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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.

P.T.O.

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.

{14, 43, 27, 86, 35, 19, 54, 78, 109, 61} **7**

b) Write a note on Hashing. **3**