



I Semester M.C.A. (Two Years Course) Examination, July 2023
(CBCS) (2020 – 2021 and Onwards)
COMPUTER SCIENCE
1MCA6 : Data Structures

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **any five** questions from Section – A.
2) Answer **any four** questions from Section – B.

SECTION – A

I. Answer **any five** of the following. **Each** question carries **6** marks. (5×6=30)

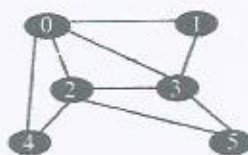
- 1) Define data structures. Explain the classification of data structures.
- 2) What are Asymptotic Notations ? Explain with an example.
- 3) Define an Array ADT. Write a function to search an element in an array.
- 4) What is a Polish Expression ? Evaluate the following postfix expression using a stack table.

2 3 * 4 5 + *

5) Define the following :

- i) Binary tree
- ii) Binary search tree
- iii) Complete binary tree.

6) Define a weighted graph. Write the adjacency matrix for the following graph.



- 7) Write an algorithm to perform quick sort for contiguous list with example.
- 8) Explain the collision resolution using open addressing with an example.



SECTION - B

II. Answer **any four** of the following. **Each** question carries **10** marks. **(4×10=40)**

- 9) a) Write an algorithm to perform Bubble Sort and illustrate time complexity of an algorithm. 6
b) Write a function to perform concatenation of two strings. 4
- 10) a) Explain the recursive approach to solve the problem of Tower of Hanoi with three discs. 5
b) Define stack. Explain the PUSH and POP operations of stack with an example. 5
- 11) a) Write an algorithm to convert infix expression to postfix expression. 5
b) Define a Queue. Explain the insert and delete operation in circular queue. 5
- 12) a) Write a function for Insertion at End and Deletion at End in Singly Linked List. 6
b) Write an algorithm to perform insert operation in doubly linked list with an example. 4
- 13) Explain the different types of tree traversal techniques with its algorithm and example. 10
- 14) a) Sort the given list of elements using Merge Sort. Discuss with algorithmic steps. 7
{14, 43, 27, 86, 35, 19, 54, 78, 109, 61}
b) Write a note on Hashing. 3