

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-137
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Discrete Mathematics
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

- N.B Please check whether you have got the right question paper.
- i) Q.1 from Section A and Q.6 from Section B are compulsory.
 - ii) Solve any two questions from the remaining in each section.
 - iii) Draw diagram or graphs wherever required.

Section A

- Q.1 Solve any five:- 10
- a) Define subset with example.
 - b) If $A = \{a, b, \{a, c\}, \phi\}$ Determine the following sets:
 - i) $A - \{a, c\}$
 - ii) $\{\{a, c\}\} - A$
 - c) Define countable and uncountable sets.
 - d) State De' Morgan's law of set theory.
 - e) Define universal generalization rule.
 - f) What is existential quantifier? Write following statement in symbolic form:-
 - i) Some students are intelligent but not hardworking.
 - g) Determine the truth value of each statement and negate every statement.
 - i) $\exists x, x + 2 = x$
 - ii) $\forall x, x + 1 > x$
 - h) Define Mathematical induction.
- Q.2 08
- a) Construct truth tables to determine whether each of the following is a tautology, a contingency or a contradiction:
 - i) $p \rightarrow (q \rightarrow p)$
 - ii) $(p \wedge q) \wedge \neg (p \vee q)$
 - b) Two dice are rolled together event A denotes that the sum of the numbers on the top faces is even and event B denotes that there is 4 on at least one of the top focus. Find probability $P(A \cup B)$ and $P(A \cap B)$ 07
- Q.3 08
- a) Using laws of logic, prove the following logical equivalence:- 08

$$[(\neg p \vee \neg q) \wedge (F_0 \vee p) \wedge p] \Leftrightarrow p \wedge \neg q$$
 - b) Test the validity of following argument. If Ravi studies, then he will pass in DMS. If Ravi does not play cricket then he will study, Ravi failed in DMS. Therefore, Ravi played cricket. 07

Q.4 a) Prove by mathematical induction for all positive integer $n \geq 1$, that, 08

$$1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$$

- b) For the universe of all integers let $P(x)$, $Q(x)$, $R(x)$ and $S(x)$ be the following statements. 07
- 1) $P(x): x > 0$
 - 2) $Q(x): x$ is even
 - 3) $R(x): x$ is perfect square
 - 4) $S(x): x$ is divisible by 5.

Write the following statement in symbolic form

- 1) At least one integer is even
- 2) There exist a positive integer that is even
- 3) If x is even then x is not divisible by 5.
- 4) There exist an even integer divisible by 5.

Q.5 a) Give a recursive definition for each of the following integer sequence. 08

- 1) $C_n = 7n$
- 2) $C_n = 2 - (-1)^n$ for $n \in \mathbb{Z}^+$

b) Show that $\cup (\bar{B} \cap C) = (A \cup \bar{B}) \cap (A \cup C)$. Using Venn diagram. 07

Section B

Q.6 Solve any five. 10

- a) Let $A = \{2,3,4\}$ and $B = \{5,6\}$. Determine all functions from A to B .
- b) Let $A = \{4,5,6,7\}$ and relation R is $\{(4,4), (5,4), (7,6), (6,7)\}$. Determine whether relation is reflexive or symmetric.
- c) State one to one function with example.
- d) Let $A = \{a, b, c, d\}$ and $B = \{1,2,3\}$ and Let $R = \{(a,1), (a,2), (b,1), (c,2), (d,1)\}$ Find the relation matrix and directed graph.
- e) Define cyclic group.
- f) Find hamming weights of x and y and also find hamming distance between x and y .
 $x = 0010111$
 $y = 0101011$
- g) Define ring with its properties.
- h) Define parity check matrix with example.

Q.7 a) Let $A = \{1,2,3,4\}$ and Let R_1 be the relation on A defined as $R_1 = \{(x, y) / x + y = 5\}$ and $R_2 = \{(x, y) / y - x = 2\}$. verify that $(R_1 R_2)^C = R_2^C R_1^C$ 08

b) Let $A = \{1,2,3,4\}$ and Let $R_1 = \{(1,1), (1,2), (2,3), (2,4), (3,4), (4,1), (4,2)\}$ and $R_2 = \{(3,1), (4,4), (2,3), (2,4), (1,1), (1,4)\}$ 07
 Verify:-

- 1) $M_{R_1 R_2} = M_{R_1} M_{R_2}$
- 2) $M_{R_1^c} = \text{transpose of } M_{R_1}$

- Q.8 a) Let $A = \{1,2,3,4\}$ and Let $R = \{(1,1), (1,2), (1,3), (2,1), (2,2), (3,1), (2,3), (3,2), (3,3), (4,4)\}$. Show that R is equivalence relation and determine the equivalence classes. Hence find the rank of R. 08
- b) Explain chain and anti chain with suitable example. 07
- Q.9 a) Let f,g,h be the functions from $Z \rightarrow Z$ defined by $f(x) = x - 1$, $g(x) = 3x$ and $h(x) = \begin{cases} 0 & \text{if } x \text{ is even} \\ 1 & \text{if } x \text{ is odd} \end{cases}$ 08
- Show that $(f \cdot g) \cdot h = f \cdot (g \cdot h)$
- b) Explain pigeonhole principle. Show that if 9 books are to be kept in 4 shelves there must be 1 shelf which contains at least 3 books. 07
- Q.10 a) Explain parity check matrix with example. 08
- b) What is group? Explain with suitable example. 07

Total No. of Printed Pages:04

SUBJECT CODE NO:- H-111
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics - IV
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N.B

1. Q. No. 1 and 6 are compulsory
2. Solve any two questions from the remaining questions of each section
3. Figures to the right indicate full marks
4. Assume suitable data, if necessary

Section: A

Q.1 Attempt any five

10

1. If $L\{J_0(t)\} = \frac{1}{\sqrt{s^2+1}}$ then find $L\{J_0(3t)\}$
2. Find Laplace transform of $\cos t \log t \delta(t - \pi)$
3. Find inverse Laplace transform of $\frac{e^{-3s}}{s^2-1}$
4. Find inverse Laplace transform of $\frac{1}{s^2-2s+17}$
5. Find inverse z-transform of $\frac{z}{(z-1)(z-2)}$ by residue method

ORSolve by direct integration method $\frac{\partial^2 u}{\partial x \partial t} = e^{-t} \cos x$

6. Find z-transform of $\sinh \frac{\pi}{2} k, k \geq 0$

OR

Form a partial differential equation by eliminating a and b from the equation

$$z = (x + a)(y + b)$$

7. Find z-transform of $f(k) = 3^k k, k \geq 0$

ORSolve $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = u, u(0, y) = 3e^{-3y}$

8. Find z-transform of $f(k) = \cos 2k, k \geq 0$

OR

Solve $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial y}$, where $u(x, 0) = 6e^{-3x}$

Q.2 a. Find Z- transform of $3^k \sin(2k + 5)$ 05

OR

Solve $y^2 zp + x^2 zq = y^2 x$ by Lagrange's method of linear partial differential equations

b. Find Laplace transform of $e^{-3t} \int_0^t t \sin 3t dt$ 05

c. Find inverse Laplace transform of $\log \left(\frac{s+a}{s+b} \right)$ 05

Q.3 a. Find z-transform of $k^2 f(k)$ if $f(k) = 3^k, k \geq 1$ 05

OR

Solve $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$, where $u(x, 0) = 6 e^{-3x}$

b. Find Laplace transform of $f(t) \begin{cases} t, 0 < t < 1 \\ 2 - t, 1 < t < 2 \text{ and} \\ f(t) = f(t + 2) \end{cases}$ 05

c. Find inverse Laplace transform of $\frac{1}{(s^2+1)(s^2+4)}$ by using convolution theorem 05

Q.4 a. Find inverse z- transform of $\frac{z}{(z-2)(z-3)}$ by partial fraction 05

OR

Solve the equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ with boundary conditions

$u(x, 0) = 3 \sin n\pi x, u(0, t) = 0$
and $u(1, t) = 0$, where $0 < x < 1, t > 0$

b. Evaluate $\int_0^\infty e^{-2t} \sin^3 t dt$ 05

c. Solve $y'' - 4y' + 3y = 6t - 8, y(0) = 0$
 $y'(0) = 0$ by Laplace transform 05

- Q.5 a. Solve the difference equation by z-transform
 $y(k + 2) - 4y(k) = 0$, given
 That $y(0) = 0, y(1) = 2$

05

OR

Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ subject to conditions
 $u(0, y) = 0, \quad u(\pi, y) = 0,$
 $u(x, 0) = 100 \quad \text{and} \quad u(x, \infty) = 0$

- b. Express the given function into Heaviside unit step function and hence find its Laplace transform

05

$$f(t) = t^2, \quad 0 < t < 1$$

$$= 4t, \quad t > 1$$

- c. Find inverse Laplace transform of $\frac{s e^{-3s}}{s^2 + 8s + 25}$

05

Section: B

- Q.6 Attempt any five

10

- a. Find $f(2)$ for the data

x:	0	1	4
f(x)	4	3	24

- b. Find the first approximate value of the root (i.e. x_1) by Newton raphson method for $\log x = \cos x$

- c. Find the values of x, y, z in the first iteration by Gauss seidal method

$$10x + 2y + z = 69$$

$$x + 8y + 2z = -3$$

$$2x - y + 20z = 76$$

- d. Find the values of k_1 and k_2 while solving the D.E.

$$\frac{\partial y}{\partial x} = 3e^x + 2y, \quad y(0) = 0, \quad \text{Take } h = 0.1 \text{ by runge-kutta fourth order method}$$

- e. Verify whether $f(z) = \sin z$ is analytic

- f. Find the image of $|z| = 2$ under $w = \frac{1}{z}$

- g. Evaluate $\int_c (x + y)dx + (2y - x)dy$ where c is the straight line $y=x$ joining the points $(0,0)$ to $(3,3)$

h. Find the residues of $\frac{z}{(z+3)(z-2)}$ at each of its poles

Q.7 a. Fit a second degree parabola to the following data 05

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

b. Apply the Runge-Kutta fourth order method to find $y(1.1)$ given that, 05

$$\frac{dy}{dx} = 3x + y^2, \quad Y(1) = 1.2, \quad h = 0.1$$

c. If $f(z) = u + iv$ is analytic then find $f(z)$ if $u + v = e^x(\cos y + \sin y)$ 05

Q.8 a. Using Lagrange's formula find $f(2)$ from the data 05

x	0	1	4	5
f(x)	4	3	24	39

b. Evaluate $\int_c \frac{e^{-z}}{(z+2)^3} dz$, where c is the circle $|z| = 3$, by Cauchy's integral formula 05

c. Show that $u = \log \sqrt{x^2 + y^2}$ is harmonic hence find harmonic conjugate 05

Q.9 a. Find the root of the equation $2(x - 3) = \log_{10} x$ by Newton Raphson method 05

b. Evaluate $\int_c \frac{dz}{\sinh z}$, where c is $|z| = 4$ by Cauchy's residue theorem 05

c. Find the bilinear transformation which maps the points $z=1, i, -1$ into the points $w=i, 0, -i$ 05

Q.10 a. Expand $f(z) = \frac{1}{z^2 - 4z + 3}$ by Laurent series for $1 < |z| < 3$ 05

b. Solve by using Gauss-Seidel method 05

$$\begin{aligned} 10x + 2y + z &= 9 \\ 2x + 20y - 2z &= -44 \\ -2x + 3y + 10z &= 22 \end{aligned}$$

c. Evaluate $\int_{(0,0)}^{(1,1)} (3x^2 + 4xy + ix^2) dz$ along $y=x$ 05

Total No. of Printed Pages:04

SUBJECT CODE NO:- H-112
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics –IV
(OLD)

[Time: Three Hours]

[Max.Marks:80]

N.B

Please check whether you have got the right question paper.

- i. Q.No.1 and 6 are compulsory.
- ii. Solve any two questions from remaining of each section.
- iii. Figures to the right indicate full marks.
- iv. Assume suitable data, if necessary.

SECTION-A

Q.1 Solve any five from the following 10

- a) Determine the analytic function whose real part is $2x(1 - y)$.
- b) Show that $u = r^n \cos n\theta$ is harmonic.
- c) Show that the image of the line $x = 0$ under the transformation $w = e^z$ is a circle.
- d) Evaluate $\int_0^{1+i} z^2 dz$ along the line $y = x$.
- e) Evaluate $\int_c \frac{e^z}{(z-1)^2} dz$ where $c : |z| = 2$.
- f) State Cauchy's residue theorem.
- g) Solve $\frac{\partial z}{\partial x} + 4z = \frac{\partial z}{\partial t}$, where $z(x, 0) = 4e^{-3x}$

OR

Find Z-transform of $f(k) = a^k$.

- h) Solve $\frac{\partial u}{\partial t} = 4 \frac{\partial^2 u}{\partial x^2}$

OR

Find Z-transform of $f(k) = \cos 2k$.Q.2 a) Determine analytic function $f(z) = u + iv$ whose imaginary part is $e^{-x}(x \sin y - y \cos y)$. 05

- b) Show that $w = \frac{i-z}{i+z}$ maps the real axis of z -plane into the circle $|w| = 1$ and the half plane $y > 0$ into the interior of the unit circle $|w| = 1$ in the w -plane. 05

- c) Solve $\frac{\partial u}{\partial t} = \beta^2 \frac{\partial^2 u}{\partial x^2}$ subject to the conditions 05
 - i. $u(0, t) = u(l, t) = 0$ for all t
 - ii. $u(x, 0) = x$ in $0 < x < l$
 - iii. $u(x, \infty)$ is finite.

OR

Find Z-transform of $3^k \sin(3k - 2)$.

- Q.3
- Show that $v = r^2 \sin 2\theta + r \sin \theta$ is harmonic. Find its harmonic conjugate and hence find corresponding analytic function. 05
 - Evaluate $\int_{1-i}^{2+i} (2x + iy + 1) dz$ along $x = t + 1; y = 2t^2 - 1$ 05
 - Solve $\frac{\partial^2 u}{\partial t^2} = C^2 \frac{\partial^2 u}{\partial x^2}$ subject to the conditions
 - $u(0, t) = u(l, t) = 0$ for all t .
 - $\frac{\partial u}{\partial t} = 0$ when $t = 0$
 - $u(x, 0) = a \sin \frac{\pi x}{l}$

OR

Find inverse z-transform of $\frac{z}{(z^2+7z+10)}$

- Q.4
- Expand $f(z) = \frac{1}{(z^2-3z+2)}$ for $1 < |z| < 2$ 05
 - Evaluate $\oint_c \frac{\cos z}{(z-\pi)^3} dz$ where c is $|z - 1| = 3$ 05
 - Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ Subject to the conditions
 - $u = 0$ when $y \rightarrow \infty$ for all x
 - $u = 0$ when $x = 0$ for all y
 - $u = 0$ when $x = 1$ for all y
 - $u = x(1 - x)$ when $y = 0$ for $0 < x < 1$

OR

Solve the difference equation by z-transform

$$u_{k+2} + 4u_{k+1} + 3u_k = 3^k \text{ with } u_0 = 0, u_1 = 1$$

- Q.5
- Find the bilinear transformation which maps the point $z = 1, i, -1$ into the points $w = i, 0, -i$. 05
 - Evaluate $\oint_c \frac{z \sec z}{(1-z)^2} dz$ where c is the circle $|z| = 2$ by residue theorem 05
 - Evaluate $\int_0^{2\pi} \frac{d\theta}{1-2a \sin \theta + a^2}, 0 < a < 1$. 05

SECTION B

Q.6 Solve any five from the following.

- a) Define Laplace Transform and find $L\{e^t\}$.
- b) Find Laplace Transform of $\sin^2 2t$.
- c) Find Laplace Transform of $f(t) = e^{t-2}, t > 2$
 $= 0, t < 2$

d) Find inverse Laplace transform of $\frac{2s+1}{s(s+1)}$

e) Find inverse Laplace transform of $\frac{e^{-\pi s}}{s^2+4}$

f) Find inverse Laplace transform of $\frac{s}{(s-3)^5}$

g) Find the Fourier sine transform of $\frac{1}{x}$

h) Find the Fourier sine transform of $f(x) = 1, |x| < a$
 $= 0, |x| > a$

Q.7

a) Find Laplace Transform of $e^{3t} \int_0^t t \cosh 3t dt$

b) Find inverse Laplace transform of $\log \left[\frac{s+3}{s+2} \right]$

c) Solve $\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}, -\infty < x < \infty$

Subject to the conditions

- i. u and $\frac{\partial u}{\partial x} \rightarrow 0$ as $x \rightarrow \pm\infty$
- ii. $u(x, 0) = \begin{cases} u_0 & |x| \leq a \\ 0 & |x| \geq a \end{cases}$

Q.8

a) Evaluate $\int_0^\infty e^{-3t} \sin^3 t dt$

b) Find inverse Laplace transform of $\frac{s}{(s^2+a^2)^2}$ by convolution theorem.

c) Solve the integral equation $\int_0^\infty f(x) \cos px dx = \begin{cases} 1-p; & 0 < p < 1 \\ 0; & p > 1 \end{cases}$

10

05

05

05

05

05

05

- Q.9
- a) Find the Laplace Transform of $f(t) = \begin{cases} 1 & ; 0 \leq t \leq 2 \\ -1 & ; 2 \leq t \leq 4 \end{cases}$ where $f(t+4) = f(t)$ 05
- b) Solve $\frac{dy}{dt} + 3y + 2 \int_0^t y dt = t, y(0) = 0$ by Laplace Transform. 05
- c) Find Fourier sine transform of $f(x) = e^{-x}$ and evaluate $\int_0^{\infty} \frac{x \sin kx}{1+x^2} dx$ 05
- Q.10
- a) Express the following function in term of Heaviside unit step function and hence find Laplace Transform $f(t) = \begin{cases} t^2 & ; 0 < t < 1 \\ 4t & ; t > 1 \end{cases}$ 05
- b) Solve by Laplace Transform $\frac{dx}{dt} - y = e^t; \frac{dy}{dt} + x = \sin t$, subject to $x(0) = 1; y(0) = 0$. 05
- c) Find Fourier sine Transform of $f(x) = \frac{e^{-ax}}{x}$ 05

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-207
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Microprocessor & Computer Organization
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N.B

- 1) Q.1 & 6 are compulsory.
- 2) Solve any two questions from remaining in each section.
- 3) Assume suitable data if necessary.

Section A

- Q.1 Solve any five:- 10
- 1) What physical address is represented by 4270:12 ACH?
 - 2) Explain the use of \overline{DEN} in 8086?
 - 3) What is NMI?
 - 4) What is flash memory?
 - 5) What is Macro and Macro expansion?
 - 6) What is Instruction pointer?
 - 7) What is use of direction flag?
- Q.2 a) For the following instruction identify addressing mode and calculate source & destination 20 bit physical address. 12
- i) JMP FAR PTR [BX]
 - ii) MOVSB
 - iii) MOV CX, [BX+DI]
 - iv) PUSH BX
- [CS] = 0100 H [DS] = 0300 H [ES] = 0500 H
 [SS] = 0700 H [SI] = 019F H [DI] = 0513 FH
 [BX] = 032C FH Direction Flag = 0
 [SP] = 01001 H
- b) Enlist the features of 8086 microprocessor? 03
- Q.3 a) Explain the 8086 min mode configuration with neat diagram? 08
- b) Compare and contrast 8086 with 8088 microprocessor? 07
- Q.4 a) Explain read and write cycles of 8086 with neat diagrams. 07
- b) Explain 8086 pin diagram in detail? 08

- Q.5
- a) Write a program for file read and write operation? 05
 - b) For Int 10 h explain IVT and ISR in detail? How 20 bit physical address is calculated? 05
 - c) Compare .EXE with .COM file. 05

Section B

- Q.6 Solve any five 10
- i) What is computer organization?
 - ii) What is USB bus?
 - iii) Enlist two function of ALU?
 - iv) What is PROM?
 - v) Write & explain basic performance equation?
 - vi) What is role of program counter?
 - vii) What is volatile memory?
- Q.7
- a) Describe in detail classification of computers? 08
 - b) Compare and contrast CISC with RISC? 07
- Q.8
- a) Explain basic CPU organization with neat diagram. 07
 - b) What is role of control unit? Explain the hardwired control unit in detail? 08
- Q.9
- a) Explain the organization of memory unit in detail? 08
 - b) What is I/O interface? How to access I/O devices using programmed I/O? 07
- Q.10 Write short note (Any three) 15
- i) Semiconductor memory
 - ii) Serial & parallel port
 - iii) Data path in CPU
 - iv) Functional components of computers
 - v) Performance of computer
 - vi) Instruction cycle.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-172
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Object Oriented Programming
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Q.No.1 and Q.No.6 are compulsory.
 2. Solve any two from each section.

Section A

- Q.1 Solve any five: 10
- a) What are different types of constructor?
 - b) How static variables differ from normal variable?
 - c) Define recursive function.
 - d) What are the user defined data types?
 - e) Write the rules to overload the operators.
 - f) Define type casting in C++.
 - g) What is use of inline function?
- Q.2
- a) What is object oriented programming? How is it different from the procedural oriented programming? 07
 - b) What is a reference variable? Write a function using reference variable as argument to swap the values of pair of integers. 08
- Q.3
- a) Describe the mechanism of accessing data members and member functions in the following cases. 08
 - i) Inside the main program.
 - ii) Inside the member function of same class.
 - iii) Inside member function of another class.
 - b) Explain the concept 'object' as a function argument with example. 07
- Q.4
- a) Write a program in C++ to overload binary plus operator for complex number addition. 08
 - b) Define destructor. With suitable example explain importance of destructor. 07
- Q.5 Write short notes on (any three) 15
- a) Preprocessor directives
 - b) Array of objects
 - c) Constructor overloading
 - d) Friend function

Section B

- Q.6 Solve any five 10
- What is container?
 - What is difference between private and protected class members?
 - List the operations on files.
 - List the advantages of using template in C++.
 - Define exceptions in C++.
 - What do you mean by function prototype?
 - Define pointers in C++.
- Q.7 05
- What is polymorphism? Differentiate between compile time & runtime polymorphism with example. 10
 - Write an object oriented program in C++ to store the following details:
Base class patient: Pat name, age, sex
Base class IPD: ward no, bed no, charge per day
Derive a class IPD- Patient from these base classes with no. of days admitted attribute.
Write necessary member function for
 - Input n record
 - Display all records
 - Search a patient by patient name
 Also write a main function to test above function
- Q.8 08
- Write a program to read the text file and copy it to output file character by character. 07
 - Explain the term 'Stream Class Hierarchy' 08
- Q.9 07
- Write a program using template concept to implement queue. 15
 - Write a program to illustrate the concept of exception handling.
- Q.10 Write short notes on any three
- Virtual function
 - Function template
 - File modes
 - Manipulators

Total No. of Printed Pages:04

SUBJECT CODE NO: H-301
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics - III
(OLD)

[Time: Three Hours]

[Max.Marks:80]

N.B

Please check whether you have got the right question paper.

- i) Questions number 1 and 6 are compulsory.
- ii) Attempt any two questions from the remaining each section.
- iii) Figures to the right indicate full marks.
- iv) Assume suitable data if necessary.

SECTION – A

Q.1 Solve any five from the following:

10

- a) Solve $(D^2 - 6D + 25)y = 0$
- b) Solve $(D^2 - 4D + 5)y = 0$
- c) Find the particular integral of $(D^2 - 4)y = x^2$
- d) Solve $(x^2D^2 + xD - 1)y = 0$
- e) If 2lb weight is pulled 6 inches below its equilibrium position and then released. Assuming a spring constant $k = 16lb/ft$, damping force $2 \frac{dx}{dt}$ Set- up the equation of motion.
- f) A circuit consists of an inductance of 0.05 henry, a resistance of 5 ohms and a Condenser of capacitance 4×10^{-4} farad, with constant EMF of 110 volts. Set-up the differential equation.
- g) In a certain manufacturing process 5% of the tools produced turn out to be defective. Find the probability that in a sample of 40 tools, at most 2 will be defective.
- h) The marks of 1000 students in a university are found to be normally distributed with mean 70 and standard deviation 5. Find the number of students whose marks will be less than 68.

- Q.2 a) Solve $(D^2 - 6D + 13)y = 8e^{3x} \sin 4x$ 05
- b) If a weight 6lb hangs from a spring with constant $k = 12$ and no damping force exists. Find the motion of weight when an external force $3\cos 18t$ acts. Initially $x = 0, \frac{dx}{dt} = 0$ at $t = 0$. Determine whether the resonance occurs. 05
- c) Calculate the mean deviation from mean of the following data: 05

x	0-6	6-12	12-18	18-24	24-30
f	8	10	12	9	5

- Q.3 a) Solve $(D^3 - 2D + 4)y = 3x^2 - 5x + 2$ 05
- b) A one henry inductance, a 4 microfarad capacitor and EMF of $180 \cos 40t$ are connected in series. Find the charge Q and the current i , if $i = Q = 0$ at $t = 0$. 05
- c) Suppose that life of a gas cylinder is normally distributed with mean of 40 days and a standard deviation of 5 days. If at a time 10,000 cylinders are issued to customer's, how many will need replacement after 35 days? 05

- Q.4 a) Solve $(D^2 + 5D + 6)y = e^{e^x}$ by using general method. 05
- b) A long column of length l fixed at one end is completely free at other. If the load P is axially applied at the free end. Its deflection is given by 05

$$EI \frac{d^2y}{dx^2} = P(a - y)$$

Where the origin is taken at the fixed end and 'a' is the lateral displacement of the free end. Show that the deflection curve is given by

$$y = a \left[1 - \cos \left(\sqrt{\frac{P}{EI}} x \right) \right]$$

- c) Compute mean, variance, β_1 and β_2 if the first four moments about a value 5 of a variable are given as 2, 20, 38 and 52. 05
- Q.5 a) Solve $(D^2 + 4)y = \frac{1}{1 + \cos 2x}$ by using method of variation of parameter. 05
- b) Solve $(x - 1)^3 \frac{d^3y}{dx^3} + 2(x - 1)^2 \frac{d^2y}{dx^2} - 4(x - 1) \frac{dy}{dx} + y = 4 \log(x - 1)$ 05

- c) Fit a straight line to the following data:

05

x	1	2	3	4
y	3	7	13	21

SECTION – B

Q.6 Solve any five from the following:

10

- a) If $\vec{F} = x \cos z i + y \log x j - z^2 k$ find $\text{curl } \vec{F}$
- b) Find the unit vector normal to the surface $xy^3z^2 = 4$ at the point $(-1, -1, 2)$
- c) Find the constant 'a' if $\vec{F} = (x + 3y^2)i + (2y + 2z^2)j + (x^2 + az)k$ is solenoidal.
- d) Evaluate $\int_C \vec{F} \cdot d\vec{r}$, where $\vec{F} = \cos y i - x \sin y j$ and C is the curve $y = \sqrt{1 - x^2}$ in xy-plane from $(1,0)$ to $(0,1)$
- e) State Stoke's theorem.
- f) Find the first approximate root of the equation $xe^x - \cos x = 0$ using Newton Raphson method.
- g) Find the first approximate solution of the equation

$$8x - 3y + 2z = 20,$$

$$4x + 11y - z = 33,$$

$$2x + y + 4z = 12$$
 by Gauss Seidal method.
- h) Find the missing term in the following:

x	0	1	3	4
f(x)	5	6	--	105

Q.7

- a) Find the directional derivative of $\frac{1}{r}$ in the direction of \vec{r} , where $\vec{r} = xi + yj + zk$ 05
- b) Find the work done in moving a particle in the force field $\vec{F} = 3x^2i + (2xz - y)j + zk$ along the straight line joining the points $(0,0,0)$ and $(2,1,3)$ 05
- c) Find the real root of the equation $x + \log x = 2$ by Newton – Raphson method correct to three decimal places. 05

- Q.8
- Prove that $\nabla^4 e^r = \left(1 + \frac{4}{r}\right) e^r$ 05
 - Evaluate Green's theorem for $\int_C (3x + 4y)dx + (2x - 3y)dy$ with $C: x^2 + y^2 = 4$ 05
 - Given $\frac{dy}{dx} = x^2 - y, y(0) = 1$, find $y(0.1)$ and $y(0.2)$ using Runge – Kutta fourth order method. 05
- Q.9
- Prove that the vector field $\vec{F} = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational. Find the scalar potential ϕ such that $\vec{F} = \nabla\phi$. 05
 - Evaluate $\iint_S \vec{F} \cdot \vec{ds}$ using Gauss divergence theorem, where $\vec{F} = 2xyi + yz^2j + zxk$ and S is surface of the region bounded by $x = 0, y = 0, z = 0, y = 3, x + 2z = 6$. 05
 - Solve the equations $83x + 11y - 4z = 95, 7x + 52y + 13z = 104, 3x + 8y + 29z = 71$ by Gauss Seidal method. 05
- Q.10
- Verify Stoke's theorem for $\vec{F} = 4xzi - y^2j + yzk$ over the area in the plane $z = 0$, bounded by $x = 0, y = 0, x^2 + y^2 = 1$ 05

- From the following table, Obtain the first and second derivative at the point $x = 0.96$ 05

x	0.96	0.98	1.00	1.02	1.04
y	0.7825	0.7739	0.7651	0.7563	0.7473

- Taking $h = 0.05$, determine the value of y at $x = 0.1$ by Euler's modified method, given that $\frac{dy}{dx} = x^2 + y, y(0) = 1$ 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-279
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Computer Graphics
(Revised)

[Time: Three Hours]

[Max.Marks:100]

Please check whether you have got the right question paper.

- N.B
- i. Q.No.1 from section A and Q.No.6 from section B are compulsory.
 - ii. Attempt any two questions from the remaining questions in each section.
 - iii. Assume suitable data, if necessary.
 - iv. Figures to the right indicate full marks.

Section A

- Q.1 Attempt any five: 10
- 1) List the operating characteristics of raster refresh display technology.
 - 2) What is meant by "OpenGL display callback function".
 - 3) What is aspect ratio?
 - 4) Distinguish between convex and concave polygons.
 - 5) What is pixel?
 - 6) Explain OpenGL line function.
 - 7) Enlist different image formats used in computer graphics.
 - 8) What do you mean by logical input devices?
- Q.2
- a) Write boundary fill procedure to fill 8-connected region. 08
 - b) Write OpenGL program to draw polygon (square) of unit length centered at the origin. 07
- Q.3
- a) What do you mean by display lists? Give suitable example. 08
 - b) Write an OpenGL program to draw small triangle whenever left mouse button is clicked. 07
- Q.4
- a) Digitize the line with endpoints (20, 10) and (30, 18) using Bresenham line algorithm. 08
 - b) Explain techniques for producing color display with CRT? 07
- Q.5 Write shorts notes on (any three) 15
- 1) Light pen & joy stick
 - 2) Display processor
 - 3) Difference between DDA & Bresenham's line algorithms.
 - 4) RGB color model
 - 5) Polygon filling.

Section B

- Q.6 Attempt any five 10
- 1) Differentiate uniform and differential scaling.
 - 2) Give the equation for window to viewport transformation.
 - 3) What is need of homogenous co-ordinates?
 - 4) Define composite transformation.
 - 5) Define rendering.
 - 6) What is axonometric projection?
 - 7) What is center of projection & projected reference point?
 - 8) What is point clipping?
- Q.7 a) Explain Z-buffer algorithm for hidden surface removal. 08
 b) Magnify the triangle with vertices A(0,0) B(1,1) & C(5,2) to twice its size while keeping (5,2) fixed. 07
- Q.8 a) A window is defined by coordinates (0, 30) (0, 30) respectively and line with endpoints $P_1(-10,15)$ & $P_2(15,-10)$. Clip a line by using midpoint subdivision algorithm. 08
 b) Define window and viewport .also derive window to viewport transformation. 07
- Q.9 a) Explain back face detection method. 08
 b) Compare and contrast between different clipping algorithms. 07
- Q.10 write short note on (any three) 15
- 1) Aliasing
 - 2) Difference between perspective & parallel projection
 - 3) OpenGL transformation matrices
 - 4) Text clipping
 - 5) Computer imaging.

Total No. of Printed Pages:2

SUBJECT CODE NO: H-280
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Object Oriented Programming Using C++
(Old)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
 - ii) Solve any two questions from each section from remaining.
 - iii) Assume suitable data, if necessary.

Section A

Q.1 Solve any five.

10

- a) Define reference variable.
- b) What did you mean by cascading?
- c) Define object.
- d) What are the operators available in C++?
- e) What is data hiding?
- f) What is inline function?
- g) What is the output of following code?

```
int a, r = 0; no = 123;
while(no > 0)
{
    a = no % 10;
    r = r * 10 + a;
    no = no / 10;
}
```

cout << r;

- h) Find the error in following code

```
cout << "Enter the no"
cin >> s1;
for(i=0; s1[i] != '\0'; ++i)
{
    S2[i] = s1[i];
}
```

Q.2 a) Write a program to compare the two string.

07

- b) Explain function overloading. Write a program to demonstrate function overloading.

08

Q.3 a) Explain friend function. Write a program to add two complex numbers using friend function.

08

- b) What is operator overloading? Write a program for + operator overloading.

07

Q.4 a) What is Inheritance? Write program for multiple inheritances.

08

- b) Explain visibility modes in inheritance.

07

- Q.5 Solve the following 15
- a) What are features of C++?
 - b) Write a program for static data member and member function.
 - c) Write a program for creating object and defining data member and member function.

Section B

- Q.6 Solve any five. 10
- a) Define template.
 - b) Explain protected class member.
 - c) What is function prototype?
 - d) What is super?
 - e) What did you mean by catch()?
 - f) What is pure abstract class?
 - g) What is an I/O stream?
 - h) Write a code to open a file.
- Q.7 08
- a) Write a program to demonstrate multiple catch statement.
 - b) Explain the I/O manipulators with example. 07
- Q.8 08
- a) Explain the concept of pure virtual function with example.
 - b) Explain granting access with the help of program. 07
- Q.9 08
- a) Explain how to achieve runtime polymorphism using virtual function.
 - b) Explain the function seekg, seekp, tellg, tellp. 07
- Q.10 Solve the following 15
- a) Explain Multilevel inheritance.
 - b) Explain Constructor and its type.
 - c) Explain protected member in details.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-397
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Unix & Shell Programming
(OLD)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
1. Q.no.1 and Q. no. 6 are compulsory.
 2. Attempt any two questions from Q.2 to Q.5 and from Q.7 to Q.10 of each section.
 3. Figure to the right indicate full marks.

Section A

- | | | |
|-----|--|----|
| Q.1 | Describe any five of following | 10 |
| | <ul style="list-style-type: none"> i) bc ii) Passwd and pwd iii) Fork and wait iv) echo and read v) Pipe and tee vi) cp and mv vii) ls viii) Chmod | |
| Q.2 | a) Explain ps command with its options and give suitable example for it. | 08 |
| | b) Discuss relative and absolute methods for changing file permissions. | 07 |
| Q.3 | a) Explain job control facility for process in detail. | 08 |
| | b) Describe the features of unix operating system. | 07 |
| Q.4 | a) Differentiate between soft link and hard link. | 08 |
| | b) How process is created in Unix? Mention briefly the role of the fork-exec mechanism in process creation. | 07 |
| Q.5 | a) With neat labeled diagram, explain unix architecture. | 08 |
| | b) With suitable diagram, explain working of vi-editor in different modes. | 07 |

Section B

- Q.6 Describe any five of following 10
- i) pr
 - ii) uniq
 - iii) tr command
 - iv) Join function in perl
 - v) Head
 - vi) tail
 - vii) Built in variables in awk
 - viii) expr
- Q.7 a) Write shell script to find an array element using binary search. 08
- b) Explain sed command with its example and options. 07
- Q.8 a) What is awk? With an example, explain begin and end sections awk. 08
- b) Explain splice and split functions in perl with an example. 07
- Q.9 a) Explain various system administrative commands in unix. 08
- b) With an example, explain following string function in awk. 07
- i) Index
 - ii) Length
 - iii) Split
 - iv) Substr
- Q.10 a) Explain grep command with BRE and ERE. 08
- b) Write perl script to convert decimal number to binary. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-138
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Microprocessors
[OLD]

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
1. Questions number 1 and 6 are compulsory.
 2. Attempt any two questions from remaining questions in each section.

Section A

- | | | |
|-----|---|---------------------|
| Q.1 | Attempt any five of the following | 10 |
| | <ol style="list-style-type: none"> 1) Explain overflow and direction flag of 8086. 2) What is function of IP? 3) Explain function of SI and DI registers. 4) Explain SBB and SUP instruction with example. 5) What is difference between logical and physical address. 6) Comment on hardware interrupt? 7) Draw diagram of 8086 flag register. 8) Explain machine control instruction of 8086. | |
| Q.2 | <ol style="list-style-type: none"> a) Draw and explain internal block diagram of 8086 microprocessor. b) Explain logical instructions of 8086 microprocessor. | <p>08</p> <p>07</p> |
| Q.3 | <ol style="list-style-type: none"> a) Explain rotate and shift instruction with example. b) Write ALP to find smallest between 10 numbers. | <p>08</p> <p>07</p> |
| Q.4 | <ol style="list-style-type: none"> a) Write ALP to find out whether entered number is even or odd. b) What is stack memory? Explain working of stack memory with help of PUSH and POP instruction. | <p>08</p> <p>07</p> |
| Q.5 | <ol style="list-style-type: none"> a) Enlist addressing modes of 8086 and explain any two with example. b) Explain following instructions with example. <ol style="list-style-type: none"> 1) JC 2) JNC 3) JZ 4) JNZ | <p>08</p> <p>07</p> |

Section – B

- Q.6 Attempt any five of the following. 10
- 1) What maskable and non- maskable interrupt?
 - 2) Explain INTO and INTN instruction.
 - 3) What is hand shaking?
 - 4) What is function of HOLD and HLDA pin of 8086 microprocessor.
 - 5) Draw machine cycle diagram for memory read operation in 8086 microprocessor.
 - 6) How clock is generated and provided to 8086 microprocessor.
 - 7) Write minimum mode signals of 8086 microprocessor.
 - 8) Differentiate memory mapped I/O and I/O mapped I/O.
- Q.7 a) Draw and explain block diagram of 8255 PPI. 08
 b) Explain maximum mode operation of 8086 with suitable diagram. 07
- Q.8 a) Draw and explain interfacing of 8086 and 8284 A clock generator. 08
 b) Explain software and hardware interrupts of 8086 microprocessor. 07
- Q.9 a) Explain following interrupt instructions. 08
 1) INTO 2) INT3 3) IRET 4) RET
 b) Draw pin diagram of 8086 microprocessor and explain following pins- 07
 1) NMI 2) ALE 3) MN/MX 4) QSO,QSI
- Q.10 a) Draw and explain pin diagram of 8284A clock generator. 08
 b) Explain DMA operation in detail. 07

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-302
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (All)
Engineering Mathematics – III
(Revised)

[Time: ThreeHours]

[Max.Marks: 80]

- N.B Please check whether you have got the right question paper.
- 1) Q. No. 1 and Q. No. 6 are compulsory.
 - 2) Solve any two questions from remaining questions of each section.
 - 3) Figures to the right indicate full marks.
 - 4) Assume suitable data, if necessary.

Section – A

- Q.1 Solve any five from the following. 10
- a) Solve $(D^2 - 13D + 36)y = 0$
 - b) Solve $(D^3 - 7D - 6)y = 0$
 - c) Find particular integral (P.I.) of $(D^3 + 1)y = 2^x$
 - d) Find Particular integral (P.I.) of $(D^2 + 4)y = \sin 3x$
 - e) Write Kirchoff's voltage law to electrical ckt.
 - f) Set – up the equation of motion of a body of weight 10kg attached to a spring given that 20 kg weight will stretch the spring to 10cm.
 - g) Find the Fourier cosine transform of $f(x) = e^{-2x}$
 - h) Find the Fourier transform of $f(x) = 1; \quad 0 < x < a$
 $= 0 \quad \text{otherwise}$
- Q.2 05
- a) Solve $(D^2 + 6D + 10)y = 50x$
 - b) An emf of 200v is in series with a 10 ohm resistance, a 1 henry inductor and 0.02 farad capacitor. At t=0 the charge Q and current I are zero. Find Q & I at any time t. 05
 - c) Solve $(D^2 + 9)y = x \cos x$. 05
- Q.3 05
- a) Solve $(D^2 - 1)y = xe^x \sin x$ 05
 - b) A body executive damped forced vibrations given by the equation 05

$$\frac{d^2x}{dt^2} + 2k \frac{dx}{dt} + b^2x = e^{-kt} \sin wt$$
Solve the equation for both the cases when $w^2 \neq b^2 - k^2$ and $w^2 = b^2 - k^2$.
 - c) Find $f(x)$ if $Fs(\lambda) = \frac{e^{-a\lambda}}{\lambda}$ 05

- Q.4
- a) $(x + 1)^2 \frac{d^2y}{dx^2} + (x + 1) \frac{dy}{dx} + y = 2 \sin \log(x + 1)$ 05
- b) The differential equation satisfied by beam uniformly loaded with one end fixed & second end subjected to a compressive force is given by $EI \frac{d^2y}{dx^2} = py - \frac{1}{2}wx^2$ show that the elastic curve for the beam With condition $y = 0, \frac{dy}{dx} = 0$ at $x = 0$ given by $y = \frac{w}{pn^2} (1 - \cos nx) + \frac{wx^2}{2p}$, where $n^2 = \frac{p}{EI}$ 05

- c) Express $f(x) = 1, 0 \leq x \leq \pi$ as a Fourier sine integral and hence evaluate $\int_0^\infty \frac{(1 - \cos \pi \lambda) \sin \lambda x}{\lambda} d\lambda, x > \pi$ 05

- Q.5
- a) Solve by using the method of variation of parameters. $(D^2 + 4)y = \sec 2x$ 05
- b) Solve the integral equation $\int_0^\infty f(x) \cos \lambda x dx = e^{-\lambda}$ 05
- c) Solve $x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} - 4y = x + 2 \log x$ 05

Section – B

- Q.6 Solve any five from the following. 10

- a) Find the mean of the following data

Class	0-10	10-20	20-30	30-40	40-50
Frequency	14	17	22	26	23

- b) $\nabla \cdot \vec{r} \text{ if } \vec{r} = xi + yj + zk$
- c) State Green's Theorem.
- d) Find $\nabla \phi$ at $(1,1,1)$ if $\phi = x^2 + y^2 + z^2$.
- e) Find the area under the normal curve between $z = 0$ to $z = 2$.
- f) Find the Karl Pearson's coefficient of skewness if mean =3, mode = 5.2 and Standard Deviation = 2.5
- g) Show that $\vec{A} = 3y^4z^2i + 4x^3z^2j - 3x^2y^2k$ is solenoidal.
- h) The probability of certain college students will pass is 0.8 Determine the probability that out of 10 students exactly 6 will pass.

Q.7 a) Evaluate $\int_C [(x^2 + 2y)dx + (4x + y^2)dy]$ by Green's theorem, where c is the boundary of the region bounded by $y = 0$, $y = 2x$ and $x + y = 3$. 05

b) Show that $\vec{F} = (y^2 - z^2 + 3yz - 2x)i + (3xz + 2xy)j + (3xy - 2xz + 2z)k$ is both solenoidal and irrotational. 05

c) Find the Karl Pearson's coefficient of skewness for the following data. 05

Marks	0-5	5-10	10-15	15-20	20-25	25-30
No. of Students	4	6	8	12	7	2

Q.8 a) Find the directional derivative of $\phi = xy^2 + yz^2$ at the point $(2, -1, 1)$ in the direction of the vector $i + 2j + 2k$. 05

b) Determine the equation for the regression line of the force on time for the following data 05

Force	11.4	18.7	11.7	12.3	14.7	18.8	19.6
Time	0.56	0.35	0.55	0.52	0.43	0.34	0.31

c) Evaluate by Stokes theorem $\iint_S \nabla \times \vec{F} \cdot \hat{n} ds$ for the vector field $\vec{F} = 4yi - 4xj + 3k$, where S is a disk of radius one lying on the plane $z = 1$. 05

Q.9 a) The mean I.Q. of large number of children of age 14 is 100 with standard deviation 16. Assuming the distribution of I.Q. is normal, find the percentage of children having I.Q. between 70 to 120. 05

b) Evaluate $div(\vec{r} \times \vec{a})$, where \vec{a} is a constant vector and $\vec{r} = xi + yj + zk$. 05

c) Find the work done in moving a particle in the force field given by $\vec{F} = yi + zj + xk$ along the parabola $y^2 = x$ from the origin to the point $4i + 2j$. 05

Q.10 a) Find the standard deviation of the following data 05

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	10	15	25	25	10	10	5

b) Express $\iiint (y^2z^2i + z^2x^2j + z^2y^2k) \vec{ds}$ as a volume integral. Evaluate it by Gauss divergence theorem over the upper part of the sphere $x^2 + y^2 + z^2 = 1$ above the XY plane. 05

c) Show that vector field \vec{A} is irrotational. Find scalar potential function ϕ such that $\vec{A} = \nabla\phi$ if $\vec{A} = y^2i + 2xyj - z^2k$. 05

Total No. of Printed Pages: 2

SUBJECT CODE NO:- H-329
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Computer networks
(Revised)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Q.no.1 & Q.no.6 are compulsory.
 2. Attempt any 2 questions from Q.no.2 to Q.no.5 & any two questions from Q.no.7 to Q.no.10

Section - A

- Q. 1 Attempt the following(any 5) 10
- a) For n devices in a network what is the number of cable links required for a mesh, ring , bus & star topology?
 - b) What are the concerns of the physical layer in the Internet model?
 - c) Name three types of transmission impairment
 - d) How is a hub different from a switch?
 - e) Define block coding & give its purpose.
 - f) State different framing techniques used in data link layer.
 - g) Which are the different types of transmission media used in computer networks?
- Q. 2 08
- a) Explain various connecting devices used in computer networks.
- 07
- b) Explain with neat diagram TCP/IP protocol suite.
- Q. 3 07
- a) Consider the data word
011101 101011 110111 010111
Calculate checksum at sending and receiving end. 07
 - b) What is Hamming distance calculate hamming distance for each of the following code words? 08
 - I) d (11011, 01011)
 - II) d(001, 101)
 - III) d(10101, 1000)
- Q. 4 08
- a) What is multiplexing? With neat diagram explain Frequency Division multiplexing (FDM).
- 07
- b) Write short note on CSMA protocol.
- Q. 5 07
- a) Explain major functions performed by data link layer.
- 08
- b) Define computer networks. Explain various network types with suitable diagram.

Section – B

- Q. 6 Answer the following (any 5) 10
- a) State the principle of optimality with regards to routing.
 - b) State different classes of IPv4 addresses with their ranges.
 - c) What is UDP?
 - d) What is remote logging?
 - e) What is socket address?
 - f) What is MIB?
 - g) What is DDNS?
- Q.7 08
- a) With suitable example explain IPv4 protocol header.
 - b) Explain distance vector routing in detail. 07
- Q.8 08
- a) Explain three-way handshaking protocol for connection termination in TCP.
 - b) Explain how congestion is handled by TCP? 07
- Q.9 08
- a) What is namespace? Differentiate between hierarchical namespace & flat name space.
 - b) With neat diagram explain file transfer protocol. 07
- Q.10 08
- a) What is user agent? Explain role of user agent in E-mail.
 - b) Explain how congestion is control in datagram network 07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-173
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Computer Graphics
[OLD]

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Q.1 from section A and Q.6 from section B are compulsory.
 - ii. From the remaining solve any two questions form each section.

Section A

- | | | |
|-----|---|---------------------|
| Q.1 | Solve any five questions. | 10 |
| | <ol style="list-style-type: none"> a) Define following Terms: <ol style="list-style-type: none"> i) Refresh Rate ii) Persistence b) What is Emissive and Nonemissive Display? c) Explain Translation and translation vector. d) Give the 2D transformation matrix for rotation about origin in <ol style="list-style-type: none"> i. clockwise Direction ii. Anticlockwise Direction e) What is pen plotter model? f) Enlist different image formats used in computer graphics. g) List out with proper syntax callback functions in OpenGL. h) What are the advantages and disadvantages of beam penetration method? | |
| Q.2 | <ol style="list-style-type: none"> a) Explain the three primary colors used in graphics and explain how other colors are achieved? b) How can you draw lines in OpenGL? Explain with suitable code. | <p>07</p> <p>08</p> |
| Q.3 | <ol style="list-style-type: none"> a) What are the major components of a graphics pipeline and how do they interact? b) Consider a polygon with coordinates A(2,5), B(7,10) and C(10,2) <ol style="list-style-type: none"> 1) Translate the polygon by 5 units in X direction and 6 units in Y direction. 2) Scale the polygon by 3 units in X and Y direction. | <p>07</p> <p>08</p> |
| Q.4 | <ol style="list-style-type: none"> a) Explain any 2 physical imaging systems in detail. b) Describe in brief menus in OpenGL. | <p>07</p> <p>08</p> |
| Q.5 | Write short notes on <ol style="list-style-type: none"> 1. Sierpinski Gasket 2. Control functions in OpenGL. 3. Clients and Servers | 15 |

Section B

- Q.6 Solve any five questions 10
- a) What is shading?
 - b) What do you mean by ambient reflection?
 - c) Define following terms:
 - i. Aspect Ratio
 - ii. Resolution.
 - d) What are the advantages and disadvantages of DDA algorithm?
 - e) Explain the concept of frame buffer.
 - f) What is view volume?
 - g) List out different types of projection.
 - h) What is aliasing and antialiasing?
- Q.7 07
- a) Explain concatenation of transformations with suitable example.
 - b) Explain rotation about fixed point and about arbitrary point. 08
- Q.8 07
- a) What are different hidden surface removal techniques? Explain any one in detail.
 - b) Find transformation of a triangle ABC with coordinates A(10, 30), B(30, 30) and C(20, 50) by: 08
 - a. Rotate about origin with angle $\theta = 45^\circ$
 - b. Translate 3 unit in left direction and 5 unit in up direction.
 - c. Scale with $S_x = S_y = 0.5$
 - d. Draw the original and transformed figure.
- Q.9 07
- a) Consider a line from (0,0) to (-8, 4). Use the simple DDA to rasterize this line.
 - b) What is line clipping? Explain Cohen – Sutherland line clipping algorithm. 08
- Q.10 07
- a) What is specular reflection? Explain the Phong model.
 - b) With suitable example explain light sources and materials. 08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-398
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Linux Operating System
(Revised)

[Time: Three Hours]

[Max.Marks: 80]

- N.B Please check whether you have got the right question paper.
- 1) Q.1 from section A and Q.6 from section B are compulsory.
 - 2) From the remaining solve any two questions from each section.

SECTION – A

- Q.1 Solve any five questions. 10
- a) Enlist the types of shell in linux?
 - b) What is the process id of init process?
 - a. 2 b. 6 c. 4 d. 1
 - c) Differentiate between who and who am i?
 - d) What is the purpose of Runlevel 3 in linux OS?
 - e) How would you change the owner user's permission on ordinary file?
 - f) Which command will be used with vi editor to append text at end of line?
 - A. A
 - B. a
 - C. i
 - D. l
- Q.2 07
- a) explain file system structure of linux
 - b) explain architecture of Linux Operating System 08
- Q.3 07
- a) explain Linux file permissions
 - b) explain the following commands 08
 1. Ls
 2. Mkdir
 3. rm
 4. cat
- Q.4 07
- a) Write a short note on shells and types of shell.
 - b) Explain various Flavours of Linux OS. 08
- Q.5 07
- a) Write a short note on regular expressions with grep, sed & awk.
 - b) Explain following filter commands-1 .head 2. Tail 3. Grep 4.cut 08

SECTION – B

- Q.6 Solve any five questions 10
- a) Define shell script.
 - b) How to enable and disable lan card.
 - c) Where is the configuration information for network interface eth0 stored?
 - d) In the following shell script, how many times will the date command run? For i in a b; do date; done
 A. 0
 B. 1
 C. 2
 D. Syntax error
 - e) Process information in the current shell can be obtained by using
 A. kill
 B. bg
 C. fg
 D. Ps
 - f) Mary has recently gotten married and wants to change her username from mstone to mknight. Which of the following commands should you run to accomplish this?
 A. Usermod -l mknight mstone
 B. Usermod -l mstone mknight
 C. Usermod -u mknight mstone
 D. Usermod -u mstone mknight
- Q.7 a) Explain installation & Configuration of FTP server. 07
 b) Explain steps to share and access network storage through SMB. 08
- Q.8 a) Explain the systems memory management function in Linux. 07
 b) Explain various Backup and restoring commands. 08
- Q.9 a) Write a shell script to reverse number using while loop. 07
 b) Write a short note on Linux firewall. 08
- Q.10 a) Explain Arrays, string Manipulation and Functions in shell script. 07
 b) How to recover the super user password and the boot loader (GRUB). 08

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-208
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Discrete Mathematics
[OLD]

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Question 1 from section A and Question 6 from section B are compulsory.
 - 2) Solve any two questions from each section from remaining questions.
 - 3) Assume suitable data, if necessary.

Section A

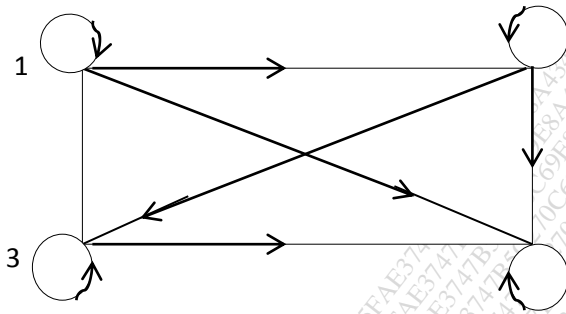
- Q.1 Solve any Five 10
- a) What is logical Equivalence?
 - b) What is modus ponens?
 - c) Explain Distributive laws of sets?
 - d) Explain power set with example?
 - e) Explain converse and contrapositive of a proposition with example?
 - f) Define probability?
 - g) Explain universal quantifier?
 - h) What is conditional proposition?
- Q.2 08
- a) From a pack of 52 cards, two cards are drawn together at random; find probability of 07 both cards being kings?
 - b) State w is a valid conclusion from premise $\sim t \rightarrow \sim r; \sim s; t \rightarrow w; r \vee s?$
- Q.3 08
- a) Prove Demorgans Law of set theory with the help of Venn diagram?
 - b) Construct the truth table for the following statement to determine tautology or contradiction. 07
- $\sim (p \vee \sim q) \rightarrow \sim p$
- Q.4 07
- a) Show that for all $n \in \mathbb{Z}^+$; 07
 $1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$ using mathematical Induction.
 - b) Simplify the following using algebra of sets 08
- $\overline{(A \cup B) \cap C} \cup \overline{B}$
- Q.5 08
- a) $A = \{1, 2, 3, 4, 5\}$ $B = \{3, 4, 5, 6, 7\}$ and $C = \{7, 8, 9\}$. Determine the following. 08
- 1) $A \Delta C$ 2) $A - C$ 3) $\overline{A \cap B}$ 4) $B - A$
- b) Write the negation of each of the following statements. 07
- i) If she works, she will earn money
 - ii) If Raju is a poet, then he is poor.
 - iii) He swims if and only if the water is warm.

Section B

- Q.6 Attempt any five:- 10
- Find the Hamming weight of the given words:
1) 1010101 2) 1110011
 - What are homomorphism and isomorphism of group.
 - Define Integral Domain and Field.
 - Explain Ring and its properties.
 - Explain one-to-one function.
 - Define Relation with example.
 - Explain transitive relation with example
 - Define cyclic group
- Q.7
- Explain pigeonhole principle and show that if any 20 people are selected then we may choose a subset of 3 so that all 3 were born on the same day of the week. 07
 - Let $A = \{1, 2\}$ and $B = \{a, b\}$, find all functions $f: A \rightarrow B$ and for each such functions determine whether it is one-to one, onto, both or neither. 08
- Q.8
- Explain elements of coding theory in detail. 07
 - $f(n) = n^3$, $g(n) = n + 2$, and $h(n) = n - 2$ 08
Find 1) goh 2) hof 3) $hogof$ 4) hog
- Q.9
- What is Ring? Explain with example. 07
 - Determine whether algebraic system $(Q, +)$ is a group where Q is the set of all rational number and $+$ is an addition operation. 08
- Q.10
- Find the code words generated by the encoding function. $E: B^2 \rightarrow B^5$ with respect to the parity check matrix. 08

$$\begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

- Determine whether the relation for the directed graph are reflexive, symmetric and transitive? 07



Total No. of Printed Pages:3

SUBJECT CODE NO:- H-364
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Data Structures
(Revised)

[Time: Three Hours]

[Max. Marks:80]

- N.B Please check whether you have got the right question paper.
- 1) Question No.1 from Section A & Question No.6 from Section B are compulsory.
 - 2) Solve any two questions from each section from remaining questions.
 - 3) Assume suitable data if necessary.

Section – A

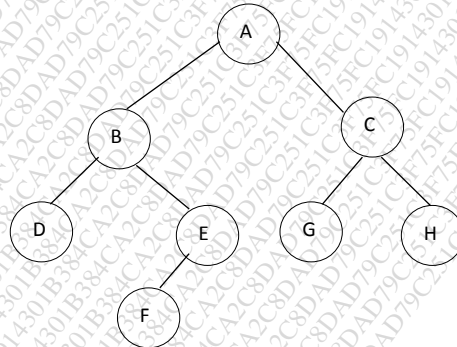
- Q.1 Solve any five 10
- a) Differentiate between array & structure with example.
 - b) List applications of queue.
 - c) Create a singly linked list for student having fields:
name, age, roll_no.
 - d) Define data structure & its types.
 - e) Write delete q() function for deleting an element in queue.
 - f) Represent the polynomial using linked list.
 $A = 15x^4 - 10x^3 + x^2 + x$
 - g) Write advantages of dynamically allocated arrays.
 - h) Write push () function for inserting element in stack.
- Q.2 07
- a) What is necessity of an ADT? Explain functions necessary to create an ADT.
 - b) Write a function to evaluate a postfix expression Evaluate $8/2 * (7+3)/2$. 08
- Q.3 08
- a) Write c function to perform following operations on doubly linked list. 08
 - i) Insert node at the beginning of list.
 - ii) Delete node in between of list.
 - b) Explain various functions used for dynamic memory allocation & deallocation. 07
- Q.4 08
- a) Write a C program to implement queue using static array. 08
 - b) Show how to represent polynomial using linked list Add A & B using linked list. 07
 $A = 5x^4 - 2x + 3$ and $B = 6x^5 - 3x^4 + 2x^2 - 1$

- Q.5 a) Analyze the difference between stack implementation using array with stack implementation using linked list. 08
 b) What is circular queue? Explain the advantages of circular queue. Write algorithm for insertion & deletion in circular queue. 07

SECTION B

- Q.6 Solve any five 10
 a) Define binary tree & binary search tree.
 b) Define cycle & path with respect to graph.
 c) Define searching & sorting.
 d) What is the maximum number of nodes in a binary tree of depth 4.
 e) What are the different ways of representing graph.
 f) Define the terms: Siblings & Ancestors.
 g) Define directed & undirected graph with example.
 h) Define complete binary tree & strictly binary tree.

- Q.7 a) Explain in order, preorder, postorder & level order traversal for binary tree. 07



- b) Write a C program for selection sort. 08
 Q.8 a) Explain graph traversal technique with suitable example 07
 b) Explain how to represent tree using 08
 i) List representation
 ii) Left child right sibling representation
 iii) Representation as degree 2 tree with suitable example

- Q.9 a) Explain the working of Insertion sort for the following elements:35, 80, 22, 11, 85, 90, 38 07
 b) Explain insertion into a binary search tree & deletion from binary search tree with suitable example. 08

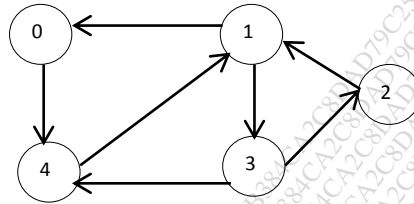
Q.10

- a) Explain difference between linear search and binary search. Perform linear search for element 60 in the given list: 80, 70, 65, 82, 90, 60, 50, 71
- b) Explain graph representation technique
 - i) Adjacent matrix
 - ii) Adjacency list

08

07

Obtain representation for the following graph.



Total No. of Printed Pages:2

SUBJECT CODE NO:- H-433
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Digital Electronics
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Q.No.1 and Q.No.6 are compulsory.
2. Figure to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Attempt Any Two from remaining.

Section A

- Q.1 Attempt any five of the following: 10
- a) Define analog and digital signal.
 - b) Define weighted and non-weighted codes.
 - c) Reduce following Boolean function

$$F(A, B, C) = \sum m(0,1,3,5)$$
 - d) Explain minterm and maxterm with example.
 - e) Draw logic diagram for the expression

$$y = (A + B)(\bar{A} + B)$$
 - f) Draw truth table for logic expression

$$y = \bar{A}B + \bar{A}C$$
 - g) State and explain De Morgan's theorem.
 - h) Draw circuit and truth table of half adder.
- Q.2 08
- a) Perform following operation using 2's complement
 - i) 101101-101010
 - ii) 11010101-11001111
 - b) Convert following SOP to standard SOP and then minimize using K-map

$$Y = AB + \bar{A}BC + \bar{A}B + BC$$
07
- Q.3 08
- a) Minimize and realize following expression

$$F(A, B, C, D) = \sum m(0,1,2,3,7,9,11) + d(10,13,15)$$
07
 - b) Design BCD to Excess -3 converter.
- Q.4 08
- a) Design full adder and full sub tractor using 3 line to 8 line decoder. 08
 - b) Design look ahead carry generator circuit. 07

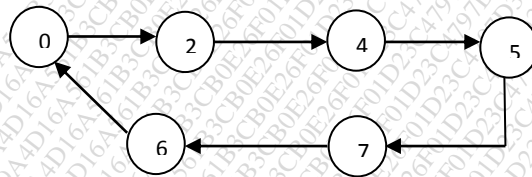
- Q.5 a) Design 4-bit binary to gray code converter. 08
 b) Design combinational circuit for two way switch used on staircase. 07

Section B

- Q.6 Attempt any five of the following: 10
 a) Define multiplexer and demultiplexer.
 b) Define synchronous and asynchronous counter.
 c) Write applications of counter.
 d) Draw 1-bit memory cell using NAND gates.
 e) Enlist types of shift register.
 f) What is race around condition?
 g) How many flip flops are required to design MOD-14 counter.
 h) Differentiate combinational and sequential circuit.

- Q.7 a) Design and explain universal shift register. 08
 b) Explain binary weighted Digital to Analog converter. 07

- Q.8 a) Design decade synchronous counter using T flip flop. Also draw waveform for it. 08
 b) Design sequence generator to generate following sequence. 07



- Q.9 a) Design and explain ring counter. 08
 b) Explain dual slop analog to digital converter. 07

- Q.10 a) Convert 08
 i) SR to D type flip flop
 ii) JK flip flop to T flip flop
 b) Design MOD-6 counter with waveform. 07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-432
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Digital Electronics
(OLD)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Q.1 and Q.6 are compulsory.
 - 2) Solve any two question from Q.2 to Q.5 and solve any two question from Q.7 to Q.10.

Section A

- | | | |
|-----|--|----------|
| Q.1 | Solve any five questions:- | 10 |
| | <ol style="list-style-type: none"> a) Which are universal gates? Why those gates are called universal gates? b) Define digital signal. c) Define multiplexer and demultiplexer. d) Define programmable logic array. e) Design AND gate using NAND gate and Design AND gate using NOR gate. f) Define magnitude comparator. g) Draw circuit diagram of T flip flop. h) Define sequential logic circuit. | |
| Q.2 | <ol style="list-style-type: none"> a) Design 16:1 mux using 4:1 mux. b) Design full adder circuit using 1:8 demux. | 08
07 |
| Q.3 | <ol style="list-style-type: none"> a) Convert 1) SR FF to D FF
2) JK FF to T FF b) Draw circuit and explain working of JK FF in detail. | 08
07 |
| Q.4 | <ol style="list-style-type: none"> a) Minimize and realize following equation using K-map.
$f(A,B,C,D) = \sum m(0,2,4,5,7,9,15) + d(12,14)$ b) Simplify following Boolean equation using Quine McClusky method.
$f(A,B,C,D) = \sum m(0,1,5,6,8,9,12) + d(2,10)$ | 08
07 |
| Q.5 | <ol style="list-style-type: none"> a) Design 3 bit parity generator for even parity. b) Design 4 bit magnitude comparator. | 08
07 |

Section B

- Q.6 Solve any five questions: 10
- a) Define register and enlist types of register.
 - b) Draw 4-bit right shift register.
 - c) Draw 3-bit synchronous counter.
 - d) Define synchronous counter and asynchronous counter.
 - e) Write any four application of D/A convertor.
 - f) What is resolution of DAC?
 - g) Enlist types of D/A convertor.
 - h) Write applications of counter.
- Q.7 08
- a) Draw and explain DFF and TFF.
 - b) Design MOD-10 counter using JK FF. 07
- Q.8 08
- a) Explain ring counter with example.
 - b) Design and explain 3-bit asynchronous counter with waveform. 07
- Q.9 08
- a) Explain dual slope A/D convertor.
 - b) Explain R-2R binary ladder. 07
- Q.10 08
- a) Differentiate between synchronous and asynchronous counter.
 - b) Draw and explain universal shift register. 07

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-363
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Data Structures using C
(OLD)

[Time: Three Hours]

[Max. Marks: 80]

- N. B Please check whether you have got the right question paper.
- i) Q. No. 1 from Section A and Q. No. 6 from Section B are compulsory.
 ii) Solve any two Questions from each Section from remaining questions.
- Section – A

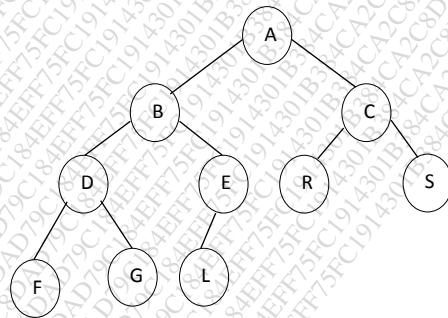
- | | | |
|------|--|----------|
| Q. 1 | Solve any five | 10 |
| | a) Explain malloc () function.
b) What parameters are use to analyze performance of any algorithm.
c) Differentiate between structure and union.
d) What is multidimensional array?
e) Write POP () function to delete an element from stack.
f) List drawback of sequential representation.
g) What is circular queue.
h) Represent given polynomial using linked list $A = 10x^4 + x^2 + x + 5$. | |
| Q. 2 | a) What is pointer? Explain various function used in C for dynamic memory allocation.
b) Write an ADT sparse matrix. | 07
08 |
| Q. 3 | a) What is stack? Explain various operations on stack with algorithm.
b) Define Algorithm. Explain all criteria that every algorithm should satisfy. | 08
07 |
| Q. 4 | a) Write C program to implement Queue using static array. Give its drawback.
b) Show how to represent Polynomial using linked list? ADD A&B using linked representation.
$A = 5x^4 - 2x + 3 \quad B = 6x^5 - 3x^4 + 2x^2 - 1$ | 08
07 |
| Q. 5 | a) How to represent circular singly linked list. Explain insert and delete operations on circular singly linked list.
b) Evaluate given postfix expression using stack. $42 + 3 * 3 /$ | 07
08 |

Section – B

- Q. 6 Solve any five 10
- Construct binary tree for given sequence of preorder and inorder
 Preorder: F A E K C D H G B
 Inorder: E A C K F H D B G
 - Explain following tree terminology
 - Degree of node
 - Siblings
 - Define Paring heap
 - Create max heap for following keys: 32, 15, 20, 30, 12, 25, 16.
 - Define splay Tree.
 - Define single ended and double ended priority queue.
 - Explain following term i) Directed graph ii) Complete graph
 - Give properties of Red-black tree

- Q. 7 a) Build an AVL tree with following values: 08
 15, 20, 24, 10, 13, 7, 30, 36, 25
- b) Define graph. Write ADT for Graph. 07

- Q. 8 a) Explain in order, preorder, Postorder for given binary tree. 08



- b) Explain bottom-up splay tree with example. 07

- Q. 9 a) Write an algorithm to perform the following operations on binary search tree. 08

- Insert a key
- Search a key

- b) Explain Fibonacci Heap with Example. 07

Q.10

- a) Construct height balanced binary tree. Assume that insertion are made in order –
CSE, IT, MECH, CIVIL, ETC, EEP, PROD
- b) What is the necessity of selection tree? Explain winner trees and loser trees in detail.

08

07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-328
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Computer Networks-I
(OLD)

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

N.B

- 1) Q. 1 & Q. 6 are compulsory.
- 2) Assume suitable data, if necessary.
- 3) Neat diagrams must be drawn wherever necessary.

Section – A

- | | | |
|-----|---|----------|
| Q.1 | Attempt ANY FIVE | 10 |
| | <ol style="list-style-type: none"> a) What is data communication & explain its components. b) Name some services provided by application layer in the Internal Model. c) Name three types of transmission impairment. d) Define block coding & give its purpose. e) Describe the goals of multiplexing. f) What are the advantages of optical fiber over twisted pair & co axial cable. g) List the three traditional switching methods. What are the most common today. h) What is Hamming distance? What is minimum Hamming distance? | |
| Q.2 | <ol style="list-style-type: none"> a) Draw & explain OSI model in detail. b) Explain the design issues related to TCP/IP model. Also differentiate between OSI & TCP/IP model. | 07
08 |
| Q.3 | <ol style="list-style-type: none"> a) Explain in brief the functions that are carried out by Data Link Layer. b) Explain CRC codes in detail. Compute the checksum for a frame which is 1101011011 using generator polynomial $x^4 + x + 1$. | 07
08 |
| Q.4 | <ol style="list-style-type: none"> a) Explain PCM with transmitter & receiver diagram. b) What is Line coding? Explain all line coding techniques with suitable diagrams. | 07
08 |
| Q.5 | <ol style="list-style-type: none"> a) Compare & contrast circuit –switched network & Packet switched network. b) What is multiplexing? Explain time Division multiplexing in detail. | 08
07 |

SECTION - B

Q.6	Attempt ANY FIVE	10
	a) What is Framing?	
	b) Name IEEE standards for Ethernet	
	c) What are the types of addresses?	
	d) Explain Bluetooth?	
	e) Explain purpose of Router	
	f) Define Error correction and detection	
	g) What is noiseless channel?	
	h) Explain IPv4 address classes	
Q.7	a) Explain CSMA/CD protocol	07
	b) Explain Flow control in data link layer.	08
Q.8	a) What is Internet Protocol? Explain IPv4 header in detail.	08
	b) Explain Internetworking in detail.	07
Q.9	a) What is Ethernet? Explain Standard Ethernet, Fast Ethernet & Gigabit Ethernet.	07
	b) What are the connecting devices used in Computer network? Explain each device in detail.	08
Q.10	Write Short notes on (Any three)	15
	a) IPv6	
	b) Bluetooth	
	c) Cellular Telephony	
	d) HDLC	