No of Pages : 1 Course Code : 18MX14

Roll No:

(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004 SEMESTER EXAMINATIONS, APRIL 19 (PHASE I)

MCA Semester: 1

18MX14 **DATA STRUCTURES** Time: 3 Hours **Maximum Marks: 100 INSTRUCTIONS:** 1. Answer **ALL** questions. Each question carries 25 Marks. a) What are the characteristic properties of algorithm? Write an algorithm for linear search. Describe the best and worst case complexities. (4)b) i. Differentiate linear and nonlinear data structures. Give an example. (4)ii. How are strings represented in storage? Give a suitable example. i. How are two dimensional arrays represented in memory? Explain with example. Write the corresponding addressing function. ii. Write a recursive algorithm for Binary Search. Write the recurrence relation describing the complexity of the algorithm. Solve the recurrence relation and find its complexity. a) Write algorithms for insertion and deletion of element in a doubly linked list. (5)b) i. Give a suitable illustration for representing sparse matrix using multiply linked list. ii. Write an algorithm to count the number of odd and even elements in a singly linked list. (4)How are polynomials represented using linked lists? Write an algorithm to add two such polynomials? What is the complexity of the algorithm? Write an algorithm to check the well formedness of parenthesis in an arithmetic expression. Trace the algorithm on the expression $a + [c-(d \cdot e-c)/q]$. What is a queue data structure? Write algorithms for the basic operations. What is a dequeue? What are its types? Describe how the basic operations are performed on c) Write algorithms for the push and pop operations on a linked stack. Using these operations, write an algorithm to evaluate postfix expression. Trace the algorithm on the expression 5 6 7 + * (12)4. a) Explain how binary trees are represented in memory? Show the representation of complete and skew trees using these methods. b) i. Draw the binary tree whose inorder traversal is B A D C G F E and pre-order traversal sequence is ABCDEFG. ii. Write algorithm for pre-order and in order traversal on binary trees. c) i) What is hashing? What is a collision? How are collisions resolved? Explain with an example.

algorithms on agraphwith 5 vertices and 9 edges

(12)

FD/RL

(OR)

ii) Write algorithms for i. Breadth first search and ii. Depth first search. Trace the