

Total No. of Printed Pages:02

**SUBJECT CODE NO:- H-138**  
**FACULTY OF ENGINEERING 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. Question No.1 from section A and question No.6 from section B(carrying 10 marks each) are compulsory
  2. Attempt any two question from the remaining questions in each section ( carrying 15 marks each )

## Section A

- Q.1 Attempt any five of the following 10
- a) What is the function of 'TRAP' in 8086 processor?
  - b) Explain the difference between J Z and JN Z instructions.
  - c) List the memory sizes for 8086 to Pentium microprocessors.
  - d) How 8086 generates 20 bit physical address?
  - e) Which are the four memory segments of 8086 microprocessor? Give their functions
  - f) For 8086 microprocessor, give default 16- bit segment and offset combination of registers
  - g) Give the function of selector, and describe in protected mode memory addressing
  - h) Write the function of carry flag and auxiliary carry flag of 8086.
- Q.2 08
- a) Explain internal block diagram of 8086 microprocessor
  - b) Write an assembly language program to find out whether the entered number is even or odd. 07
- Q.3 08
- a) Explain 'Shift and rotate' instructions with suitable examples.
  - b) Write assembly language program to find smallest element from any array of ten elements. 07
- Q.4 07
- a) What are 'addressing modes'? Explain any two addressing modes of 8086 microprocessor
  - b) What is stack memory? Explain the working of stack with the help of PUSH and POP instructions. 08
- Q.5 07
- a) Differentiate between JMP and CALL instructions.
  - b) Write assembly language program for BCD addition and BCD subtraction 08

## Section B

- Q.6 Attempt any five of the following 10
- Draw read back control word format of 8254
  - What is the need of address decoding?
  - Explain the difference between isolated I/O and memory mapped I/O
  - Briefly explain the handshaking mode.
  - Why it is required to refresh DRAM?
  - Give reason as to why SRAM is called as volatile memory
  - Comment on hardware interrupt
  - Explain the function of 'chip select pin' of an IC
- Q.7 a) With suitable waveforms explain timing diagram of read cycle of 8086 08  
b) Explain the pin – out of 8284A clock generator. 07
- Q.8 a) Explain 'READY' and 'WAIT' states with suitable diagram; explain how to insert 'WAIT' states in 8086 microprocessor bus cycle. 08  
b) With suitable diagram explain input and output interface 07
- Q.9 a) What is the use of interrupt vectors and vector table? Where the vector table is located? Explain any four types of interrupt vectors with their functions 10  
b) Write a note on EPROM. 05
- Q.10 a) Draw and explain the interconnection between 8086 microprocessor and 8284A 08  
b) Explain DMA operation in detail. 07

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**SUBJECT CODE NO:- H-137**  
**FACULTY OF ENGINEERING 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.
- 1) Q.1 from Section A and Q.6 from Section B are compulsory.
  - 2) Solve any two questions from remaining in each Section.
  - 3) Draw diagram or graphs wherever required.

**Section A**

- Q.1 Solve any five:- 10
- a) Define set with proper example.
  - b) Explain absorption law of set theory.
  - c) If we toss a fair coin, what is the probability that we will get a head?
  - d) Write the following set in a tabular form.
    - i)  $A = \{x: x^2 = 9\}$
  - e) Which of these sentences are propositions? What are the truth values of those that are propositions?
    - i) The Earth is flat.
    - ii) Answer this question.
  - f) Write the following statement in symbolic form.
    - i) Indians will win the world cup if their fielding improves.
    - ii) I will score good marks in the exam if and only if I study hard.
  - g) Define rule of universal specification.
  - h) What is law of syllogism?
- Q.2 a) Prove the following using Venn diagram:- 08  
 $A \Delta (B \Delta C) = (A \Delta B) \Delta C$
- b) A ticket is drawn from a set of 20 tickets, numbered 1 to 20 and kept aside. Then another ticket is drawn. Find the probability that both the tickets shows even numbers. 07
- Q.3 a) Explain De’Morgan’s law of sets. 07
- b) Prove that  $5^n - 1$  is divisible by 4, for  $n \geq 1$ . 08
- Q.4 a) Show that S is valid conclusion from the premises  $p \rightarrow q, p \rightarrow r, \neg (q \wedge r)$  and  $S \vee P$  08
- b) Define quantifiers. Rewrite following arguments using quantifiers, variables and predicate symbols:- 07

- i) All birds can fly.
- ii) Some men are genius
- iii) There is a student who likes mathematics but not geography.

- Q.5 a) Prove that  $(p \rightarrow (q \rightarrow r)) \Rightarrow ((p \rightarrow q) \rightarrow (p \rightarrow r))$  07
- b) I am happy if my program runs. A necessary condition for the program to run is it should be error free. I am not happy. Therefore the program is not error free. Determine whether the above is a valid argument or not. 08

**Section B**

- Q.6 Solve any five:- 10

- a) Explain antisymmetric relation with example.
- b) Let  $A = \{1,2,3,4\}$  and  $B = \{a, b, c\}$  and let  $R = \{(1, a), (1, b), (2, c), (3, a), (4, b)\}$  and  $S = \{(1, b), (1, c), (2, a), (3, b), (4, b)\}$ . Find  $\bar{R}$ ,  $\bar{S}$ .
- c) Let  $f: X \rightarrow Y$ , where  $f(x) = 3x + 5$ . Find its inverse function.
- d) Let  $A = \{7,8,9\}$ . Determine all the partitions of the set.
- e) Define monoid.
- f) Explain homomorphism.
- g) Define left and right coset with example.
- h) Construct parity check matrix associated with generator matrix

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

- Q.7 a) Let  $A = \{1,2,3,4,5,6,7\}$  and R be the relation on set A. 08
- $R = \{(x, y) | (x - y) \text{ is divisible by } 3\}$
- i) Show that R is an equivalence relation.
  - ii) Find equivalence classes generated by elements of A.
- b) Define composite function. Function f and g are defined on set  $X = \{1,2,3\}$  as 07
- $f = \{(1,2), (2,3), (3,1)\}$  and  $g = \{(1,2), (2,1), (3,3)\}$ . Find fog and gof. Are they equal?

Q.8 a) Explain pigeon hole principle with example. 07

b) Draw the hasse diagram representing the positive divisors of 36. 08

Q.9 a) Consider the generator matrix:- 08

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

Determine parity check matrix and decode following received words.

- 1) 111101
- 2) 110101

b) Explain elements of coding theory. 07

Q.10 a) Explain integral domain and field. 07

b) Show that  $(2, 5)$  encoding function  $E: B^2 \rightarrow B^5$  defined by. 08

$$E(00) = 00000$$

$$E(01) = 01110$$

$$E(10) = 10101$$

$$E(11) = 11011$$

is a group code.

Total No. of Printed Pages:05

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

[Time: Three Hours]

[Max. Marks: 80]

N.B 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. Find the Laplace transform of  $\sin 2t \sin 3t$
2. Find Laplace transform of  $t^2 H(t-2)$
3. Find Laplace transform of  $f(t) = (t-2)^2, t > 2$   
 $= 0, t < 2$
4. Find the inverse Laplace transform of  $\frac{s+2}{s^2-4s+13}$
5. Find the inverse Laplace transform of  $\frac{s e^{-3s}}{s^2-1}$
6. Form the partial differential equation from

$$(x-h)^2 + (y-k)^2 = a^2 - z^2$$

OR

Find Z-transform of  $\sin h\left(\frac{k\pi}{2}\right), k \geq 0$ 

7. Solve:  $pq = p + q$

OR

Find the z-transform of  $ke^{ak}, K \geq 0$

8. Solve  $x \frac{\partial z}{\partial x} - 4y \frac{\partial z}{\partial y} = 0$   
OR

Find the  $z$ -transform of  $2^k \cos h \propto k, k \geq 0$

Q.2 a. Find the Laplace transform of  $\int_0^t t \cos^2 t dt$  05

b. Find the inverse Laplace transform of  $\tan^{-1}(s)$  05

c. Solve:  $p^2 + q^2 = Z$  05

OR

Find  $z$ -transform of  $\cos\left(\frac{k\pi}{3} + 5\right)$

Q.3 a. Evaluate:  $\int_0^\infty e^t \frac{\sin^2 t}{t} dt$  05

b. Find the inverse Laplace transform by using convolution theorem 05

c. Solve  $x^2 p + y^2 q + z^2 = 0$  05

OR

Find the inverse  $z$ - transform of  $\frac{z}{(z-2)(z+3)^2}, |z| > 3$

Q.4 a. Find the Laplace transform of periodic function 05

$$f(t) = E, 0 < t < \frac{p}{2}$$

$$= -E, \frac{p}{2} < t < p$$

And  $f(t) = f(t + p)$

b. Solve by Laplace transform  $y'' + 2y' + 5y = e^{-t} \sin t$ ; given that  $y(0) = 0, y'(0) = 1$  05

c. Obtain the solution of  $\frac{\partial v}{\partial t} = k \frac{\partial^2 v}{\partial x^2}$  under the conditions 05

- i.  $v \neq \infty, t \rightarrow \infty$
- ii.  $v = 0, \text{ for } x = 0 \text{ and } x = \pi$
- iii.  $u = \pi x - x^2$  as  $t = 0$  in the range of  $(0, \pi)$

OR

Find the z-transform of  $k^2, k \geq 0$

- Q.5 a. Express the following function in terms of Heaviside unit step function and hence find its Laplace transform  $f(t) = (t + 1), 0 < t < 2$   
 $= 3, t > 2$  05

- b. Solve the simultaneous L.D.E. by Laplace transform method 05

$$\frac{dx}{dt} + 4y = 0, \frac{dy}{dt} - 9x = 0, \text{ given}$$

$$x = 2, y = 1 \text{ at } t = 0$$

- c. Solve  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$  which satisfies the conditions  $u(0, y) = 0 = u(l, y)$  05

$$\text{And } u(x, \infty) = 0, u(x, 0) = kx$$

OR

Solve the difference equation by using z- transform

$$6y(k + 2) - y(k + 1) - y(k) = 0, k \geq 0$$

$$\text{Given } y(0) = y(1) = 1$$

Section B

- Q.6 Attempt any five 10

- a. Prepare a forward difference table for the data

$$x : 2 \quad 4 \quad 6 \quad 8 \quad 10$$

$$y : 15 \quad 23 \quad 27 \quad 33 \quad 40$$

- b. Find the first approximate value of the root (i.e.  $x_1$ ) by Newton Raphson method for  $\log x - x + 3 = 0$

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

$$83x + 11y - 4z = 95$$

$$7x + 52y + 13z = 104$$

$$3x + 8y + 29z = 71$$

- d. Find f(8) for the data

$$x : 5 \quad 6 \quad 9$$

$$f(x) : 12 \quad 13 \quad 14$$

- e. Find the residues at each of its poles of

$$f(z) = \frac{3z^2}{(z-1)(z+3)}$$



- f. Evaluate  $\int_c \sinh z \, dz$ , where  $c : |z| = 1$
- g. Show that  $\cosh z$  is analytic every where
- h. State Cauchy-Riemann equations in Cartesian and polar form

Q.7 a. Given that  $\frac{dy}{dx} = 2 + \sqrt{xy}$  and  $y(1)=1$ . Find the approximate value of  $y$  at  $x=1.2$  using Euler's modified method 05

b. Use runge-kutta fourth order method to find  $y$  at  $x=0.2$ . given that 05

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}, \quad y(0) = 1$$

c. Under the transformation  $w = \frac{1}{z}$  find the image of  $x^2 + y^2 - 6x = 0$  05

Q.8 a. Find the root of the equation  $x \log_{10} x = 1.2$  by Newton-Raphson method 05

b. Prove that  $u = r^3 \cos 3\theta - r \sin \theta$  is harmonic and hence find its harmonic conjugate 05

c. Evaluate by cauchy's Residue Theorem 05

$$\oint_c \frac{z^2}{(z-1)(z+2)^2} dz, \quad c: |z| = \frac{3}{2}$$

Q.9 a. State cauchy's integral formula and hence evaluate 05

$$\oint_c \frac{z+1}{(z^3-4z)} dz, \text{ where } c: |Z + 2| = \frac{3}{2}$$

b. Find the bilinear transformation which maps the points  $-1, 0, 1$  into the points  $-1, -i, i$  of  $w$ -plane respectively 05

c. Fit a second degree parabola to the following data 05

x :	0	1	2	3	4
y :	-4	-1	4	11	20

Q.10 a. Find  $\frac{dy}{dx}$  and  $\frac{d^2y}{dx^2}$  at  $x=0$  for the data 05

x :	0	1	2	3	4
y :	2	5	10	14	19

b. Find the analytic function  $f(z) = u + iv$  if  $v = \left(r - \frac{1}{r}\right) \sin\theta$  05

c. Evaluate  $\int_0^{\pi - \pi i} e^{\bar{z}} dz$ , along the curve  $x = t, y = -t$  05

**SUBJECT CODE NO:- H-112**  
**FACULTY OF ENGINEERING 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.
- Q.No.1 and 6 are compulsory.
  - Solve any two questions from remaining of each section.
  - Figures to the right indicate full marks.
  - Assume suitable data, if necessary.

**SECTION-A**Q.1 Solve any five from the following

10

- Find k such that  $f(z) = \frac{1}{2} \log(x^2 + y^2) + i \tan^{-1} \left( \frac{ky}{x} \right)$  is analytic.
- Find the image of  $|z| = 2$  under the mapping  $W = z + 3 + 2i$ .
- State Cauchy's integral theorem.
- Determine the singularity and the residue of the function  $f(z) = \frac{\sin z}{z}$ .
- Expand  $f(z) = \cos z$  about  $z = \frac{\pi}{2}$  by using Taylor's series.
- Evaluate  $\int_0^{2i} \sin hz \, dz$ .
- Solve:  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$ .

**OR**Find Z-transform of  $F(k) = \frac{1}{k}, k \geq 1$ 

- Solve:  $2x \frac{\partial z}{\partial x} - 3y \frac{\partial z}{\partial y} = 0$ .

**OR**Find Z-transform of  $F(k) = \frac{a^k}{k!}, k \geq 0$ 

- Find the analytic function  $f(z) = u(r, \theta) + iv(r, \theta)$  such that  $v(r, \theta) = r^2 \cos 2\theta - r \cos \theta + 2$  05
- Evaluate  $\int_{(0,0)}^{(1,1)} (3x^2 + 4xy + 3y^2) dx + 2(x^2 + 3xy + 4y^2) dy$  along  $y^2 = x$  05
- Evaluate  $\int_0^\infty \frac{dx}{(a^2+x^2)^2}$  by using residue theorem. 05

- Evaluate  $\oint_C \frac{\sin^6 z}{(z-\frac{\pi}{2})^3} dz$ , where C is  $|z| = 2$  by Cauchy's integral formula. 05
- Show that the real and imaginary part of analytic function  $f(z) = u + iv$  is harmonic function. 05

- c) Obtain the solution of partial differential equation  $\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}$ , with subject to the condition  $u(0, t) = 0, u(l, t) = 0, u = 3 \sin \frac{\pi}{l} x$ , when  $t = 0$ . For all values of  $0 < x < l$ . 05

OR

Find Z-transform of  $F(k) = 3^k \cos\left(\frac{k\pi}{2} + \frac{\pi}{4}\right), k \geq 0$

- Q.4 a) Find and plot the image of triangular region with vertices (0,0), (0,1) and (1,0) under the transformation  $w = (1 - i)z + 3$ . 05
- b) Expand  $f(z) = \frac{1}{(1-z)(z-2)}$  into Laurent series for  $i) 1 < |z| < 2$  05
- c) Solve  $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$ , subject to the conditions 05
- i)  $v = 0$  when  $y \rightarrow \infty$
  - j)  $v = 0$  when  $x = 0$  for all values of  $y$
  - k)  $v = 0$  at  $x = \pi$
  - l)  $v = v_0$  when  $y = 0$  for  $0 < x < \pi$

OR

Solve  $y(k + 2) - 5y(k + 1) + 6y(k) = u(k); y(0) = 0, y(1) = 1$

- Q.5 a) Find the bilinear transformation which maps the point  $z = 0, -i, -1$  into the points  $w = i, 1, 0$ . 05
- b) Evaluate  $\int_0^{2\pi} \frac{d\theta}{2 + \cos \theta}$  by calculus of residue. 05
- c) The vibration of an elastic string is governed by the partial differential equation  $\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}$ . The  $\pi$  and the ends are fixed. The initial velocity is zero and the initial deflection  $u(x, 0) = 2(\sin x + \sin 3x)$ . Find the deflection  $u(x, t)$  of the vibrating sting for  $t > 0$ . 05

OR

Find inverse z-transform of  $\frac{z^2+z}{z^3-3z^2+3z-1}, |z| > 1$

SECTION-B

- Q.6 Solve any five of the following 10
- a) Find Laplace transform of  $e^{-t} \sin t H(t - 2\pi)$
  - b) Find inverse Laplace transform of  $\frac{e^{-\pi s}}{s^2+9}$
  - c) Find inverse transform of  $\frac{1}{(s+3)^2}$
  - d) State second shifting theorem of Laplace transform
  - e) Find Laplace transform of  $t \cos 2t$ .
  - f) State inverse convolution theorem of Laplace transform.

- g) Find Fourier transform of  $f(x) = x, |x| \leq a$   
 $= 0, \text{ otherwise}$
- h) Find Fourier sine transform of  $\frac{1}{x}$

Q.7 a) Evaluate  $\int_0^\infty \sin 4t \delta(t - \frac{\pi}{8}) dt$  05

b) Find inverse Laplace transform of  $\frac{1}{s} \log \sqrt{\frac{s^2+1}{s^2}}$  05

c) Find Fourier sine and cosine transform  $f(x) = ae^{-ax} - be^{-\beta x}$  05

Q.8 a) Find Laplace transform of  $\frac{\sin^2 t}{t}$  05

b) Find inverse Laplace transform of  $\frac{s^2}{(s^2+a^2)^2}$  05

c) Solve the integral equation  $\int_0^\infty f(x) \cos \lambda x dx = e^{-\lambda}, \lambda > 0.$  05

Q.9 a) Express the function in terms of Heaviside unit step function hence find their Laplace transform of 05

$$f(t) = 4, \quad 1 < t < 2$$

$$= -2, \quad 2 < t < 3$$

$$= 5, \quad t > 3$$

b) Find f(x) if its Fourier sine transform is  $\frac{\lambda}{\lambda^2+1}$  05

c) Solve  $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = e^{-x} \sin x$ , where  $y(0) = 0$  and  $\frac{dy}{dx} = 1$  at  $x = 0$  05

Q.10 a) Find Laplace transform of 05

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

$$= 0, \quad 1 < t < 2 \quad \text{if } f(t) = f(t+3)$$

$$= -1, \quad t > 2$$

b) Solve  $\frac{dx}{dt} - y = e^t; \frac{dy}{dt} + x = \sin t, x(0) = 1, y(0) = 0$  by Laplace transform method. 05

c) Using Fourier transform, solve the equation  $\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial t^2}$  for  $x \geq 0, t \geq 0$  under the given condition  $u = u_0$  at  $t = 0, t > 0$  and  $u(x, 0) = 0, x \geq 0.$  05

Total No. of Printed Pages:03

**SUBJECT CODE NO:- H-207**  
**FACULTY OF ENGINEERING 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
- i) List out segment registers of 8086. & describe use of any one.
  - ii) Which factor defines the addressing space of microprocessor and How?
  - iii) What is difference between assembler directives and instructions?
  - iv) List out any four differences between 8086 and 8088 microprocessor?
  - v) What is use of READY pin in 8086?
  - vi) What is IVT?
  - vii) Describe DAA instruction with example.
- Q.2 a) For the following instructions identify addressing modes and Calculate 20 bit physical address. Direction flag is set. 10
- i) MOV SB
  - ii) MOV AX, [SI]
  - iii) MOV CX, [BX + SI]
  - iv) MOV DX, 01888 H
  - v) PUSH A
- Where,
- |                |               |               |
|----------------|---------------|---------------|
| [CS]=0100 H    | [DS] = 0AC00H | [ES] = 0B930H |
| [SS] = 0CD09H  | [BX] = 03417H | [BP] = 09000H |
| [IP] = 0000H   | [SI] = 0193FH | [DI]= 0F3EEH  |
| [SP] = 001C1 H |               |               |
- b) Draw and explain read cycle timing diagram of 8086 for minimum mode. 05
- Q.3 a) Explain the minimum mode configuration of 8086 with neat diagram? 07
- b) What is memory map? Explain the concept of even and odd memory banks? 05

- c) Explain the use of following pins in 8086. 03  
 i) TEST                      ii) ALE                                      iii) INTR

- Q.4 a) Write an interactive Assembly language program to convert two digit BCD number into equivalent HEX number. 08  
 b) What is Interrupt vector table? How it is related with ISR? For int 31H how system finds address of ISR? 07

- Q.5 Write short notes (any three) 15  
 i) TSR program  
 ii) PSP  
 iii) .EXE Vs. .COM Files  
 iv) Near and Far Procedure  
 v) 8088 Maximum mode.

**Section B**

- Q.6 Solve any five:- 10  
 i) Define computer organization?  
 ii) List out any two functions of control unit?  
 iii) What is RISC?  
 iv) Enlist any four features of V<sup>th</sup> generation of computers?  
 v) What is PROM?  
 vi) What is data path?  
 vii) What is use of MAR and MBR?

- Q.7 a) Explain Von Neumann Architecture with neat diagram? 05  
 b) Describe functional components of a computer? 05  
 c) Compare and contrast CISC and RISC? 05

- Q.8 a) What is control unit? How it is designed? Explain any one method. 08  
 b) What is instruction cycle? Explain different steps of instruction cycle with example. 07

- Q.9 a) What is memory organization? Explain in detail hierarchical memory organization? 06
- b) What is serial port? Explain COM port in detail? 04
- c) Explain semiconductor memory in detail. 05

Q.10 Write short note (any three) 15

- 1) SRAM and DRAM
- 2) SCSI and USB bus
- 3) Data Path
- 4) Classification of computers
- 5) Output devices
- 6) Working of ALU



Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-208**  
**FACULTY OF ENGINEERING 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. Q.no.1 from section A and Q.no.6 from section B are compulsory
2. Solve any two questions from Q.no.2 to Q.no.5 in section A and any two questions from Q.No.7 to Q.no.10 on section B.
3. Assume suitable data if necessary

## Section A

- Q.1 Solve any five questions of the following 10
- a) Explain conditional probability.
  - b) Explain associative law of sets
  - c) Find the power set of each of these sets
    - a. {a}
    - b. {a, b}
  - d) Explain universal quantifier
  - e) Explain basic connectives of compound proposition
  - f) Define principle of Duality
  - g) What is logical equivalence
  - h) Define open statement & Truth table
- Q.2 a) If  $n$  is a positive integer, prove that  $1.2+2.3+3.4+\dots+n(n+1) = n(n+1)(n+2) / 3$  using mathematical induction 08
- b) Determine whether  $(\neg p \wedge (p \rightarrow q)) \rightarrow \neg q$  is a tautology. 07
- Q.3 a) Explain De- morgan's law of sets. 08
- b) Let  $A, B, C$  be sets. Show that  $(A - B) - C = (A - C) - (B - C)$  07
- Q.4 a) Use the substitution rule to show that  $[p \rightarrow (q \vee r)] \Leftrightarrow [(p \wedge \neg q) \rightarrow r]$  08
- b) Lets  $p(x)$  be the open statement " $x^2 = 2x$ " where the universe comprise all integers Determine whether each of the following statement is true or false 07
- 1)  $p(0)$
  - 2)  $p(1)$
  - 3)  $p(2)$
  - 4)  $p(-2)$
  - 5)  $xp(x)$

- Q.5 a) Construct truth table for  $(p \wedge (\sim q \vee p)) \wedge \sim p$  08  
 b) Show that  $t$  is a valid conclusion from the premises 07  
 $p \Rightarrow q, q \Rightarrow r, r \Rightarrow s, \sim S$  and  $p \vee t$ .

Section B

- Q.6 Solve any five questions of the following 10  
 a) What are differences between Cartesian product & relation?  
 b) Explain the Cartesian product of two sets  
 c) Explain homomorphism with example  
 d) Explain cyclic group  
 e) Explain integral domain  
 f) What is hamming weight & distance?  
 g) What is inverse of a function give example?  
 h) Explain ring & its properties
- Q.7 a) Explain chain & anti chain with example. 08  
 b) Explain Equivalence classes & partition of a Equivalence relation with example 07
- Q.8 a) Let  $A = \{2,4,5,10,12,20,25\}$ . Show that whether the relation is partial order relation and draw the hasse diagram & relation 08  
 $R = \{(2,2), (2,4), (2,12), (4,12), (5,10), (5,20), (5,25), (10,20), (4,4), (5,5), (10,10), (12,12), (20,20), (25,25)\}$   
 b) Let  $f(x) = 2x+3, g(x) = 3x + 4$  and  $h(x) = 4x$  for where  $R$  is set of real numbers find gof, fog, foh & goh 07
- Q.9 a) Explain elements of coding theory in detail 08  
 b) What is group, explain with example 07
- Q.10 a) Explain LaGrange theorem in detail 08  
 b) Show that  $(2,5)$  encoding function  $E: B^2 \rightarrow B^5$  defined by 07  
 $E(00) = 00000, E(01) = 01110$   
 $E(10) = 10101, E(11) = 11011$   
 Is a group code

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-172**  
**FACULTY OF ENGINEERING 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 from remaining.

**Section A**

- |     |   |    |
|-----|---|----|
| Q.1 | Solve any five:   | 10 |
|     | <ol style="list-style-type: none"> <li>a) Give some characteristics of object oriented programming language.</li> <li>b) Define copy constructor.</li> <li>c) Illustrate with an example how the set w manipulator works?</li> <li>d) What is function prototype?</li> <li>e) What are the different argument passing techniques?</li> <li>f) Describe the major parts of C++ program.</li> <li>g) How does an inline function differ from a preprocessor macro?</li> </ol> |    |
| Q.2 | a) Define recursion. Write a program in C++ to find the factorial of a given number using recursion.  | 08 |
|     | b) What do you meant by overloading of a function? When do we use this concept?   | 07 |
| Q.3 | a) What is a friend function and what are the merits and demerits of using friend functions.  | 07 |
|     | b) Write a program to find larger number among two numbers using nesting of a member function concept.  | 08 |
| Q.4 | a) What is operator overloading? What are the rules for overloading the operators?  | 07 |
|     | b) Can we have more than one constructor in a class? If yes, explain such a situation with example.   | 08 |
| Q.5 | Write short notes on any three  | 15 |
|     | <ol style="list-style-type: none"> <li>a) Type conversion</li> <li>b) Object as a function argument</li> <li>c) Static data members</li> <li>d) Inline function</li> </ol>  |    |

**Section B**

- Q.6 Solve any five 10
- When do we use protected visibility specifier to a class member?
  - What are the memory management operators?
  - What is method overriding?
  - When do we make virtual function 'pure'?
  - List some of the file modes with its meaning.
  - Why are the words such as Cin and Cout are not considered as keywords?
  - What are the advantages to use exception handling mechanism in program?
- Q.7 a) What does 'this' pointer point to? What are the applications of 'this' pointer? 05
- b) What is multilevel inheritance? Write a program to display student roll number, marks in two subjects and total marks. 10  
 Consider class student stores the roll no, class test, stores marks of two subjects class result contains total marks obtained in test. The class result can inherit the details of the mark obtained in test and roll no of a student through multilevel inheritance.
- Q.8 a) What is a difference between opening a file with constructor function and opening a file with open () function. 07
- b) Explain the term stream class Hierarchy. 08
- Q.9 a) What should be placed inside the try block and catch block? When do you use multiple catch handlers? 07
- b) Distinguish between overloaded function and function template. 08
- Q.10 Write short notes on any three 15
- Command line argument
  - Ambiguity in multiple inheritance
  - Error handling during file operation
  - Constructor in derived classes

Total No. of Printed Pages:2

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

**[Time: Three Hours]****[Max.Marks: 80]**

- N.B Please check whether you have got the right question paper.
- Q.No.1 from section A and Q.No.6 from section B are compulsory.
  - Attempt any two questions from the remaining questions in each section.

**Section A**

- Q.1 Solve all of the following questions. 10
- Compare and contrast between: random scan display & raster scan display.
  - Write the steps of mid-point circle drawing algorithm.
- Q.2 Solve all of the following questions. 15
- Write short note on: boundary fill algorithm.
  - Enlist and explain the various application areas of computers graphics.
  - Explain synthetic camera model for imaging system.
- Q.3 Solve all of the following questions. 15
- Write a short note on : joystick and data glove .
  - Write a short note on :RGB color model.
  - With suitable example for each enlist logical classes for graphical input devices.
- Q.4 Solve all of the following questions. 07  
08
- Write an open GL code to draw square of unit length centered at origin.
  - List and explain in details, different frame coordinates open GL.
- Q.5 Solve all of the following questions. 07  
08
- Write an open GL program to implement event driven input using keyboard.
  - Explain the concept of pinhole camera of an imaging system, also devise the expression for angle of view.

## Section B

- Q.6 Solve all of the following question. 10
- Write a short note on: concatenation of transformation.
  - Write short note on: Z-buffer algorithm.
- Q.7 Solve all of the following questions. 15
- Write a short note on: depth comparison for hidden surface removal.
  - Write a short note on: viewing transformation.
  - Write a short note on: point and text clipping.
- Q.8 Solve all of the following questions. 15
- What is alising effect? Explain antialiasing and the various method of antialiasing.
  - Write a short note on: cyrus beck algorithm.
  - Describe in details, the different light sources in open GL.
- Q.9 Solve all of the following questions. 07
- Consider the line from (0, 0) to (-6,- 6). Use DDA algorithm to rasterize this line. 08
  - Give a  $3 \times 3$  homogeneous coordinate transformation matrix for each of the following translation:
    - Shift the image to the right 3 units.
    - Shift the image up 2 units.
    - Move the image down  $\frac{1}{2}$ unit and right 1 unit.
    - Move the image down  $\frac{2}{3}$ unit and left 4 units.
- Q.10 Solve all of the following questions. 07
- Explain modified phong model .what are the advantages of it? 08
  - Find the transformation of triangle A(1,0), B(0,1),C(1,1)BY:
    - Rotating  $45^\circ$  about the origin and then translating one unit in x and y direction.
    - Translating one unit in x and y Direction and then rotating  $45^\circ$  about the origin.

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-279**  
**FACULTY OF ENGINEERING 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       |
|     | <ol style="list-style-type: none"> <li>1) Define computer graphics.</li> <li>2) Define Random scan, Raster scan displays.</li> <li>3) What do you mean by emissive and none missive displays?</li> <li>4) What is horizontal &amp; vertical retrace?</li> <li>5) Distinguish between convex &amp; concave polygon.</li> <li>6) What are advantages &amp; disadvantages of DDA line algorithm?</li> <li>7) How to draw cross lines using OpenGL?</li> </ol> |          |
| Q.2 | <ol style="list-style-type: none"> <li>a) Write down and explain midpoint circle drawing algorithm .Assume 10cm as the radius and co-ordinate origin as the center of the circle.</li> <li>b) Write OpenGL program to draw hexagon.</li> </ol>   | 08<br>07 |
| Q.3 | <ol style="list-style-type: none"> <li>a) Write any two polygon filling algorithms.</li> <li>b) Explain various primitives and attributes in OpenGL.</li> </ol>  | 08<br>07 |
| Q.4 | <ol style="list-style-type: none"> <li>a) Rasterize the line using DDA line drawing algorithm with end points (5, 5) And (13, 9).</li> <li>b) How display list is used in OpenGL? Give suitable example.</li> </ol>  | 08<br>07 |
| Q.5 | Write short notes on (any three).  | 15       |
|     | <ol style="list-style-type: none"> <li>1) Logical classification of i/p devices.</li> <li>2) Display processor.</li> <li>3) Application of computer graphics.</li> <li>4) Menu &amp; submenu in OpenGL.</li> <li>5) Viewing.</li> </ol>  |          |

Section B

- Q.6 Attempt any five: 10
- 1) What is composite transformation?
  - 2) Define pivot point for rotation.
  - 3) What is point clipping?
  - 4) What is called scaling transformation?
  - 5) Differentiate between parallel and perspective projections.
  - 6) Enlist properties of light.
  - 7) Why Cohen Sutherland line clipping is popular?
- Q.7 08
- a) Explain Z-buffer algorithm for hidden surface removal.
  - b) Consider the object with vertices (2, 2) (2, 1) (3, 1) & (3, 2).double the object & translate it by 10 units along x & y direction. 07
- Q.8 08
- a) Explain midpoint subdivision algorithm.
  - b) Consider the  $\Delta ABC$  with co-ordinates A(1,1);B(10,1); C(5,5). Rotate above object by  $90^\circ$  in anticlockwise direction. Give coordinates of transformed object. 07
- Q.9 08
- a) How window-to-viewport coordinate transformation happens?
  - b) Prove that multiplication of transformation matrices for two successive rotations is commutative. 07
- Q.10 Attempt any three. 15
- 1) Clipping operations
  - 2) Concatenation of transformations.
  - 3) Affine transformations.
  - 4) Transformations in homogeneous co-ordinates.
  - 5) OpenGL 2D viewing functions.
    - i) glu Ortho 2D.
    - ii) gl viewport.u



Total No. of Printed Pages:02

**SUBJECT CODE NO: H-280**  
**FACULTY OF ENGINEERING 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 the remaining from each section.
  - iii) Assume suitable data, if necessary.

**Section A**

- |     |   |          |
|-----|---|----------|
| Q.1 | Solve <u>any five</u> .   | 10       |
|     | <ol style="list-style-type: none"> <li>a) What is data hiding?</li> <li>b) What is use of scope resolution operator?</li> <li>c) How does constructor differ from normal functions?</li> <li>d) Explain Syntax of class.</li> <li>e) Describe new and delete operators.</li> <li>f) What is encapsulation of data?</li> <li>g) How do we invoke constructor function?</li> <li>h) What is inline function?</li> </ol> |          |
| Q.2 | <ol style="list-style-type: none"> <li>a) What are abstract classes? Explain with suitable example.</li> <li>b) Explain concept of constructor overloading.</li> </ol>  | 08<br>07 |
| Q.3 | <ol style="list-style-type: none"> <li>a) Write a C++ program to overload + operator to perform addition of two 3 × 3 matrix.</li> <li>b) What is friend function? Write a program to demonstrate friend function.</li> </ol>   | 08<br>07 |
| Q.4 | <ol style="list-style-type: none"> <li>a) Write a program to create class student and implement concept of array of object.</li> <li>b) Explain concept of constructor overloading.</li> </ol>  | 08<br>07 |
| Q.5 | Explain all types of constructors with programming example.   | 15       |

**Section B**

- |     |  |    |
|-----|--|----|
| Q.6 | Solve <u>any five</u> .  | 10 |
|     | <ol style="list-style-type: none"> <li>a) What is generic template?</li> <li>b) What is difference between public and private class members?</li> <li>c) What is use of try block?</li> <li>d) What is stream? What is input stream and output stream?</li> <li>e) How to detect end of file?</li> <li>f) Discuss role of file ( ) function.</li> <li>g) What is virtual base class?</li> <li>h) Define dynamic object.</li> </ol> |    |

- Q.7 a) What is containers and containership? How it differs from inheritance? 07  
b) Write a program to demonstrate static binding. 08
- Q.8 a) Write a C++ program to implement template to find minimum of two data items of type int, float, char, and double. 08  
b) Explain I/O Manipulators. 07
- Q.9 a) Write a program to demonstrate multiple exceptions. 08  
b) Explain the concept of pure virtual function with example. 07
- Q.10 Write short note on (any three) 15
  - a) Single level Inheritance
  - b) Late binding
  - c) Virtual base class
  - d) Error handling functions in file handling

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-398**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**S.E. (CSE/IT) (CGPA)**  
**Linux Operating System**  
**(REVISED)**

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

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

**Section A**

- |     |   |    |
|-----|---|----|
| Q.1 | Describe any five   | 10 |
|     | a) Enlist types of shell.   |    |
|     | b) 'wc' command   |    |
|     | c) Kernel   |    |
|     | d) 'chmod' command  |    |
|     | e) 'date' command   |    |
|     | f) 'at' and 'batch' command   |    |
|     | g) 'who' command  |    |
| Q.2 | a) Explain major application area of Linux.                           | 07 |
|     | b) Explain VI Editor with its three modes.                            | 08 |
| Q.3 | a) Explain file and Directory handling command in Linux.              | 08 |
|     | b) Explain structure of file system in detail.                        | 07 |
| Q.4 | a) Explain 'sed' command with line addressing and context addressing. | 08 |
|     | b) What is process? Explain various states of process.                | 07 |
| Q.5 | Write a short note: (any three)                                       | 15 |
|     | a) Disk partition management  |    |
|     | b) GNOME Desktop environment  |    |
|     | c) History of Linux   |    |
|     | d) Compare Linux and other O.S.                                       |    |

**Section B**

- Q.6 Describe any five 10
- a) Enlist network services.
  - b) Differentiate between static IP and Dynamic IP.
  - c) 'ifconfig' command
  - d) How to execute shell script in Linux
  - e) 'echo' and 'read' command in shell script
  - f) Need of data backup
  - g) Enlist network related problem in Linux
- Q.7 07
- a) Explain Linux Firewall in detail.
  - b) Explain working of FTP server in Linux. 08
- Q.8 08
- a) Write a shell script program, to perform basic arithmetic operation. 08
  - b) Write a shell script program to verify whether given number is prime number or not. 07
- Q.9 08
- a) Explain use of 'tar' and 'restore' command with example.
  - b) How to generate system utilization reports for processor, memory, disk and network. Explain 07 in detail
- Q.10 Write a short note: (any three) 15
- a) Network Files
  - b) Disaster planning and Recovery
  - c) Study of Log file
  - d) Web Server

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-397**  
**FACULTY OF ENGINEERING 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. Question No.1 from section A & question No.6 from section B are compulsory.
  2. Solve any two from each section A & B
- Section A**
- Q.1 Solve any five from following. 10
- i) Date and cal
  - ii) echo- command
  - iii) Chgrp – command
  - iv) Environment variable
  - v) How shell is created
  - vi) Escaping & quoting
  - vii) Cp-command
- Q.2
- a) Explain kernel-shell relationship and also enlist different shell . 08
  - b) How user can change directory permission using chmod with relative and absolute manner. 07
- Q.3
- a) Explain ps command with its option. 08
  - b) Explain links with its type. 07
- Q.4
- a) Explain different attributes of files and how to change them. 08
  - b) Explain – wild-card characters with an example. 07
- Q.5
- a) Explain shells interpretive cycle with example. 08
  - b) How to schedule jobs using at, batch and cron – command 07

**Section B**

- Q.6 Solve any five from following. 10
- i) For loop in shell
  - ii) pr-command
  - iii) Cut-command
  - iv) Numerical comparison operator used by test
  - v) Read – command
  - vi) expr-command
  - vii) Chop – function in perl
- Q.7 a) Explain sed-command with its option and give suitable example. 08  
 b) Write a awk script to demonstrate the use awk- built-in variables. 07
- Q.8 a) Write a shell script- to implement file test operator. 08  
 b) Write a perl script to implement associative array. 07
- Q.9 a) Write a shell script to implement positional parameters. 08  
 b) Explain grep command with its option and suitable example. 07
- Q.10 a) Explain chop and chomp function in perl with example 08  
 b) Explain BEGIN and END section in awk with example. 07

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-433**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**S.E. (CSE/IT) (CGPA)**  
**Digital Electronics**  
**(REVISED)**

[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 questions from Q.2 to Q.5 and any two questions from Q.7 to Q.10.

**Section A**

- Q.1 Solve any five questions: 10
- a) Define digital signal.
  - b) Perform following subtraction using 10's complement 4567-1234.
  - c) Represent  $(-23)_{10}$  in
    - i) Sign magnitude
    - ii) Two's complement
  - d) Convert
    - i)  $(110011.1010)_2 = (?)_{16}$
    - ii)  $(47.23)_{10} = (?)_{BCD}$
  - e) Draw 4 variable k map structure.
  - f) Perform following binary arithmetic operations
    - i)  $(1010) * (1010)$
    - ii)  $(1110101)/(1001)$
  - g) Draw the logic diagram of following expression.  

$$Y = (A + B).(\bar{A} + \bar{B}).C$$
  - h) Reduce following using Boolean algebra  

$$Y = F(A, B, C) = \Pi M(0, 2, 5, 6)$$
- Q.2 08
- a) For the following expression
    - i) Find minimal SOP expression
    - ii) Find minimal POS expression.
$$f(w, x, y, z) = \sum m(0, 1, 2, 5, 8, 14) + \sum d(4, 10, 13)$$
  - b) Draw and explain working of half and full adder. 07

- Q.3 a) Design Gray code to Binary converter. 08  
 b) Differentiate between analog signal and digital signals. 07
- Q.4 a) Design BCD to 7 segment decoder. 08  
 b) Prove that positive logic AND gate is equivalent to negative logic OR gate and vice versa. 07
- Q.5 a) Justify why NAND and NOR gate is called as universal gate. 08  
 b) Design a logic circuit that has 4 bit binary input and one output. The output should be 1 iff the input is evenly divisible by 3. Use two level NOR-NOR gate. 07

**Section B**

- Q.6 Solve any five questions: 10  
 a) Draw and explain working of 1:4 Demultiplexer with gates realization.  
 b) What is encoder? Explain with example.  
 c) What is PLD? Compare PROM, PLA and AAL.  
 d) Draw the logic symbol and write truth table of S.R flf.  
 e) Compare combinational and sequential circuits  
 f) List the application of shift register.  
 g) Compare synchronous and asynchronous counters.  
 h) Write excitation table of J-K flf.
- Q.7 a) Design and implement circuit for 2 bit comparator using 4 line to 16 line decoder and multi input OR gate. 08  
 b) Convert 07  
 i) S-R flf to D flf  
 ii) D flf to J-K flf
- Q.8 a) Design 16:1 multiplexer by using 4:1 multiplexers only. explain it 08  
 b) Draw the logic diagram for 4 bit parallel in , parallel out shift register. Explain it. 07
- Q.9 a) Explain how Schmitt Triggers can be used to generate clock signal. 07  
 b) Design synchronous decade up counter. Using T flf. 08
- Q.10 a) Design 8 bit odd parity generator using XNOR gates. 08  
 b) What is race around condition? How the problem is solved using MSJK flf. 07



[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

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

## Section A

- Q.1 Solve any five: 10
- a) Define data type & abstract data type.
  - b) Explain time complexity.
  - c) Explain circular queue full condition.
  - d) Explain dangling reference in pointers.
  - e) Explain realloc and calloc functions.
  - f) What are the advantages of linked representation over sequential representation?
  - g) Write postfix form of following expression.  
 $a*b/c$
- Q.2 a) Define algorithm. What criteria's algorithms should satisfy? How to measure performance of algorithm. 08
- b) What is pointer? Explain '&' and '\*' operators. 07
- Q.3 a) Write C function to transpose sparse matrix. 07
- b) Define array. Explain types of arrays. 08
- Q.4 a) Write C program to implement queue using static array. 07
- b) How to represent circular singly linked list? Explain insert and delete operations on it 08
- Q.5 a) Show how to represent polynomial using linked list. Add the give polynomials: 08
- $$A = 5x^3 + 2x + 7$$
- $$B = 6x^4 - 4x^3 + 3x^2 + 8$$
- b) Explain stack and its operations. 07

Section B

Q.6 Solve any five of the following: 10

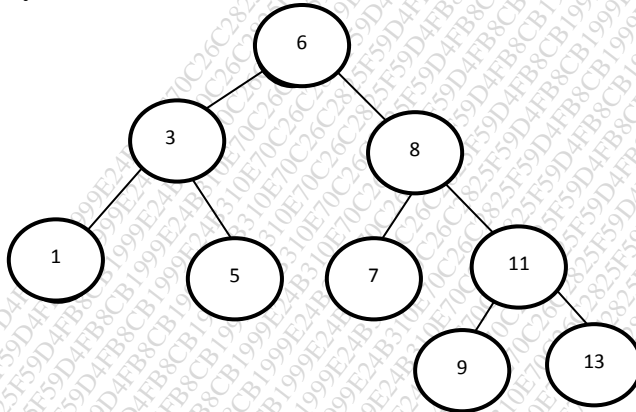
- a) Explain following tree terminologies:
  - i) Degree of tree
  - ii) Sibling

b) Construct binary tree for a given sequence of pre-order and in-order

Pre-order	a	b	d	e	c	f
In-order	d	b	e	a	f	c

- c) Define single ended and double ended priority queue.
- d) Explain directed and undirected graph.
- e) Define binomial heap.
- f) Give properties of red-black tree.
- g) How to find balance factor in AVL tree.

Q.7 a) What is threaded binary tree? Show the threaded-binary tree representation for the given binary tree: 07



b) Construct Max-Heap for the following key values: 14, 15, 4, 9, 7, 18, 3, 5, 16, 20, 17. 08

Q.8 a) Explain leftist tree, height biased leftist tree and weight biased leftist tree with example. 08

b) Show the possible binary search trees for the key-set  $(a_1, a_2, a_3) = (2, 6, 8)$  with equal probability  $p_i = q_i = 1/7$ . 07

- Q.9 a) Construct AVL tree for: 5, 8, 9, 4, 2, 7, 3,1 07
- b) Explain with example representation of tree using list representation and left child right sibling representation. 08
  
- Q.10 Write short notes on any three: 15
  - a) Top-down splay tree
  - b) Graph
  - c) Winner tree & loser tree
  - d) Meld operation in pairing heap

Total No. of Printed Pages:02

**SUBJECT CODE NO:- H-328**  
**FACULTY OF ENGINEERING 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. Question No.1 and 6 is compulsory.
  2. Attempt any two questions from Q. No. 2 to Q. No. 5 and Q. No. 7 to Q. No.10 of each section.

**Section A**

- |     |   |          |
|-----|---|----------|
| Q.1 | Attempt any five  | 10       |
|     | <ol style="list-style-type: none"> <li>a) Explain star topology.</li> <li>b) Define CRC.</li> <li>c) Define block coding.</li> <li>d) State difference between error correction and error detection.</li> <li>e) Define Shannon capacity on noisy channel.</li> <li>f) Calculate a bit rate of PCM system to transmit a voice channel. Assume no of bit per word to be 16</li> <li>g) Define Burst Error.</li> <li>h) Explain Tel net.</li> </ol> |          |
| Q.2 | <ol style="list-style-type: none"> <li>a) Explain polar bipolar &amp; Manchester method.</li> <li>b) Differentiate TDMA &amp; FDMA.</li> </ol>  | 08<br>07 |
| Q.3 | <ol style="list-style-type: none"> <li>a) Explain Circuit Switched Network with example.</li> <li>b) Explain serial Transmission.</li> </ol>  | 08<br>07 |
| Q.4 | <ol style="list-style-type: none"> <li>a) Explain CRC in detail with the help of an example.</li> <li>b) Explain frequency hopping spread spectrum.</li> </ol>  | 08<br>07 |
| Q.5 | <ol style="list-style-type: none"> <li>a) Why multiplexing is needed? Explain any one type of multiplexing in detail.</li> <li>b) Explain layered architecture of OSI model with suitable diagram.</li> </ol>   | 08<br>07 |

**Section B**

- Q.6 Attempt any five: 10
- a) Define ASK & FSK.
  - b) A pure ALOHA Network transmit 400.bit frame on shared channel of 400 kbps. What is the through put is system produces 2000 frame per second.
  - c) Explain Routing table in short.
  - d) A block of address is given one of the address 205.16.37.39/20. What is the first address in the block?
  - e) State the differences between Soft Handoff and Hard Handoff.
  - f) Define BSS.
  - g) Define Unicast & multicast.
  - h) Define Framing.
- Q.7 a) Give details about Channelization. 08
- b) Explain Architecture of IEEE 802.11. 07
- Q.8 a) Give details about PPP. 08
- b) Explain cellular Generations. 07
- Q.9 a) Explain Fast Ethernet. 08
- b) Explain logical Addressing. 07
- Q.10 a) What is NAT? How can NAT help in address depletion? Explain with diagram. 08
- b) Explain CSMA/CD protocol in detail along with the flow chart. 07

Total No. of Printed Pages:02

**SUBJECT CODE NO:- H-329**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**S.E. (CSE/IT) (CGPA)**  
**Computer Networks**  
**(REVISED)**

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Question .No.1 and Question.No.6 is compulsory.
- ii) Attempt any two from Q.2 to Q.5 and Q.7 to Q.10 from each section

**Section A**

- |     |   |                               |
|-----|---|-------------------------------|
| Q.1 | Attempt any five  | 10                            |
|     | <ol style="list-style-type: none"> <li>a) Define computer network.</li> <li>b) Define signal to noise ratio (SNR)</li> <li>c) What is flow control?</li> <li>d) What is the difference between half duplex and full duplex transmission mode?</li> <li>e) Define broadband and baseband signal.</li> <li>f) Define code word and parity bit.</li> <li>g) What is hamming distance?</li> </ol> |                               |
| Q.2 | <ol style="list-style-type: none"> <li>i. With neat diagram explain network topology.</li> <li>ii. Explain characteristics, frame format and physical addressing of standard Ethernet.</li> </ol>   | <p>08</p> <p>07</p>           |
| Q.3 | <ol style="list-style-type: none"> <li>i. Suppose a signal travels through a transmission medium and its power is reduced to one-half. Calculate the attenuation of signal.</li> <li>ii. Sketch the distortion of composite signal.</li> <li>iii. Explain in brief block coding for error detection and correction techniques at data link layer.</li> </ol>                                  | <p>04</p> <p>05</p> <p>06</p> |
| Q.4 | <ol style="list-style-type: none"> <li>i. What are the types of digital to analog conversion? Explain any one technique with waveform diagram.</li> <li>ii. Explain the working of Address Resolution Protocol (ARP)</li> </ol>   | <p>08</p> <p>07</p>           |
| Q.5 | <ol style="list-style-type: none"> <li>i. Explain line coding and decoding mechanism.</li> <li>ii. With neat diagram explain OSI model.</li> </ol>  | <p>07</p> <p>08</p>           |

**Section B**

Q.6	Define following (any five)	10
	i. Fragmentation	
	ii. Subnetting	
	iii. Socket	
	iv. Sliding window	
	v. Piggy backing	
	vi. HTTP	
	vii. POP <sub>3</sub>	
Q.7	i. Explain major functions performed by network layer.	08
	ii. Explain architecture of web.	07
Q.8	i. What are the services provided by UDP?	08
	ii. Explain simple Mail Transfer Protocol (SMTP).	07
Q.9	i. Draw TCP segment and explain each field in the header.	08
	ii. Explain in detail IPv4 classful addressing.	07
Q.10	i. What is name server? Explain hierarchy of name servers.	08
	ii. Compare virtual circuit and datagram networks.	07

Total No. of Printed Pages:4

**SUBJECT CODE NO:- H-364**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**S.E. (CSE/IT) (CGPA)**  
**Data Structures**  
**(REVISED)**

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

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

**Section A**

- Q.1 Solve any five: 10
- a) Define algorithm. Write two characteristics of algorithm.
  - b) Explain malloc ( ) function with syntax.
  - c) What will be the output of the following code?  
 Struct  

```

      {
      int a;
      double d;
      float c p;
      } s;
      void main ( )
      {
      printf (“% d \ t % d \ t % d, “\ t % d”,
      size of (s. a), size of (s. d),
      size of (s. cp), size of (s));
      }
      
```
  - d) Convert given infix expression to prefix & postfix  $(A + B) * C - (D + E)$
  - e) What is circular queue?
  - f) How array is different from linked list.
  - g) Design circular doubly linked list for 3 nodes.
- Q.2 a) Write C program to multiply two  $3 \times 3$  matrix. 08
- b) Explain structure and union with example. 07
- Q.3 a) What is stack? Explain stack full condition. Suppose stack is allocated  $N = 6$  memory cells. Initially stack is empty and top =0. Find output of following module.
1. Set  $x = 2$  and  $y = 5$
  2. Call push (x)



Call push (4)  
 Call push (y+2)  
 Call push (9)  
 Call push (x+y)

3. Repeat while Top=0  
 POP ()  
 End of while loop

b) What is linked list? What are different types of linked list? 07

Q.4 a) Write a function to 08  
 i) Traverse doubly linked list from left to right, printing out the contents of the data field of each node.  
 ii) Insert a node at the beginning of DLL.

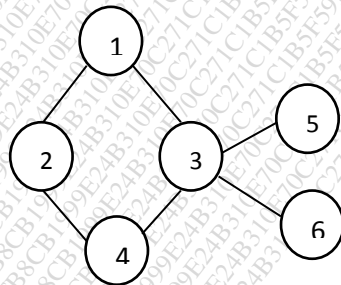
b) Show how to represent polynomials using linked list. Subtract B from A 07  
 $A = 8x^7 + 2x^6 + 5x^4 + 3x^2 + 10$   
 $B = 5x^7 - x^6 + 2x^2 + 5$

Q.5 a) Write C program to implement queue using static array. Give its drawbacks? 08  
 b) Convert given infix expression to postfix expression using stack 07  
 $A + B * C / D - E$

**Section B**

Q.6 Solve any five: 10  
 a) Explain following terms.  
 i) Sibling  
 ii) Height of tree

b) Give list representation of following graph.



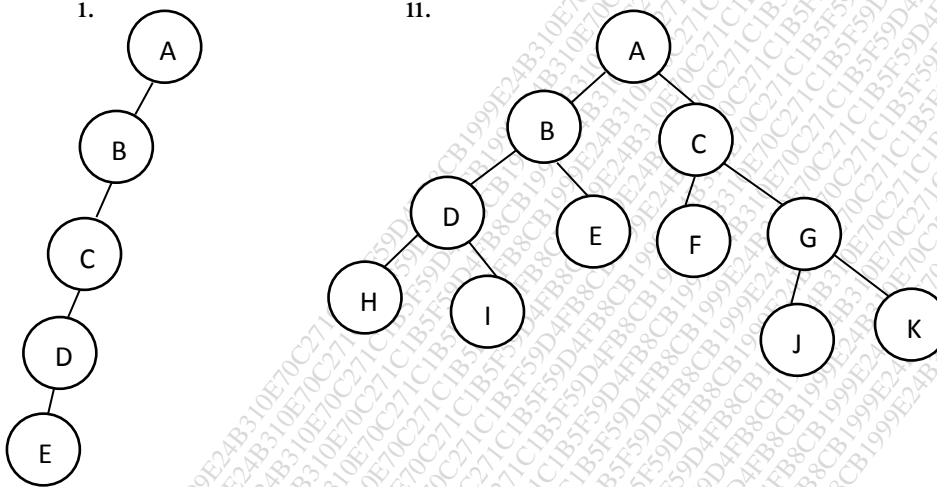
c) Construct binary tree for a given sequence

Preorder:	A	B	D	G	C	E	H	I	F
Inorder:	D	G	B	A	H	E	I	C	F

- d) Define complete graph. Draw complete graph having 6 nodes.
- e) Define property of min heap. Give example.
- f) How many no of comparisons will require to search key  $x=10$  using linear search for the given list 2, 5, 10, 15, 20. Is there any other method to reduce number of comparison?
- g) Apply bubble sort on: 4, 2, 5, 3

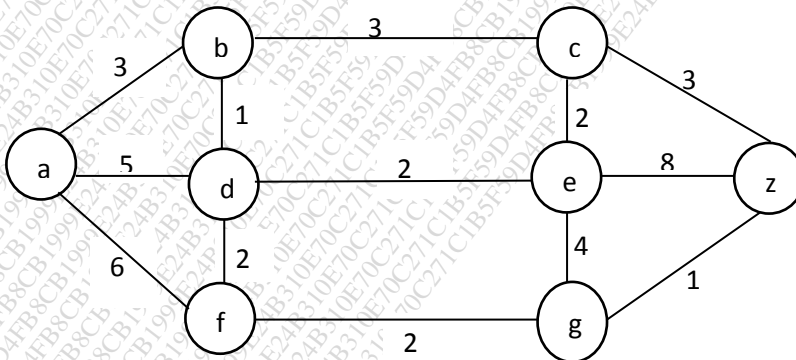
Q.7 a) Explain binary search tree property construct binary search tree for following key values: 07  
7, 16, 49, 5, 31, 6, 2, 44.

b) Explain inorder, preorder and postorder traversals for binary tree. 08



Q.8 a) Write a program for breadth first search technique. 07

b) Find shortest path from a to z. 08



- Q.9 a) Construct AVL tree for the following keys: July, Feb, May, August, December, October, November. 08
- b) Apply selection sort method to sort numbers in descending order: 50, 25, 10, 5, 7, 3, 30 07
- Q.10 a) Write C program to implement insertion sort. 07
- b) Using max heap sort the following list 15, 20, 24, 10, 13, 7, 30, 36, 25 08

Total No. of Printed Pages:2

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

**[Time: Three Hours]****[Max.Marks:80]**

- N.B Please check whether you have got the right question paper.
- i) Question No.1 and Q. No.6 are compulsory. Solve another four questions taking two from each section.
  - ii) Assume suitable data wherever needed.

**Section A**

- |     |   |          |
|-----|---|----------|
| Q.1 | Solve any five from the following   | 10       |
|     | <ol style="list-style-type: none"> <li>(a) Define digital signal</li> <li>(b) What are the applications of Flip Flop?</li> <li>(c) Realize the following expression by using NAND gates only<br/> <math display="block">y = A\bar{B} + B\bar{C} + \bar{A}C</math> </li> <li>(d) Construct truth table for 3-input NOR gate.</li> <li>(e) What is mean by edge triggered and level triggered.</li> <li>(f) What is encoder?</li> <li>(g) Convert following SOP expression to POS<br/> <math display="block">F(A, B, C, D) = \sum m(0,1,3,5,7,9,11)</math> </li> <li>(h) Draw symbol of negative edge triggered J-K flip flop.</li> </ol> |          |
| Q.2 | <ol style="list-style-type: none"> <li>(a) Which logic gate are universal logic gates? Why?</li> <li>(b) Design 9-bit odd parity generator using IC74180 and suitable gates.</li> </ol>   | 07<br>08 |
| Q.3 | <ol style="list-style-type: none"> <li>(a) Explain characteristics of digital ICs</li> <li>(b) What is multiplexer? Design 4:1 mux using logic gates.</li> </ol>  | 08<br>07 |
| Q.4 | <ol style="list-style-type: none"> <li>(a) Design binary to gray code converter</li> <li>(b) Explain J-K master slave flip flop and draw its truth table.</li> </ol>  | 07<br>08 |
| Q.5 | <ol style="list-style-type: none"> <li>(a) Minimize the following expression by using K-map and realize the same using logic gates.<br/> <math display="block">F(A, B, C, D) = \sum m(0,1,2,3,5,7,8,9,11,14,15)</math> </li> <li>(b) Design a 2-bit comparator using gate.</li> </ol>   | 08<br>07 |

**Section B**

Q.6	Solve any five	10
	(a) Draw block diagram of SIPO shift register.	
	(b) Define asynchronous and synchronous counter.	
	(c) Enlist types of D to A converter.	
	(d) What is universal shift register.	
	(e) What do you mean by preset and clear.	
	(f) What is continuous type of A&D converter.	
	(g) Compare sequential and combinational circuits.	
	(h) How many flip flaps are required to design a decade counter?	
Q.7	(a) Explain working of bi-directional Shift register	07
	(b) Design and explain 2-bit synchronous counter	08
Q.8	(a) Design and explain SISO Left shift register.	08
	(b) Explain implementation of a parallel Comparator (Flash) A to D converter.	07
Q.9	(a) Design Mod-11 ripple counter.	08
	(b) Explain weighted register D to A converter with suitable diagram.	07
Q.10	(a) Design and explain PISO Shift register.	08
	(b) Explain single slope A to D converter.	07