Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

April, 2017   **Common for CSE & IT**

Third Semester   **Discrete Mathematical Structures**

Time: Three Hours   **Maximum :** 60 Marks

Answer Question No.1 compulsorily.   (1X12 = 12 Marks)

Answer ONE question from each unit.   (4X12=48 Marks)

1. Answer all questions   (1X12=12 Marks)

   a) (Pv~P) is a tautology or contradiction**?**
   b) Give the generating function A(X) for the sequence $a_n = (n+1)$?
   c) In how many ways can 10 people arrange themselves in a ring?
   d) Give the principle of Mathematical Induction?
   e) State the Euler's theorem?
   f) Give the chromatic number for Cycle if the length is even**?**
   g) What is meant by Bi – partite graph?
   h) What is the difference between tree and graph?
   i) What is meant by POSET?
   j) Show that 3 and 24 integers are congruent modulo 7?
   k) What is an Equivalence Relation?
   l) State the law of hypothetical syllogism?

UNIT I

1. Show that the following are equivalent formulas:
   a) [P v (P^Q)$\leftrightarrow$P]   (Using truth table)   **[6 M]**
   b) [P v (~P^Q)$\leftrightarrow$P vQ] (Using rules of propositions)   **[6 M]**

(OR)

2. **a)** Use Principle of Mathematical Induction to Prove that : $3n^5 + 5 n^3 + 7$ where n is divisible by 15 for each +ve integer.   **[6 M]**
   b) Prove (or) Disprove the validity of the following argument (Using Rules of Inference)   **[6 M]**
   Every living thing is a Plant or animal.
   David's dog is alive and it is not a plant.
   All animals have hearts.
   Hence, David's dog has a heart.

UNIT II

3. **a)** Find the coefficient of X^{12} in   **[6 M]**

$$\frac{1-X^4-X^7+X^{11}}{(1-X)^5}$$

   b) Find the coefficient of X^{25} in $(X^2+X^3+X^4+X^5+X^6)^7$ **[6 M]**

(OR)

5. **a)** In How many ways can the committee of 5 teachers and 4 students be chosen from 9 teachers and 15 students if teacher A refuses to serve if student B is on the committee?   **[6 M]**
   b) In how many ways can 10 people arrange themselves **i)** In a row of 10 chairs? **ii)** In a row of 7 chairs?   **iii)** In a circle of 10 chairs?   **[6 M]**

UNIT III

6. Solve the following recurrence relations:
   a) $a_n=a_{n-1}+n$ where $a_0=2$. (using substitution method)   **[6 M]**
   b) $a_n-6a_{n-1}=0$ where $a_0=1$.(Using Generating Functions Method)   **[6 M]**

(OR)

7. **a)** Define the terms: **i)** lattice?   **ii)** Join – semi lattice   **[4 M]**
                   iii) Meet – semi lattice   **iv)** TOSET
   b) Draw the Hasse – diagram for the poset [D12;/]. Where '/' is the divisibility relation.
   Determine this POSET is lattice or not   **[8 M]**

UNIT IV

8. a) Find the Chromatic – Number for the "Wheel" graph? **[6 M]**
b) State and explain Euler's Formula for planar graph? **[6 M]**

(OR)

9. a) What is meant by Adjacency – Matrix? Give the adjacency matrix $K_{3,3}$. **[6 M]**
b) What is meant by Isomorphism? Discuss with suitable examples. **[6 M]**

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

April, 2017	Common for CSE & IT
Third Semester	**Digital Logic Design**

Time: Three Hours   **Maximum :** 60 Marks

Answer Question No.1 compulsorily.   (1X12 = 12 Marks)

Answer ONE question from each unit.   (4X12=48 Marks)

1. Answer all questions   (1X12=12 Marks)

    a   Convert $(100101)_{gray}$ to binary.
    b   Which logic gate is used in parity checkers?
    c   How many numbers of Boolean functions that can be generated by n variables?
    d   Differentiate between a prime implicant and non-prime implicant.
    e   Write truth table for 2-bit magnitude comparator.
    f   Design EX-OR gate using decoder
    g   Write characteristic equation of JK flip flop.
    h   Compare combinational and sequential circuits.
    i   How many flip flops are required to build MOD-12 counter?
    j   What is meant by PAL?
    k   How many number of states can count by n-bit Johnson counter
    l   Draw the block diagram of RAM cell.

UNIT I

2.a   Explain about signed magnitude and 2's complement approaches for representing the fixed point numbers. Why 2's complement is preferable?   6M

2.b   Design all basic gates with NOR and NAND gates.   6M

(OR)

3.a   With respect to the Boolean expressions identify correct and in-correct statements
$(i) A' + AB = A + B$, $(ii) A(A + B) = A$, $(iii) (A + B')(B' + C) = AC$, $(iv) A + A + AA' + B + B + BB' + AB = A$ 4M

3.b   Simplify the following Boolean function using 4-varaiable K-map and implement the simplified function with basic gates (inverter, and, & or) only.
    $f(A,B,C,D) = \sum m(1,5,6,7,11,12,13,15)$ 8M

UNIT II

4.a   Minimize the following Boolean function using tabulation method
    $f(w,x,y,z) = \sum m(1,4,6,7,8,9,10,11,15)$ 6M

4.b   Design a full adder with two half adders and basic gates.   6M

(OR)

5.a   Implement the following Boolean function using a single 8 X 1 multiplexer and no other gate.
    $F(A, B, C, D) = BC + ABD' + A'C'D$ 6M

5.b   Design seven segment display decoder.   6M

UNIT III

6.a   Design a MOD – 6 asynchronous counter using T-flip flops.   6M

6.b   Design a synchronous BCD counter using JK-flip flops.   6M

(OR)

7.a   Derive D flip flop and JK flip flop from T flip flop. Give the procedure for flip flop inter conversion.   5M

7.b   Explain about SR flip flop with its truth table. Write its characteristic table, excitation table and characteristic equation. Draw its logic diagram   7M

UNIT IV

8.a Draw a 4-bit shift register using JK flip flop which can shift the data to register one by
one on the application of a clock. 6M

8.b Design a 4-bit binary up and down ripple counter. 6M

(OR)

9.a Implement the following function using PLA
$F1 = \sum m(1,2,4,6)$
$F2 = \sum m(0,1,6,7)$ 7M
$F3 = \sum m(2,6)$

9.b Elucidate the importance of ROM with neat diagrams. 5M

Hall Ticket Number:

II/IV B.Tech (Supplementary) DEGREE EXAMINATION

April, 2017	**Common for CSE & IT**
Third Semester	**Operating Systems**
Time: Three Hours	**Maximum :** 60 Marks

Answer Question No.1 compulsorily.   (1X12 = 12 Marks)

Answer ONE question from each unit.   (4X12=48 Marks)

1. Answer all questions   (1X12=12 Marks)
   a) Describe the objectives of Operating Systems.
   b) Describe Process Control Block (PCB).
   c) List any three differences between Thread & Process
   d) What is race condition?
   e) Define waiting time
   f) List the types of semaphores
   g) What is a Dead Lock?
   h) List necessary condition for Dead Lock.
   i) What is contiguous memory allocation?
   j) What is a File?
   k) What are File attributes?
   l) Define Directory.

UNIT I

2.   What is a "System Call" ? list the types of system calls.   [12 M]

(OR)

3.   Describe in detail about Types of scheduling queues & types of schedulers   [12 M]

UNIT II

4.   Explain CSP through Reader – writer Problem.   [12 M]

(OR)

5.   Consider the following set of process with the length of the CPU burst time given in milliseconds.   [12 M]
   The process are assumed to have arrived in the order   1,2,3 all at the time zero.

Process	CPU Burst Time
P1	24
P2	3
P3	3

   i) Draw Gantt chart that indicates the execution of these processes using the Scheduling
      Algorithms FCFS & SJF.
   ii) What is waiting time of each process for each of these scheduling algorithms?
   iii) What is turnaround time of each process for each of these scheduling algorithms?

UNIT III

6.   Explain about deadlock avoidance with Bankers algorithm with an example   [12 M]

(OR)

7.   Explain memory management techniques : paging & segmentation   [12 M]

UNIT IV

8.   Explain file system mounting, file sharing & file protection.   [12 M]

(OR)

9.a   Discuss types of directory implementation   [4 M]
9.b   Explain different disk space allocation methods   [8 M]

Hall Ticket Number:

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II/IV B.Tech (Supplementary) DEGREE EXAMINATION

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April, 2017	**Computer Science & Engineering**
Third Semester	**Data Structures**
Time: Three Hours	**Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a. Define ADT
   b. What is Big Oh Notation
   c. What is the structure of node for storing polynomial equations.
   d. What is the ADT of a Stack
   e. Write the post fix expression for (a+b)*c^d-e
   f. List any two applications of queues.
   g. Define tree
   h. What is the difference between binary tree and binary search tree
   i. What are the applications of AVL Tree
   j. Explain any two types of hash functions
   k. Define a priority queue
   l. How do we represent a DAG using adjacency matrix

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UNIT – I

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2.a What are the advantages and disadvantages of doubly linked list over singly linked list? Explain the applications of doubly linked lists.   6M

2.b Write a program to reverse a singly linked list   6M

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(OR)

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3.a How do we perform addition of two polynomials using singly linked list   6M

3.b What are the various ways to analyze the time/space complexity of recursive functions? Explain with an example   6M

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UNIT – II

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4.a List any two applications of stacks in computing environment   4M

4.b Write a C program to implement a Stack which a restriction that, the first two elements which are to be pushed are 0 & 1, later you can only push an element which is equal to sum of last two elements of stack.(i.e. when all elements are popped you will see a reverse order of Fibonacci series).   8M

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(OR)

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5.a List the advantages and disadvantages of linked representation over array representation of queue.   4M

5.b Write a C program that enqueues only palindrome numbers.   8M

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UNIT – III

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6.a Construct a binary tree for the following data items: 80, 40, 75, 30, 20, 90, 50, 25, 80. Write the inorder, preorder & postorder notation of constructed tree.   8M

6.b Explain about the height of an AVL Tree   4M

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(OR)

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7.a What are tree properties? List any four applications of trees.   6M

7.b Explain the double rotations of AVL Tree using examples   6M

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UNIT – IV

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8.a Explain linear probing with an example. What are the disadvantages of this approach   6M

8.b Define a Graph. Explain BFS with an example   6M

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(OR)

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9.a   What are the applications of Priority Queues   4M

9.b Explain chaining mechanism with an example. What are the disadvantages of chaining mechanism?   8M