10. Describe the following with a suitable example :
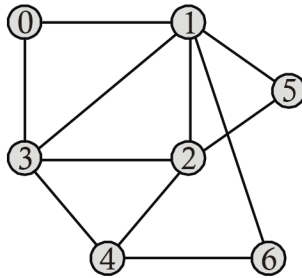
    (i)   Dynamic strategy

    (ii)  Travelling salesman problem

11. Write an algorithm to implement Prim's algorithm. Discuss with the help of an example.

12. Apply BFS and DFS on the graph given below. Show algorithmic steps also.



13. The inorder and preorder traversal of the tree is given below :

    **Inorder**   : DBMINEAFCJGK

    **Preorder**  : ABDEIMNCFGJK

    (i)   Construct the corresponding Binary Tree

    (ii)  Determine the postorder traversal of the tree drawn.

# MSCCS-07/MSCCS-201/ MSCCSC-201/MCA-201

## December – Examination 2022

## MSCCS (Final)/MCA (IInd Year) Examination

### Data Structure and Algorithm

### Paper : MSCCS-07/MSCCS-201/MSCCSC-201/MCA-201

*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 Linked List ? Give an example.

    (ii)  Explain the worst case scenario for linear search. Give an example.

    (iii) List any *four* applications of priority queue.

    (iv)  State Knapsack Problem. Also, give an example.

    (v)   What do you mean by 3-D array ? Give some examples.

    (vi)  State Cook-Levin Theorem.

    (vii) What do you mean by complete binary tree ? Give an example.

    (viii) What is AVL Tree ? Give an example.

### 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.  What is a Queue ? Explain how queue is differ from stack with suitable examples.

3.  What is Selection Sort ? Write its algorithm. Compare its complexity with insertion sort.

4.  Write an algorithm to delete an item from the singly linked list. Also, give the time complexity of the different cases considered.

5.  Write an algorithm to insert and delete an element from an array. Explain your algorithm by suitable example.

6.  What do you mean by NP-Complete Problem ? Describe with suitable example.

7.  What is Data Structure ? Write a brief note on classification of data structure.

8.  What is reverse polish notation ? Solve the following arithmetic expression written in postfix notation by using stack :

    5, 6, 2, +, *, 12, 4, /, –.

9.  Suppose the following list of letters is inserted in order into an empty binary search tree :

    J, R, D, G, T, E, M, H, P, A, F, Q

    (i)   Find the final tree T

    (ii)  Find the preorder, inorder and post-order traversal of T.

### 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.