

11. Explain the implementation of stack using arrays.
12. What is Queue ? Why circular queue is needed ?  
Explain the adjacency matrix with the help of a suitable example.
13. The inorder and preorder traversal of the tree is given below :
- Inorder** : D B M I N E A F C J G K
- Preorder** : A B D E I M N C F G J K
- (i) Construct the corresponding binary tree.
- (ii) Determine the postorder traversal of the tree drawn.

## MCA-06

December – Examination 2022

### MCA Examination

#### DATA STRUCTURE THROUGH 'C' LANGUAGE

Paper : MCA-06

Time : 3 Hours ]

[ Maximum Marks : 80

*Note* :- The question paper is divided into three Sections A, B and C. Write answers as per the given instructions.

#### Section-A

8×2=16

#### (Very Short Answer Type Questions)

*Note* :- Answer all questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to 30 words. Each question carries 2 marks.

1. (i) What is a data structure ?  
(ii) Define the space complexity.

- (iii) Define the circular link list.
- (iv) Distinguish between static and dynamic implementation of stack.
- (v) Define doubly link list.
- (vi) What is user defined data type ?
- (vii) How does a quick sort performs on an array that is already sorted ?
- (viii) Can postfix notation be evaluated with the help of stack ?

**Section-B** **4×8=32**

**(Short Answer Type Questions)**

**Note** :- Answer any *four* questions. Each answer should not exceed **200** words. Each question carries 8 marks.

- 2. Write an algorithm to find the median of  $n$  numbers. Find number of instruction executed by your algorithm. What are the time and space complexities ?
- 3. Implement queue using circular linked list.
- 4. Why are stacks called 'LIFO' structures ? Explain with suitable example.

- 5. Explain the priority queue with suitable example.
- 6. What is Searching ? What are the advantages and disadvantages of sequential search technique ?
- 7. Write a program to sort the following list using Quick Sort method :

4, 3, 1, 6, 7, 2, 5, 8

- 8. For the following expression find out the postfix notation and evaluate the postfix notation :

$(2 + 7 * 3)/(4 * 8 - 2) + 7$

- 9. Define the following in term of Graph :

- (i) Degree of a vertex
- (ii) Weighted graph
- (iii) Path
- (iv) Strongly connected graph

**Section-C** **2×16=32**

**(Long Answer Type Questions)**

**Note** :- Answer any *two* questions. You have to delimit your each answer maximum up to **500** words. Each question carries 16 marks.

- 10. Explain the insertion of new node at first place in doubly link list with suitable example.