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10MAT31

Third Semester B.E. Degree Examination, June/July 2016
Engineering Mathematics – III

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Find the Fourier series for the function $f(x) = x(2\pi - x)$ in $0 \le x \le 2\pi$. Hence deduce that $\frac{\pi^2}{8} = 1 + \frac{1}{3^2} + \frac{1}{5^2} + \text{-----}$. **(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 co-efficient of the 1st sine and cosine terms in the Fourier series of y as given in the following table. **(07 Marks)**

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

2 a. Solve the integral equation :

$\int_0^\infty f(\theta)(\cos\alpha\theta\, d\theta = \begin{cases} 1-\alpha, & 0 \le \alpha \le 1 \\ 0, & \alpha > 1 \end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin^2 t}{t^2}\, dt$. **(07 Marks)**

b. Find the Fourier transform of $f(x) = e^{-|x|}$. **(06 Marks)**

c. Find the infinite Fourier cosine transform of e^{-x^2}. **(07 Marks)**

3 a. Solve two dimensional Laplace equation $u_{xx} + u_{yy} = 0$ by the method of separation of variables. **(07 Marks)**

b. Obtain the D'Alembert's solution of the wave equation $u_{tt} = C^2 u_{xx}$ subject to the conditions $u(x, 0) = f(x)$ and $\frac{\partial u}{\partial t}(x,0) = 0$. **(06 Marks)**

c. Solve the boundary value problem $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$, $0 < x < \ell$ subject to the conditions $\frac{\partial u}{\partial x}(0,t) = 0$; $\frac{\partial u}{\partial x}(\ell, t) = 0$, $u(x, 0) = x$. **(07 Marks)**

4 a. Find the equation of the best fit straight line for the following data and hence estimate the value of the dependent variable corresponding to the value of the independent variable x with 30. **(07 Marks)**

x	5	10	15	20	25
y	16	19	23	26	30

b. Solve by graphical method :
Max Z = x + 1.5 y
Subject to the constraints $x + 2y \le 160$
$3x + 2y \le 240$
$x \ge 0$; $y \ge 0$. **(06 Marks)**

c. Solve by simplex method :
max z = 3x + 5y
subject to $3x + 2y \le 18$
$x \le 4$
$y \le 6$
$x, y \ge 0$. **(07 Marks)**

PART – B

5 a. Using the method of false position, find a real root of the equation $x \log_{10} x - 1.2 = 0$, correct to 4 decimal places. **(07 Marks)**

b. By relaxation method, solve :
$10x + 2y + z = 9$; $x + 10y - z = -22$; $-2x + 3y + 10z = 22$. **(06 Marks)**

c. Find the largest Eigen value and the corresponding Eigen vector for the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ using Rayleigh's power method, taking $x_0 = [1\ 1\ 1]^T$. Perform 5 iterations. **(07 Marks)**

6 a. Find the cubic polynomial by using Newton's forward interpolation formula which takes the following values.

x	0	1	2	3
y	1	2	1	10

Hence evaluate f(4). **(07 Marks)**

b. Using Lagrange's formula, find the interpolating polynomial that approximate the function described by the following table.

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

Hence find f(3). **(06 Marks)**

c. Evaluate $\int_4^{5.2} \log_e x \, dx$ using Weddler's rule by taking 7 ordinates. **(07 Marks)**

7 a. Solve $u_{xx} + u_{yy} = 0$ in the following square Mesh. Carry out two iterations. **(07 Marks)**

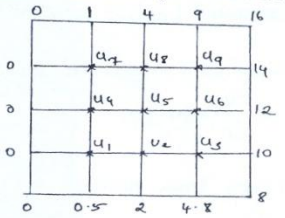

Fig. Q7(a)

b. The transverse displacement of a point at a distance x from one end to any point 't' of a vibrating string satisfies the equation : $\frac{\partial^2 u}{\partial t^2} = 25\frac{\partial^2 u}{\partial x^2}$ with boundary condition u(0, t) = u(5, t) = 0 and initial condition $u(x, 0) = \begin{cases} 20x & \text{for } 0 \le x \le 1 \\ 5(5-x) & \text{for } 1 \le x \le 5 \end{cases}$ and $u_t(x, 0) = 0$ solve by taking h = 1, k = 0.2 upto t = 1. **(06 Marks)**

c. Find the solution of the equation $u_{xx} = 2u_t$ when u(0, t) = 0 and u(4, t) = 0 and u(x, 0) = x(4 – x) taking h = 1. Find values upto t = 5. **(07 Marks)**

8 a. Find the Z – transformation of the following : i) $3n - 4\sin\frac{\pi}{4} + 5a^2$ ii) $\frac{a^n e^{-a}}{n!}$. **(07 Marks)**

b. Find the inverse Z – transformation of $\frac{4z^2 - 2z}{z^3 + 5z^2 + 8z - 4}$. **(06 Marks)**

c. Solve the difference equation : $y_{n+2} + 6y_{n+1} + 9y_n = 2^n$; given $y_0 = y_1 = 0$ using Z – transformation. **(07 Marks)**

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MATDIP301

Third Semester B.E. Degree Examination, June/July 2016
Advanced Mathematics – I

Time: 3 hrs. Max. Marks:100

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

1 a. Express the complex number $\frac{(1+i)(1+3i)}{(1+5i)}$ in the form a + ib. **(06 Marks)**

b. Find the modulus and amplitude of $1 + \cos\theta + i\sin\theta$. **(07 Marks)**

c. Find the cube root of $1 - i$. **(07 Marks)**

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

b. Find the n^{th} derivative of $\frac{6x}{(x-2)(x+2)(x-1)}$. **(07 Marks)**

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

3 a. Find the angle of intersection of the curves $r^2\sin 2\theta = a^2$, $r^2\cos 2\theta = b^2$. **(06 Marks)**

b. Find the nodal equation of the curve $r(1 - \cos\theta) = 2a$. **(07 Marks)**

c. Expand log (secx) upto the term containing x^4 using Maclaurin's series. **(07 Marks)**

4 a. If $u = x^3 - 3xy^2 + x + e^x\cos y + 1$, show that $u_{xx} + u_{yy} = 0$. **(06 Marks)**

b. If $u = f\left(\frac{x}{y}, \frac{y}{z}, \frac{z}{x}\right)$, prove that $xu_x + yu_y + zu_z = 0$. **(07 Marks)**

c. Find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$, where $u = x + y + z$, $v = y + z$, $w = z$. **(07 Marks)**

5 a. Obtain reduction formula for $\int \cos^n x\, dx$, where n is positive integer. **(06 Marks)**

b. Evaluate $\int_0^2 \frac{x^4}{\sqrt{4-x^2}}dx$. **(07 Marks)**

c. Evaluate $\int_{-c}^{c}\int_{-b}^{b}\int_{-a}^{a}(x^2 + y^2 + z^2)\,dz\,dy\,dx$. **(07 Marks)**

6 a. Prove that: i) $\Gamma(n+1) = n\,\Gamma(n)$ and ii) $\Gamma(n+1) = n!$ for a positive integer n. **(06 Marks)**

b. Prove that $\beta(m, n) = \dfrac{\Gamma(m)\,\Gamma(n)}{\Gamma(m+n)}$. **(07 Marks)**

c. Show that $\int_0^{\pi/2} \frac{d\theta}{\sqrt{\sin\theta}} \cdot \int_0^{\pi/2} \sqrt{\sin\theta}\, d\theta = \pi$. **(07 Marks)**

7 a. Solve $\dfrac{dy}{dx} = (9x + y + 1)^2$. **(06 Marks)**

b. Solve $ye^{xy}\,dx + (xe^{xy} + 2y)\,dy = 0$. **(07 Marks)**

c. Solve $\dfrac{dy}{dx} + y\cot x = \cos x$. **(07 Marks)**

8 a. Solve $\dfrac{d^2y}{dx^2} - 6\dfrac{dy}{dx} + 9y = 5e^{-2x}$. **(06 Marks)**

b. Solve $(D^2 - 4D + 13)y = \cos 2x$. **(07 Marks)**

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

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10CS32

Third Semester B.E. Degree Examination, June/July 2016
Electronic Circuits

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. With the help of common – emitter amplifier configuration, explain the criteria for selection of a suitable operating point and the factors affecting its stability. **(08 Marks)**

b. Fig. Q1(b)(i) shows the transistor as an inverting switch with the desired output waveform for the given input waveform as shown in Fig. Q1(b)(ii). Find the value of V_{CC}, R_C and R_B given that $\beta = 80$, $I_{C(sat)} = 10$ mA, the output voltage V_{out} when the transistor is off is 12 V, $V_{BE} = 0.7V$. **(08 Marks)**

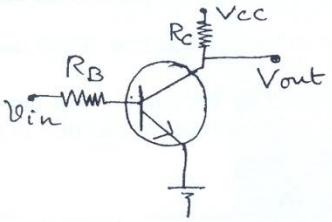

Fig. Q1(b)(i)

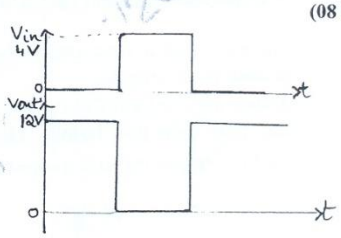

Fig. Q1(b)(ii)

c. Explain the gate triggering characteristics of an SCR. **(04 Marks)**

2 a. Draw and explain the working of D–MOSFET with the help of drain current and transconductance curve. When the voltage is applied to the gate of a P–Channel D–MOSFET, does the current flow depleted or enhanced? **(12 Marks)**

b. Fig. Q2(b) shows a circuit using E – MOSFET given that the threshold voltage for the MOSFET is 2 V and $I_{d(on)} = 6$ mA for $V_{GS(on)} = 5V$, determine the volume of the operating point. **(08 Marks)**

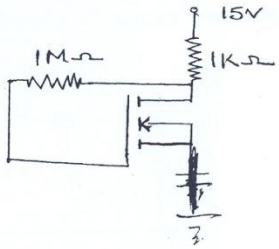

Fig. Q2(b)

3 a. What are photodiodes? Explain with VI characteristics. **(05 Marks)**

b. Determine the cut-off wave length for silicon and germanium photodiodes, given that their Bandgap energies are 1.1 ev and 0.72 ev, respectively, at 25°C. How will the cut off wave length change when the operating temperature change form 25°C to 200°C? **(05 Marks)**

c. Write short note on :
i) Cathode ray tube display
ii) Emerging display technologies. **(10 Marks)**

4 a. Explain how the h–parameters are determined by making use of transistor's input and output characteristics. **(10 Marks)**

b. Carryout the analysis of a transistor amplifier operating in common emitter fixed bias configuration with suitable derivations. **(10 Marks)**

PART – B

5 a. Distinguish between class A, class B, Class C, class D, class AB amplifiers interms of conduction angle, operating region, application and efficiency. **(05 Marks)**

b. Explain all four feedback topologies with appropriate circuit diagrams. **(10 Marks)**

c. An amplifier has a open – loop voltage gain $A_v = 1000 \pm 100$. It is required to have an amplifier whose voltage gain varies by no more than $\pm 0.1\%$.

i) Find the value of feedback factor β

ii) Find gain with feedback. **(05 Marks)**

6 a. Explain Barkhausen criteria with suitable circuit diagrams and essential conditions. **(05 Marks)**

b. Explain with a neat connection diagram and waveforms how IC555 timer is used as the astable multivibrator. **(08 Marks)**

c. A step input of amplitude 8 volts is applied to a RC low – pass circuit shown in Fig. Q6(c)(i) and Fig. Q6(c)(ii) below. Determine the output voltage at end of : i) 2m/sec ii) 5m/sec iii) Find upper cut-off frequency f_w and rise time t_r. **(07 Marks)**

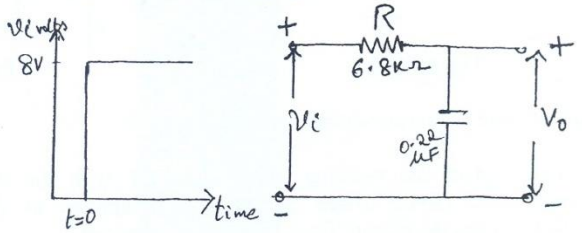

Fig. Q6(c) (i)

Fig. Q6(c)(ii)

7 a. Write a note on 3 terminal voltage regulator. **(05 Marks)**

b. Determine the regulated output voltage for LM 317 voltage regulator shown in Fig. Q7(b). **(05 Marks)**

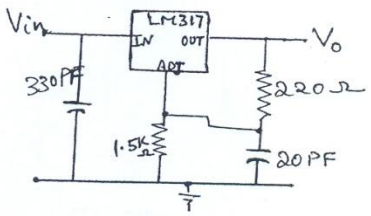

Fig. Q7(b)

c. What are switching regulators? Describe the basic topology of Boost regulator. **(10 Marks)**

8 a. Differentiate ideal Op-Amp and practical Op-Amps. **(05 Marks)**

b. Discuss performance parameters of operational amplifiers. **(10 Marks)**

c. Explain Op-Amp as peak detector circuit. **(05 Marks)**

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10CS33

Third Semester B.E. Degree Examination, June/July 2016
Logic Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Name universal gates. Realize basic gates using NAND gate only. **(08 Marks)**

b. Prove that symmetrical signal has a duty cycle of 50% and find the frequency, low and high duty cycles for asymmetrical signal if it is high for 3 ms and low for 4 ms. **(08 Marks)**

c. Explain the structure of VHDL/Verilog program. **(04 Marks)**

2 a. Find the SOP of the following Boolean function using K – map :

i) $f(p\ q\ r\ s) = \Sigma m(6, 7, 9, 10, 11, 13) + d(0, 1, 8, 12)$

ii) $f(a\ b\ c\ d) = \pi m(1, 2, 4, 9, 10, 12) + d(0, 3, 5)$. **(08 Marks)**

b. Simplify $f(A\ B\ C\ D) = \Sigma m(0, 1, 2, 3, 5, 8, 12, 14, 15)$ using Quine – McClusky method. **(12 Marks)**

3 a. Design a 16 : 1 multiplexer using two 8 : 1 multiplexers and one 2 : 1 multiplexers with expressions. **(06 Marks)**

b. With relevant diagram explain n-bit magnitude comparator. **(08 Marks)**

c. Give HDL implementation for 4 : 1 MUX using 'case' statement. **(06 Marks)**

4 a. What do you mean by characteristic equation of 'Flip-flop'? Draw the logic diagram, truth table and explain working of 'JK – Flip – Flop' and implement the same using NAND gate. **(12 Marks)**

b. With state table and state transition diagram, analyse the behaviour of sequential circuit shown in Fig. Q4(b). **(08 Marks)**

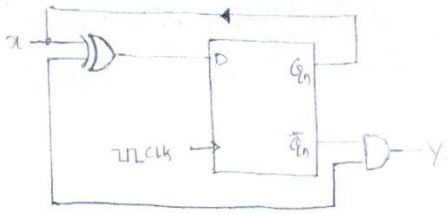

Fig. Q4(b)

PART – B

5 a. With a neat logic and timing diagram, explain the working of a 4 – bit SISO register. **(10 Marks)**

b. Design two 4 – bit number serial adder. **(06 Marks)**

c. Write verilog HDL code for 4 – bit SIPO shift register. **(04 Marks)**

6 a. Design synchronous modulus – 5 (mod -5) counter using JK – Flip-Flop. **(10 Marks)**

b. Explain, design of 4 – bit binary ripple – up counter using negative edge triggered JK – flip-flops with block diagram and timing diagram. **(10 Marks)**

7 a. With neat diagram explain and compare Mealay and Moore machine. **(10 Marks)**

b. Reduce state transition diagram (Moore model) of Fig. Q7(b) by i) Row elimination method ii) implication table method. **(10 Marks)**

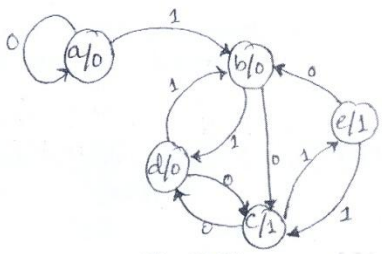

Fig. Q7(b)

8 a. Discuss the two drawbacks of resistive divider used in converting D/A. Draw the schematic for a 4–bit binary ladder and explain how the digital to analog conversion is achieved using it. **(10 Marks)**

b. Discuss the working of following A/D converters :

i) Successive approximation A/D

ii) Counter type A/D. **(10 Marks)**

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10CS34

Third Semester B.E. Degree Examination, June/July 2016
Discrete Mathematical Structures

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define subset, disjoint sets and complement of a set with an example for each **(06 Marks)**

b. In a survey of 260 college students the following data were obtained : 64 had taken mathematics course, 94 had taken computer science, 58 had taken business, 26 had taken both mathematics and computer science, 28 had taken mathematics and business, 22 had taken computer science and business and 14 had taken all the three types of courses.
   i) How many students were surveyed who had taken none of the three types of courses?
   ii) How many had taken only computer science course? **(07 Marks)**

c. Three students write an examination. Their chances of passing are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. Find the probability that : i) all of them pass ii) at least one of them passes and iii) at least two of them pass. **(07 Marks)**

2 a. Define conjunction and disjunction with an example. **(04 Marks)**

b. Prove that $(p \rightarrow (q \vee r)) \leftrightarrow ((p \wedge \sim q) \rightarrow r)$ is a tautology using the truth table. **(05 Marks)**

c. Define converse and inverse of a conditional. State the converse and inverse of the following statement "If Ram can solve the puzzle then Ram can solve the problem". **(06 Marks)**

d. Establish the validity of the argument
$(q \vee \sim r) \vee s$
$\sim q \vee (r \wedge \sim q)$
$\therefore r \rightarrow s.$ **(05 Marks)**

3 a. Write the open statement "Some straight lines are parallel or all straight lines interest" in symbolic form and find its negation. **(04 Marks)**

b. Test the validity of the following argument :
   All employers pay their employees
   Anil is an employer
   ∴ Anil pays his employees. **(06 Marks)**

c. Prove by contradiction that "if n^2 is an odd integer then n is odd". **(05 Marks)**

d. Prove that for all real numbers x and y if $x + y \geq 100$ then $x \geq 50$ or $y \geq 50$. **(05 Marks)**

4 a. State the induction principle. Prove by induction that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integer n. **(06 Marks)**

b. For the sequence $\{a_n\}$ defined recursively by $a_1 = 8$, $a_2 = 22$, $a_n = 4(a_{n-1} - a_{n-2})$ for $n \geq 3$ prove that $a_n = (5 + 3_n)2^{n-1}$ for $n \geq 1$. **(07 Marks)**

c. If F_0, F_1, F_2 - - - - - are Fibonacci numbers prove that $\sum_{i=0}^{n} F_i = F_{n+2} - 1$. **(07 Marks)**

PART – B

5 a. Define Cartesian product of two sets. For non empty sets A, B, C prove that $A \times (B - C) = (A \times B) - (A \times C)$. (07 Marks)

b. If $A = \{1, 2, 3, 4\}$ and R is a relation on A defined by $R = \{(1,2)\ (1,3)\ (2,4)\ (3,2)\ (3,3)\ (3,4)\}$ find R^2 and R^3. Draw their digraphs. (06 Marks)

c. Find the number of equivalence relations that can be defined on a finite set A with $|A| = 6$. (07 Marks)

6 a. Let $A = R\ B = \{x/x \text{ is real and } x \geq 0\}$. Is the function $f : A \to B$ defined by $f(a) = a^2$ an onto function? a one to one function? (05 Marks)

b. Let $A = \{1, 2, 3, 4\}$ f and g be functions from A to A given by :
$f = \{(1, 4)\ (2, 1)\ (3, 2)\ (4, 3)\}$ $g = \{(1, 2)\ (2, 3)\ (3, 4)\ (4, 1)\}$ prove that f and g are inverses of each other. (05 Marks)

c. Draw the Hasse diagram representing the positive divisors of 36. (05 Marks)

d. Let $A = \{1, 2, 3, 4, 5, 6, 7\}$. R be the equivalence relation on A that induces the partition $A = \{1, 2\} \cup \{3\} \cup \{4, 5, 7\} \cup \{6\}$. Find R. (05 Marks)

7 a. A binary symmetric channel has probability $p = 0.05$ of incorrect transmission. If the word $c = 011011101$ is transmitted what is the probability that i) single error occurs ii) a double error occurs iii) a triple error occurs? (06 Marks)

b. The parity check matrix for an encoding function $E : Z_2^3 \to Z_2^6$ is given by :

$$H = \begin{pmatrix} 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 \end{pmatrix}$$

i) Determine the associated generator matrix
ii) Does this code correct all single errors in transmission? (07 Marks)

c. i) Define cyclic group
ii) Prove that the group $(Z_4, +)$ is cyclic. Find all its generators. (07 Marks)

8 a. State and prove Lagrange's theorem. (06 Marks)

b. Prove that the set Z with binary operations $\oplus$ and $\odot$ defined by :

$x \oplus y = x + y - 1$

$x \odot y = x + y - xy$

is a commutative ring with unity. (07 Marks)

c. Prove that every finite integral domain is a field. (07 Marks)

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10CS35

Third Semester B.E. Degree Examination, June/July 2016
Data Structures with C

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Write a recursive function to print the permutation of a string (ABC) passed to it as an argument. **(06 Marks)**

b. What is the purpose of using free( )? With an example explain the problem that occur when free( ) is not used. **(04 Marks)**

c. Obtain the step count for the C – function to add two matrices of M × N size using counting method and tabular method.

```
void add_matrix(int a[ ][MAX_SIZE], int b[ ][MAX_SIZE], int c[ ][MAX_SIZE], int m, int n)
{ int i, j ;
   for (i = 0 ; i < m; i ++)
   {
      for (j = 0 ; j < n; j++)
      {
         C[i][j] = a[i][j] + b[i][j] ;
      }
   }
}
```

(04 Marks)

d. Explain how memory can be dynamically allocated using realloc( ). **(06 Marks)**

2 a. Explain how address calculation is done in row major ordering for a 2–dimensional array. Also generalize for n–dimension. **(04 Marks)**

b. Describe unions used in C. How is it different from structures? **(06 Marks)**

c. Design an algorithm to add two polynomials using ADT polynomial. **(05 Marks)**

d. With the help of an example, explain sparse matrix. How the sparse matrix is represented in memory. Design the algorithm to transpose a given matrix represented as triples in a 1–D array. **(05 Marks)**

3 a. Write an algorithm to evaluate a postfix expression. Use a stack to evaluate the following postfix arithmetic expression. Show the changing status of the stack in tabular form. (AB + C – B A + C $–)for given A = 1, B = 2, C = 3. **(06 Marks)**

b. Differentiate between stack and queue. How are they related to LIFO and FIFO concept? **(06 Marks)**

c. Write a program to check whether a given string is palindrome or not using stack. **(04 Marks)**

d. What is the disadvantage of queue which is implemented using array and how to overcome it? **(04 Marks)**

4 a. Write a program that create a linked list consisting of nodes of the following struct type and searches the record of a student whose roll_number is given by the user.

```
sturct student
{
  char name [15];
  int roll_no ;
  struct student *next ;
} ;
```

(10 Marks)

b. List out the difference between singly linked list and doubly linked list. What are the advantages of circular list? (05 Marks)

c. Explain how to reverse and invert a given singly linked list with an example and write its C-function. (05Marks)

PART – B

5 a. Write a C – function to insert an item into a binary tree based on direction. (06 Marks)

b. Define max-heap and min-heap. How will you represent a max-heap as an array? Write an algorithm to insert an element to a max-heap. Create a max-heap : 100 200 –10 –30 –60 80 90 300. (08 Marks)

c. List various types of threaded binary trees. Explain in-threaded binary tree. (06 Marks)

6 a. Suppose the following list of number is inserted in order into an empty binary search tree(BST) 70 80 60 65 50 45 55,

i) Construct the binary search tree

ii) Find in order, pre-order and pos-order traversal of BST created

iii) Is the BST constructed at AVL tree? State reasons for your claim. Further if your answer is negative balance the tree so that it becomes an AVL tree. (10 Marks)

b. Explain the activities to be performed to delete a node from a binary tree and write C–function to delete an item from the tree. (10 Marks)

7 a. Obtain the shortest(x) and weight(x) for each node in the following binary trees and identify which is height – based leftist tree and which is weight–based leftist tree. (10 Marks)

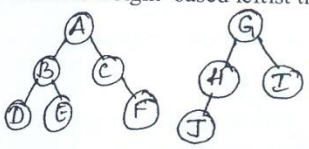

Fig. Q7(a)

b. Construct an AVL tree by inserting the elements MAR, MAY, NOV, AUG, APRIL, JAN, DEC, JULY, FEB, JUNE, OCT, SEPT. (10 Marks)

8 a. Obtain the optimal binary search tree for the following items and associated probability.

Keys	10	15	20	25
Probability	3	3	1	1.

(10 Marks)

b. Define RED–BLACK trees. Consider the red–black tree shown below and insert the item 50 into the tree and write the final red–black tree. (10 Marks)

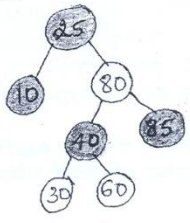

Fig. Q8(b)

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10CS36

Third Semester B.E. Degree Examination, June/July 2016
Object Oriented Programming With C++

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain any three features of object oriented programming. **(06 Marks)**

b. What is function overloading? Write a C++ program to define three overloaded functions to find the sum of two integers, sum of two floating point numbers and sum of three integers. **(08 Marks)**

c. What are inline functions? Illustrate inline functions with an example. **(06 Marks)**

2 a. Define class and objects. Write a C++ program to create a class STUDENT with the following specifications.
Data members: Name, Roll No. and Average Marks
Member functions: Read & Write
Use the above specification to read and print the information of 5 students. **(10 Marks)**

b. What are constructors? Explain the different types of constructors. Write a C++ program to illustrate the different types of constructors. **(10 Marks)**

3 a. What are friend functions? Write a C++ program to find the sum of two complex numbers using friend functions. **(10 Marks)**

b. Write a C++ program to perform the addition of two location objects by overloading '+' operator, using a class "LOCATION" with the data members longitude and latitude. Read and display the location objects by overloading the operators << & >>. **(10 Marks)**

4 a. Explain the visibility of the base class members for the access specifiers:
i) Public ii) Private iii) Protected.
Illustrate the same with a program. **(10 Marks)**

b. Write a C++ program to illustrate multiple inheritance and multilevel inheritance. **(10 Marks)**

PART – B

5 a. Illustrate with a C++ program the execution of constructors and destructors when single inheritance is involved. **(06 Marks)**

b. Explain passing of parameters to base class constructors in multiple inheritance. **(08 Marks)**

c. Explain the need for virtual base classes. **(06 Marks)**

6 a. What is a virtual function? Write a C++ program to demonstrate calling of virtual function through a base class reference. **(10 Marks)**

b. With examples explain pure virtual function and abstract classes. **(10 Marks)**

7 a. What are streams in C++? Explain C++'s predefined streams? **(08 Marks)**

b. Explain width ( ), precision ( ) and fill ( ) functions. **(06 Marks)**

c. What are I/O manipulators? Explain any five C++ manipulators used for output. **(06 Marks)**

8 a. What is exception handling? Write a C++ program that illustrates exception handling with the help of keywords: try, throw and catch. **(10 Marks)**

b. What is STL? Briefly explain the use of containers, vectors, lists and Maps. **(10 Marks)**

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