S-768

Total Pages : 5 **Roll No. ----------**

MCS-405/DCA-105

DATA STRUCTURE AND PROGRAM METHODOLGY

(MSCIT/PGDCA/DCA)

2ND Semester, Examination 2022(Dec.)

Time: 2 Hours Max. Marks: 70

Note : This paper is of Seventy (70) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section – A

(Long Answer – type questions)

Note: Section 'A' contains Five (05) long-answer-type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.

[2 x 19 = 38]

P.T.O.

Q.1. Discuss the following in detail: (Marks are mentioned against each question)

a. Give an array of n integers, write an algorithm to find the smallest element. Find number of instruction executed by your algorithm? (7 Marks)

b. Discuss the time and space complexities with example. (5 Marks)

c. Discuss Linked List with example of Singly Linked List and Doubly Linked List. (7 Marks)

Q.2. Discuss the following in detail: (Marks are mentioned against each question)

a. Write a C program where following numbers are stored in a array: 2 12 17 24 5 78 35 18 16. (8 Marks)

b. What are methods for representing negative binary number? Convert the following number to ones complement and twos complement notation : 00110111 (5 Marks)

c. Discuss the following in detail: (Marks are mentioned against each question) (6 Marks)

i. Queue (2 Marks)

ii. Tree (2 Marks)

iii. Graph (2 Marks)

Q.3. Discuss the following in detail: (Marks are mentioned against each question)

a. Write a C program to implement tower of Hanoi using stack. (10 Marks)

b. Discuss Binary Tree Traversal along with Inorder, Preorder and Postorder Traversal with examples of each. (9 Marks)

Q.4. Discuss the following in detail: (Marks are mentioned against each question)

a. Discuss Algorithm of Bubble Sort. Sort the following using bubble sort technique. (7 Marks)

15	18	9	4	2	19	13	75	1

b. Discuss Minimum Spanning Tree with proper figures and diagrams. (7 Marks)

P.T.O.

c. Discuss Array Representation of Binary Tree with examples. (7 Marks)

Q.5. Discuss the following in detail along with examples and diagrams of each: (4.75 Marks each, 4.75 x 4 =19)

a. Adjacency List

b. DFS

c. BFS

d. Kruskal algorithm

Section – B

(Short-answer-type questions)

Note: Section 'B' contains Eight (08) short-answer-type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only.

[4 x 8 = 32]

Q.1. Discuss Algorithm of Insertion Sort with example and its Time Complexity.

Q.2. Discuss Data Structures? Give details and examples about Linear and Non-Linear Data Structures.

Q.3. Discuss algorithm for addition and deletion of items in a Queue.

Q.4. Discuss Quick Sort with algorithm, example and time-complexity.

Q.5. Write a procedure for the merge procedure Merge1 (a, i, j, k). Explain taking example.

Q.6. Discuss the algorithms with example for Linear Search for sorted list as well as Non Sorted List. Also discuss the run time complexities for both the cases.

Q.7. Discuss Stack with the examples of Push and Pop operations, also give examples of these operations.

Q.8. Discuss Algorithm of Binary Search with examples, complexity, limitations and padding.

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