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Total No. of Questions : 5]

SEAT No. :

PE-4189

[Total No. of Pages : 2

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M.C.A. (Management)

DSA502MJ-12 : DATA STRUCTURE AND ALGORITHMS

(2024 Pattern) (Semester - I)

Time : 2½ Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) *All questions carry equal marks.*
2) *All questions are compulsory.*

Q1) a) Write an algorithm to find and print sum and average of array elements. **[6]**

b) Explain memory allocation & indexing of a 1-D array. **[4]**

OR

c) Write an algorithm to insert an element at the beginning of the list. **[6]**

d) Write an algorithm to concatenate two strings. **[4]**

Q2) a) Write an algorithm to print sum of even and odd node elements in singly link list. **[6]**

b) Differentiate between singly Link List & Doubly Link List. **[4]**

OR

c) Write an algorithm to insert an element in the doubly link list at a given position. **[6]**

d) Explain in brief applications of a circular linked list. **[4]**

Q3) a) Write an algorithm to perform all operations of a stack using linked list. **[6]**

b) Explain applications of queue with suitable example. **[4]**

OR

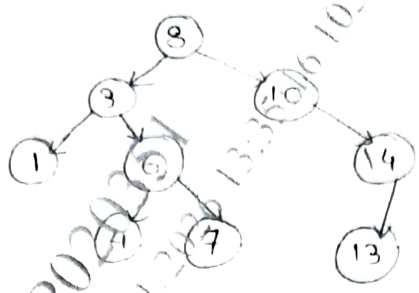
c) Convert the following infix expression to postfix expression using stack
A * (B * C + D * E) + F **[6]**

d) Differentiate between stack and queue. **[4]**

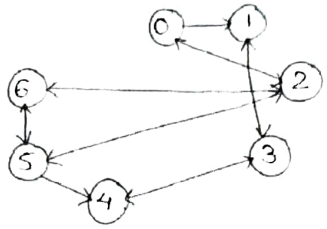
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Q4) a) For the given binary search tree write recursive algorithms to print the inorder, preorder and post order traversals. **[6]**



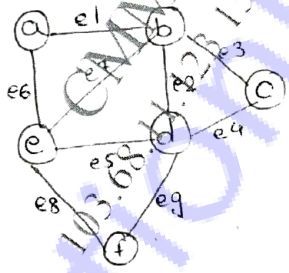
b) In the given directed graph find out in-degree, out - degree and total degree of graph. **[4]**



OR

c) Create an AVL tree by inserting the values 48, 72, 36, 8, 79, 22, 84, 66. Write a recursive algorithm to explain the insertion and balancing process using proper rotation techniques. **[6]**

d) Give the Adjacency Matrix and linked list representation of undirected graph. **[4]**



Q5) a) Write an algorithm to sort given array using merge sort. **[6]**

20, 18, 23, 38, 5, 11, 9, 21, 30, 4.

b) Discuss Min heap and max heap with suitable example. **[4]**

OR

c) Consider the array : 7, 10, 13, 17, 20, 23, 26, 29, 32. Element to search : 29 apply interpolation search algorithm. **[6]**

d) Discuss Hash functions with suitable example. **[4]**

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