USN | | | | | | | | | | | 10MAT31

Third Semester B.E. Degree Examination, June 2012
Engineering Mathematics – III

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions choosing atleast two from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Obtain the Fourier series for the function

$$f(x)=\begin{cases}1+\dfrac{2x}{\pi}, & -\pi\le x\le 0\\ 1-\dfrac{2x}{\pi}, & 0\le x\le\pi\end{cases}$$ and deduce $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\dots\dots=\frac{\pi^2}{8}$. **(07 Marks)**

b. Find the half range cosine series for the function $f(x)=(x-1)^2$ in $0<x<1$ **(06 Marks)**

c. Obtain the constant term and the coefficient of the first sine and cosine terms in the Fourier expansion of y as given below. **(07 Marks)**

x	0	1	2	3	4	5
y	9	18	24	28	26	20

2 a. Express the function

$$f(x)=\begin{cases}1, & |x|\le 1\\ 0, & |x|>1\end{cases}$$ as a Fourier integral and hence evaluate $\int_0^\infty \frac{\sin x}{x}\,dx$. **(07 Marks)**

b. Find the sine and cosine transform of $f(x)=e^{-ax}$, $a>0$ **(06 Marks)**

c. Find the inverse Fourier sine transform of $\frac{e^{-as}}{s}$. **(07 Marks)**

3 a. A tightly stretched string with fixed end points $x=0$ and $x=l$ is initially at rest in its equilibrium position. If it is vibrating giving to each of its points a velocity $\lambda x(l-x)$, find the displacement of the string at any distance x from one end and at any time t. **(07 Marks)**

b. Find the temperature in a thin metal bar of length 1 where both the ends ate insulated and the initial temperature in bar is $\sin \pi x$. **(07 Marks)**

c. Find the solution of Laplace equation, $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0$, by the method of separation of variables. **(06 Marks)**

4 a. Fit a parabola $y=a+bx+cx^2$ to the following data: **(07 Marks)**

x	-3	-2	-1	0	1	2	3
y	4.63	2.11	0.67	0.09	0.63	2.15	4.58

b. A fertilizer company produces two products Naphtha and Urea. The company gets a profit of Rs.50 per unit product of naphtha and Rs.60 per unit product of urea. The time requirements for each product and total time available in each plant are as follows:

Plant	Hours required		Available hours
	Naphtha	Urea	
A	2	3	1500
B	3	2	1500

The demand for product is limited to 400 units. Formulate the LPP and solve it graphically. **(06 Marks)**

c. Solve the following using Simplex method:
Maximize $Z=x_1+4x_2$
Subject to constraints $-x_1+2x_2\le 6$; $5x_1+4x_2\le 40$; $x_j\ge 0$. **(07 Marks)**

PART – B

5 a. Use Regula-falsi method to find a root of the equation $2x - \log_{10}x = 7$ which lies between 3.5 and 4. **(06 Marks)**

b. Solve by relaxation method.
$10x - 2y - 2z = 6$; $-x + 10y - 2z = 7$; $-x - y + 10z = 8$ **(07 Marks)**

c. Use the power method to find the dominant eigenvalue and the corresponding eigenvector of the matrix $A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ with the initial eigenvector as $[1\ \ 1\ \ 1]^T$. **(07 Marks)**

6 a. The following data is on melting point of an alloy of lead and zinc where t is the temperature in Celsius and P is the percentage of lead in the alloy, tabulated for P = 40(10)90 (i.e., P from 40 to 90 at intervals of 10). Find the melting point of the alloy containing 86% of lead.

P	40	50	60	70	80	90
t	180	204	226	250	276	304

(07 Marks)

b. Using Lagrange's formula, find the interpolation polynomial that approximates to the functions described by the following table:

x	0	1	2	5
f(x)	2	3	12	147

and hence find f(3). **(07 Marks)**

c. Evaluate $\int_0^5 \frac{dx}{4x+5}$, by using Simpson's $\frac{1}{3}^{rd}$ rule, taking 10 equal parts. Hence find log 5. **(06 Marks)**

7 a. Solve the partial differential equation
$$\frac{\partial^2 U}{\partial x^2} + \frac{\partial^2 U}{\partial y^2} = -10(x^2 + y^2 + 10)$$
over the square with side x = 0, y = 0, x = 3, y = 3 with u_0 on the boundary and mesh length h = 1. **(07 Marks)**

b. Solve the heat equation $\frac{\partial U}{\partial t} = \frac{\partial^2 U}{\partial x^2}$, subject to the conditions
$$U(0, t) = u(1, t) = 0 \text{ and } u(x,0) = \begin{cases} 2x & \text{for } 0 \le x \le 1/2 \\ 2(1-x) & \text{for } 1/2 \le x \le 1 \end{cases}$$
Taking h = 1/4 and according to Bender Schmidt equation. **(06 Marks)**

c. Evaluate the pivotal values of the equation $u_{tt} = 16\, u_{xx}$ taking h = 1 upto t = 1.25. The boundary conditions are $u(0, t) = u(5, t) = 0$, $u_t(x, 0) = 0$ and $u(x, 0) = x^2(5 - x)$. **(07 Marks)**

8 a. If $U(z) = \frac{2z^2 + 5z + 14}{(z-1)^4}$, evaluate u_2 and u_3. **(06 Marks)**

b. Find the Z-transform of i) $\sin(3n + 5)$ ii) $\frac{1}{(n+1)!}$. **(07 Marks)**

c. Solve the $y_{n+2} + 6y_{n+1} + 9y_n = 2^n$ with $y_0 = y_1 = 0$ using Z-transforms. **(07 Marks)**

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Third Semester B.E. Degree Examination, June 2012

Advanced Mathematics – I

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

1 a. Express $z = \dfrac{2-\sqrt{3}i}{1+i}$ in the form a + ib. **(06 Marks)**

b. Find modulus and amplitude of $z = \dfrac{3+i}{2+i}$. **(07 Marks)**

c. Find all the values of $z = \left(\dfrac{1}{2} + i\dfrac{\sqrt{3}}{2}\right)^{3/4}$. **(07 Marks)**

2 a. Find the n^{th} derivative of $y = e^{ax}\cos(bx+c)$. **(06 Marks)**

b. If $y = \sin(m\sin^{-1}x)$ prove that $(1-x^2)y_{n+2} - (2n+1)x\,y_{n+1} + (m^2-n^2)y_n = 0$. **(07 Marks)**

c. Expand $y = \log(1+x)$ in Maclaurins series upto 5^{th} term. **(07 Marks)**

3 a. If $u = \dfrac{x^2y^2}{x+y}$, find the value of $x^2\dfrac{\partial^2 u}{\partial x^2} + 2xy\dfrac{\partial^2 u}{\partial x \partial y} + y^2\dfrac{\partial^2 u}{\partial y^2}$. **(06 Marks)**

b. If $u = 3x^2 + y^2$ and $x^2 - y^2 = 1$, find $\dfrac{du}{dx}$. **(07 Marks)**

c. If $x = r\cos\phi$, $y = r\sin\phi$, $z = z$, find $\dfrac{\partial(x, y, z)}{\partial(r, \phi, z)}$. **(07 Marks)**

4 a. Obtain the reduction formula for $\int_0^{\pi/2} \sin^n x\,dx$ and hence obtain $\int_0^{\pi/2} \sin^4 x\,dx$. **(06 Marks)**

b. Evaluate $\int_0^1 x^2(1-x^2)^{7/2}dx$. **(07 Marks)**

c. Evaluate $\int_0^1\int_0^3 x^3y^3\,dx\,dy$. **(07 Marks)**

5 a. Evaluate $\int_0^1\int_0^2\int_0^3 (x+y+z)\,dz\,dy\,dx$. **(06 Marks)**

b. Evaluate $\int_0^\infty x^2e^{-4x}dx$ using gamma function. **(07 Marks)**

c. Find $\beta\left(\dfrac{5}{2}, \dfrac{3}{2}\right)$ in terms of gamma function.. **(07 Marks)**

6 a. Solve the equation $\sqrt{1-y^2}\,dx + \sqrt{1-x^2}\,dy = 0$. **(06 Marks)**

b. Solve $\frac{dy}{dx} = \frac{x-y}{x+y}$. **(07 Marks)**

c. Solve $\frac{dy}{dx} = (x+y)^2$. **(07 Marks)**

7 a. Solve $\frac{dy}{dx} = \frac{\sin 2x - \tan y}{x \sec^2 y}$. **(06 Marks)**

b. Solve $\frac{d^2y}{dx^2} + x^2 y = x^2$. **(07 Marks)**

c. Solve $\frac{dy}{dx} + \sin xy = \sin x \cos x$. **(07 Marks)**

8 a. Solve $(D^2 + a^2)y = x^2$. **(06 Marks)**

b. Solve $(D^3 + D^2 - D - 1)y = e^{2x}$. **(07 Marks)**

c. Solve $(D^4 - 1)y = \sin x + 2$. **(07 Marks)**

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USN | | | | | | | | | | **10CS32**

Third Semester B.E. Degree Examination, June 2012
Electronic Circuits

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the effects of collector resistor, base current and supply voltage on the operating point of a fixed bias circuit. Which is the ideal position for an operating point on the BJT fixed bias transistor circuit? Explain the above with neat diagrams. **(10 Marks)**

b. What is the operating point for the following voltage divider bias circuit? **(10 Marks)**

Assume $\beta = 150$
$V_{BE} = 0.7$ V

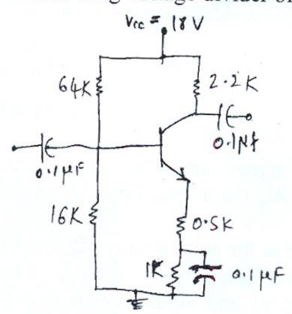

Fig.Q1(b)

2 a. Explain the working of a N-channel E-Mosfet with neat diagram. Explain with a diagram output charactertics of the same. **(10 Marks)**

b. Find the values of voltages V_D and V_C for the circuit shown, Fig.Q2(b). Assume $\beta = 100$, $V_{BE} = 0.7$ V, saturation drain current of JFET is –10 mA and pinch off voltage is- 5V. **(10 Marks)**

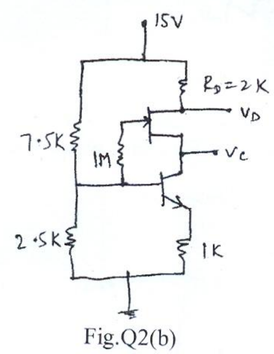

Fig.Q2(b)

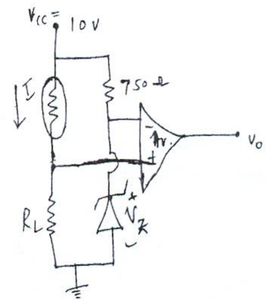

Fig.Q3(b)

3 a. Explain photodiode, photosensor, photo conductor and phototransistors with necessary diagrams. **(10 Marks)**

b. Find the value of R_L for the circuit shown, Fig.Q3(b) such that the circuit gives a logic high when the light incident on it is above 200 lux and the photo conductor has a resistance of 14 kΩ at a light level of 100 lux, $\alpha = 0.5$, power supply voltage is $V_{CC} = 10$V and reference voltage of zener diode is 3.5V. **(10 Marks)**

4. a. Graphically how h-parameters of a BJT are determined? Explain with neat diagram. Also derive expression for input impedance and voltage gain for a BJT amplifier. **(10 Marks)**

b. Give the hybrid equivalent model for the circuit shown, in Fig.Q4(b). Find input impedance, voltage gain, current gain and output impedance. The h-parameters are hie = 1.5 k, hje = 100, hre = 1×10^{-4}, hoe = 25μ A/v. **(10 Marks)**

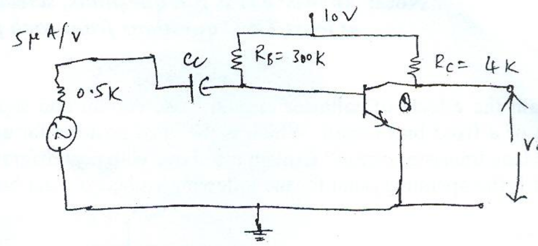

Fig.Q4(b)

PART – B

5 a. Discuss large signal amplifier characteristics. Discuss harmonic distortion. Derive A_0, A_1, A_2, A_3, A_4, the amplitude of D,C, first, second, third, forth amplitude of harmonic components. **(10 Marks)**

b. Derive expressions for gain, input resistance and output resistance of voltage shunt feedback amplifier with the help of neat diagram. For the opamp based inverting amplifier circuit shown in Fig.Q5(b) find input impedance given that transimpedance, input impedance and output impedance of opamp are 100 MΩ, 10 M Ω, and 100 Ω respectively **(10 Marks)**

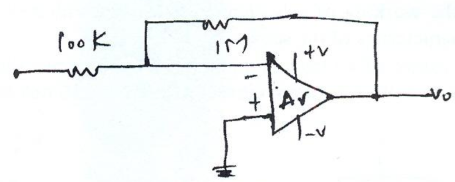

Fig.Q5(b)

6 a. Mention the conditions necessary for oscillations in a feedback amplifier circuit. Determine the frequency at which the following circuit, shown in Fig.Q6(a) would oscillate if the loop gain criterion was met. **(10 Marks)**

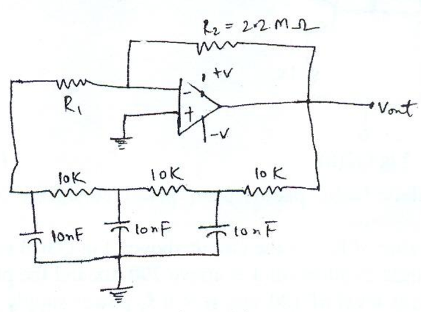

Fig.Q6(a)

Also determine the maximum value of R_1 for sustained oscillation.

b. With neat diagram and waveforms explain the working of a bistable multivibrator. (BJT based). **(10 Marks)**

7 a. Explain regulated power supply parameters: Load regulation, line regulation, output impedance. Ripple rejection factor. Determine the output ripple of a regulated power supply which provides a ripple rejection of-80dB and a ripple voltage in the unregulated input were 2 V. **(10 Marks)**

b. Explain buck regulator boost regulator and inverting regulator with neat diagram. **(10 Marks)**

8 a. Explain with neat diagram: i) Peak detector circuit ii) Absolute value circuit and their working. **(10 Marks)**

b. Explain with neat diagram: i) Current to voltage converter ii) Voltage to current converter and their working. **(10 Marks)**

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USN | | | | | | | | | | | 10CS34

Third Semester B.E. Degree Examination, June 2012

Discrete Mathematical Structures

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Let $S = \{21, 22, 23, \ldots, 39, 40\}$. Determine the number of subsets A of S such that :
   i) $|A| = 5$
   ii) $|A| = 5$ and the largest element in A is 30
   iii) $|A| = 5$ and the largest element is at least 30
   iv) $|A| = 5$ and the largest element is at most 30
   v) $|A| = 5$ and A consists only of odd integers. **(10 Marks)**

b. Prove or disprove: For non-empty sets A and B, $P(A \cup B) = P(A) \cup P(B)$ where P denotes power set. **(05 Marks)**

c. In a group of 30 people, it was found that 15 people like Rasagulla, 17 like Mysorepak, 15 like Champakali, 8 like Rasagulla and Mysorepak, 11 like Mysorepak and Champakali, 8 like Champakali and Rasagulla and 5 like all three. If a person is chosen from this group, what is the probability that the person will like exactly 2 sweets? **(05 Marks)**

2 a. Verify that $[p \rightarrow (q \rightarrow r)] \rightarrow [(p \rightarrow q) \rightarrow (p \rightarrow r)]$ is a tautology. **(05 Marks)**

b. Write dual, negation, converse, inverse and contrapositive of the statement given below :
   If Kabir wears brown pant, then he will wear white shirt. **(05 Marks)**

c. Define $(p \uparrow q) \Leftrightarrow \neg(p \wedge q)$. Represent $p \vee q$ and $p \rightarrow q$ using only $\uparrow$. **(05 Marks)**

d. Establish the validity or provide a counter example to show the invalidity of the following arguments : **(05 Marks)**

i)
$$\begin{array}{l} p \vee q \\ \neg p \vee r \\ \underline{\neg r} \\ \therefore q \end{array}$$

ii)
$$\begin{array}{l} p \\ p \rightarrow r \\ p \rightarrow (q \vee \neg r) \\ \underline{\neg q \vee \neg s} \\ \therefore s \end{array}$$

3 a. For the universe of all polygons with three or four sides, define the following open statements:
   i(x): all the interior angles of x are equal
   h(x): all sides of x are equal
   s(x): x is a square
   t(x): x is a triangle

Translate each of the following statements into an English sentence and determine its truth value:
   i) $\forall x\, [s(x) \leftrightarrow (i(x) \wedge h(x))]$
   ii) $\exists x\, [t(x) \rightarrow (i(x) \leftrightarrow h(x))]$

Write the following statements symbolically and determine their truth values.
   iii) Any polygon with three or four sides is either a triangle or a square
   iv) For any triangle if all the interior angles are not equal, then all its sides are not equal. **(08 Marks)**

3 b. Let p(x, y) denote the open statement x divides where the universe consists of all integers. Determine the truth values of the following statements. Justify your answers.
i) $\forall x \; \forall y \; [p(x, y) \wedge p(y, x) \rightarrow (x = y)]$ ii) $\forall x \; \forall y \; [p(x, y) \vee p(y, x)]$ **(06 Marks)**

c. Prove that for every integer n, n^2 is even if and only if n is even. **(06 Marks)**

4 a. Prove $\sum_{i=1}^{n} \frac{1}{i(i+1)} = \frac{n}{n+1} \quad \forall n \in z^+$. **(06 Marks)**

b. Prove $2^n < n! \quad \forall\, n > 3$ and $n \in z^+$. **(06 Marks)**

c. Define an integer sequence recursively by
$a_0 = a_1 = a_2 = 1$
$a_n = a_{n-1} + a_{n-3} \; \forall\, n \geq 3$.
Prove that $a_{n+2} \geq (\sqrt{2})^n \quad \forall\, n \geq 0$. **(08 Marks)**

PART – B

5 Let $A = \{\alpha, \beta, \gamma\}$, $B = \{\theta, \eta\}$, $C = \{\lambda, \mu, \nu\}$.

a. Find $(A \cup B) \times C$, $A \cup (B \times C)$, $(A \times B) \cup C$ and $A \times (B \cup C)$. **(08 Marks)**

b. Give an example of a relation from A to B × B which is not a function. **(04 Marks)**

c. How many onto functions are there from (i) A to B, (ii) B to A? **(02 Marks)**

d. i) Write a function $f : A \rightarrow C$ and a function $g : C \rightarrow A$. Find $g_o f : A \rightarrow A$.
ii) Write an invertible function $f : A \rightarrow C$ and find its inverse. **(06 Marks)**

6 a. Let $A = \{1, 2, 3, 4\}$, $B = \{w, x, y, z\}$ and $C = \{p, q, r, s\}$. Consider $R_1 = \{(1, x), (2, w), (3, z)\}$ a relation from A to B, $R_2 = \{(w, p), (z, q), (y, s), (x, p)\}$ a relation from B to C.
i) What is the composite relation $R_1 \circ R_2$ form A to C?
ii) Write relation matrices $M(R_1)$, $M(R_2)$ and $M(R1 \circ R2)$
iii) Verify $M(R_1) \cdot M(R_2) = M(R_1 \circ R_2)$ **(06 Marks)**

b. Let $A = \{1, 2, 3, 6, 9, 12, 18\}$ and define a relation R on A as xRy iff x|y. Draw the Hasse diagram for the poset (A, R). **(06 Marks)**

c. Let $A = \{1, 2, 3, 4, 5\} \times \{1, 2, 3, 4, 5\}$ and define R as $(x_1, y_1)R(x_2, y_2)$ iff $x_1 + y_1 = x_2 + y_2$.
i) Verify that R is an equivalence relation on A.
ii) Determine the equivalence class [(1, 3)].
iii) Determine the partition induced by R. **(08 Marks)**

7 a. Define a binary operation $*$ on Z as $x * y = x + y - 1$. Verify that $(Z, *)$ is an abelian group. **(07 Marks)**

b. Let $f : G \rightarrow H$ be a group homomorphism onto H. If G is an abelian group, prove that H is also abelian. **(07 Marks)**

c. The encoding function $E : Z_2^2 \rightarrow Z_2^5$ is given by the generator matrix $G = \begin{bmatrix} 1 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 1 \end{bmatrix}$.
i) Determine all the code words.
ii) Find the associated parity-check matrix H. **(06 Marks)**

8 a. If $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \in M_2(R)$, prove that $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is a unit of this ring if and only if $ad - bc \neq 0$. **(08 Marks)**

b. Let R be a ring with unity and a, b be units in R. Prove that ab is a unit of R and that $(ab)^{-1} = b^{-1}a^{-1}$. **(06 Marks)**

c. Find multiplicative inverse of each (non-zero) element of Z_7. **(06 Marks)**

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10CS35

Third Semester B.E. Degree Examination, June 2012
Data Structures with C

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Define a pointer. Write a C function to swap two numbers using pointers. **(05 Marks)**
b. Explain the functions supported by C to carryout dynamic memory allocation. **(05 Marks)**
c. Explain performance analysis and performance measurement. **(10 Marks)**

2 a. Define structure and union with suitable example. **(08 Marks)**
b. Write a C program with an appropriate structure definition and variable declaration to store information about an employee using nested structures. Consider the following fields like Ename, Empid, DOJ (Date, Month, Year) and salary (Basic, DA, HRA). **(12 Marks)**

3 a. Write a C-program to implement the two primite operations on stack using dynamic memory allocation. **(08 Marks)**
b. Write an algorithm to convert infix to postfix expression and apply the same to convert the following expression from infix to postfix :
i) (a * b) +c/d
ii) (((a/b)-c) + (d * e)) – (a * c). **(12 Marks)**

4 a. Define linked list. Write a C program to implement the insert and delete operation on a queue using linked list. **(10 Marks)**
b. Write a C-function to add two polynomials using linked list representation. Explain with suitable example. **(10 Marks)**

PART – B

5 a. Define binary trees. For the given tree find the following :
i) Siblings
ii) Leaf nodes
iii) Non-leaf nodes
iv) Ancestors
v) Level of trees. **(08 Marks)**

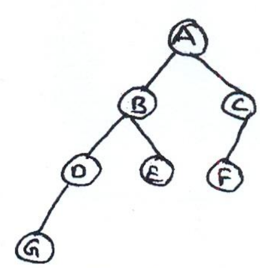

Fig.Q.5(a)

b. Write the C-routines to traverse the given tree using i) inorder ; ii) pre order ; iii) post order. **(12 Marks)**

6 a. Define ADT of binary search tree. Write the iterative search function and recursive search function of BST. **(08 Marks)**

b. Construct the binary tree for the given expressions :

i) Pre order : / + ∗ 1 $ 2 3 4 5

A B D G C E H I F

ii) In order : 1 + 2 ∗ 3 $ 4 – 5

D G B A H E I C F. **(08 Marks)**

c. Define furest with example. **(04 Marks)**

7 a. Define leftlist trees. Explain varieties of leftlist trees. **(08 Marks)**

b. Write short notes on :

i) Priority queues
ii) Binomial heaps
iii) Priority heaps
iv) Fibonacci heaps. **(12 Marks)**

8 a. Define AVL trees. Write a C-routine for

i) Inserting into an AVL tree
ii) LL and LR rotation. **(10 Marks)**

b. Explain the following with example :

i) Red-black trees
ii) Splay trees. **(10 Marks)**

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10CS36

Third Semester B.E. Degree Examination, June 2012
Object Oriented Programming with C++

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting atleast TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Describe the following characteristics of object oriented programming :
i) Encapsulation ii) Polymorphism iii) Inheritance. **(08 Marks)**
b. Write the general form of function. Explain the different types of argument passing techniques, with example. **(08 Marks)**
c. What are pointers? Explain with example. **(04 Marks)**

2 a. What is class? How it is created? Write a C++ programme to create a class called employee with data members : name, age and salary. Display at least '5' employee information. **(10 Marks)**
b. What are constructors? How is a constructor different from member function? Illustrate with example. **(06 Marks)**
c. What is data hiding? How it is achieved in C++? Explain with example. **(04 Marks)**

3 a. What are friend functions? Why they are required? Illustrate with example. **(10 Marks)**
b. What is the use of operator overloading? Write a programme to overload the following operators :
i) Pre – increment ii) Post – decrement operators. **(10 Marks)**

4 a. What is inheritance? How to inherit a base class as protected? Explain the inheriting multiple base classes. **(06 Marks)**
b. With an example, explain the inheriting multiple base classes. **(06 Marks)**
c. Explain with example base class access control. **(08 Marks)**

PART – B

5 a. Explain the different order of invocation of constructors and destructors in inheritance, with simple example. **(12 Marks)**
b. Explain with example, "granting access" with respect to inheritance. **(08 Marks)**

6 a. What are virtual functions? What is the need of virtual function? How is early binding is different from late binding? **(06 Marks)**
b. What is pure virtual function? Explain with an example. **(08 Marks)**
c. How to inherit a virtual attributes? Explain with example. **(06 Marks)**

7 a. What is exception handling? Write a C++ programme to demonstrate the "try", "throw" and "catch" keywords for implementing exception handling. **(10 Marks)**
b. What is standard template library (STL)? List and explain any five member functions from "list" and "vector" classes. **(10 Marks)**

8 Write a short note on :
a. C++ stream classes
b. File operation
c. Function overloading
d. Inline function. **(20 Marks)**

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