowing in fixed channel assignment? Also, give the solution to avoid unnecessary load on the MSC due to handoffs because of the simultaneous high and slow speed traffic? (5)

Q. IV (a) Differentiate between co-channel and adjacent channel interference. Also explain in detail the near far effect in adjacent channel interference and how it can be avoided. (2.5)
(b) What is large scale fading? Explain the three phenomena in large scale fading in detail with examples. (2.5)

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University College of Engineering, Punjabi University, Patiala.
MST-II Wireless/Mobile Communications (ECE-403)
B.Tech. IV Year (ECE, 7th Semester, Groups EC1-EC6)

Time: 1 hour M. Marks: 15

Note: *Question number should be clearly mentioned strictly according to the pattern of the question paper only. Use of calculator is allowed.*

SECTION- A (Attempt all)

Q. I (a) Explain the non linear effects in FDMA.
(b) Suggest a method to simulate a frequency selective fading channel.
(c) What are pseudo-noise sequences? How will you generate them?
(d) Explain the technique which enables the reuse of frequency within the cell.
(e) The GSM TDMA system uses a 270.833 kbps data rate to support eight users per frame. What is the raw data rate provided for each user? If the guard-time, ramp-up time and synchronization bits occupy 10.1 kbps, determine the traffic efficiency for each user.

(1x5)

SECTION-B (Attempt any two questions)

Q.II (a) Discuss the packet radio protocols in detail and also derive the maximum throughput of pure and slotted ALOHA.
(b) Discuss the forward channel of IS-95 with a block diagram.

(3.5+1.5)

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Q. III (a) Explain the direct sequence spread spectrum and frequency hopped spread spectrum in detail. Discuss the advantages and disadvantages of DS-SS and FH-SS.
(b) Write short notes on hybrid spread spectrum multiple access techniques.

(3+2)

Q.IV (a) Differentiate and discuss the types of small scale fading based on delay spread, coherence bandwidth, Doppler spread and coherence time.
(b) In an unslotted ALOHA system the packet arrival times form a Poisson process having a rate of 10^3 packets/sec. If the bit rate is 10Mbps and there are 1000 bits/packet, find the normalized throughput of the system

(3.5+1.5)

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Total Pages : 3

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WIRELESS AND MOBILE COMMUNICATION 403

(Semester VII)

Time : Three Hours] **[Maximum Marks : 50**

Note : Attempt *one* question each from Section A, B, C and D carrying 10 marks each, and the entire Section E consisting of 10 short answer type questions carrying 1 mark each.

SECTION–A

I. (a) What are HSCSD, GPRS, EDGE, WLAN, and bluetooth?

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(b) Explain GSM architecture. (5,5)

II. (a) What are advantages of 3G networks?

(b) What is WLL? (5,5)

SECTION–B

III. (a) Name the techniques used to improve the coverage and capacity of a cellular system. Explain any *one* of them.

(b) What are the basic propagation mechanisms which impact the propagation in mobile communication system ? Explain any *two* of them. (5,5)

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