DMMC/M-18   **10575**

DATA STRUCTURES
Paper : CS-DE-13

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all, selecting exactly *one* question from each unit. Question number 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following in brief :

    (a) What do you mean by data structures?

    (b) Define diagonal and triangular matrices. .

    (c) How can you represent a linked list in computer memory?

    (d) What is a priority queue?

    (e) Write a recursive function for finding factorial of a number.

    (f) What is a heap?

    (g) Differentiate between directed and undirected graphs.

    (h) Discuss the complexity of bubble sort.   (8×2=16)

UNIT–I

2. (a) Discuss various operations that can be performed on data structures. Describe various data structures in brief.   8

(b) Describe various ways to store strings in computer memory. 8

3. (a) Write algorithms for insertion and deletion of an element from an array. 8

(b) How can you store an upper triangular matrix (sparse matrix) in one dimensional array? Explain. 8

UNIT–II

4. Discuss various types of linked lists. How can you insert and delete an element from a two-way linked list? Explain by writing algorithms and with the help of suitable examples. 16

5. (a) Write an algorithm for inserting an element in a queue. Explain the same using suitable example. 8

(b) Write algorithms for push and pop operations in stack. Explain both using suitable examples. 8

UNIT–III

6. What do you mean by polish notation? Write algorithms for converting an infix expression into a postfix expression and evaluating a postfix expression. Explain both the algorithms using suitable examples. 16

7. What is a binary search tree? How can you store a binary search tree in computer memory? Explain the insertion and deletion operations in a BST by writing algorithms and using suitable examples. 16

UNIT–IV

8. How can you store a graph in computer memory? Write an algorithm for traversing a graph and explain the same using suitable example. 16

9. (a) Write an algorithm for searching a number from a given list of numbers using binary search. 8

(b) What do you mean by radix sort? How can you sort following numbers using radix sort:

99, 100, 8, 345, 66, 123, 820, 55, 9, 294, 742. 8

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