I Semester M.C.A. (2 Years Course) Examination, August/September 2021
(CBCS Scheme)
(2020 – 2021 and Onwards)
Computer Science
1MCA6 : DATA STRUCTURES

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **all** the Sections.
 2) Answer **any five** from Section – **A**, Answer **any four** from Section – **B**.
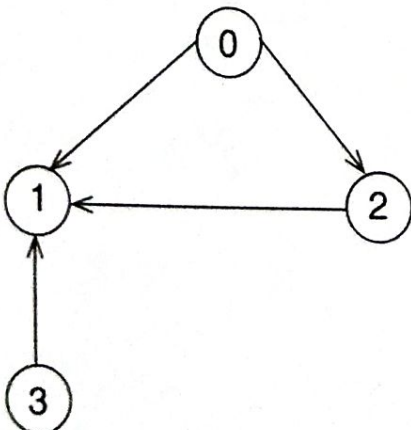
SECTION – A

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

1. Define data structure and explain the operations performed on the linear data structure. **6**

2. Explain abstract data type. What is the importance of abstract data type in data structure ? **6**

3. What are the ways in which a two dimension array is stored ? Write any two limitations of array. **6**

4. Given the following sparse matrix,

$$\begin{bmatrix} 0 & -1 & 0 & 0 & 2 \\ 3 & 0 & 4 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 2 & 0 & 1 & 0 \end{bmatrix}$$. Design an algorithm to search an item in sparse matrix. **6**

5. What is weighted graph ? Write the adjacency matrix for the following graph. **6**

6. Convert the following infix expression to postfix using stack
   A * B – (f + D) + E. **6**

7. Explain different collision resolution strategies for hashing. **6**

8. Explain Quick sort algorithm in detail with an example. **6**

SECTION – B

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

9. a) Explain string as ADT. **6**

   b) Write an algorithm to delete a substring from a given string. **4**

10. a) Write an algorithm to traverse in a single linked list. **6**

    b) Write an algorithm to insert a node at the beginning of a singly linked list. **4**

11. a) Write an algorithm for push and POP operations on stack. **6**

    b) Write an algorithm to find GCD of two numbers using recursion. **4**

12. a) Explain directed and undirected graph with an example. **6**

    b) Discuss the importance of graph and tree in data structure. **4**

13. a) Explain depth first search algorithm to traverse a graph. **6**

    b) Explain linear search with its merits and demerits. **4**

14. a) Write bubble sort algorithm. Sort the following using bubble sort.
    {5, 1, 6, 2, 4, 3}. **6**

    b) Explain Binary search algorithm. **4**

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