



I Semester B.C.A. Examination, February/March 2024
(NEP) (F + R)
COMPUTER SCIENCE
Data Structures

Time : 2½ Hours

Max. Marks : 60

Instruction : Answer all Sections.

SECTION – A

- I. Answer **any four** questions. **Each** question carries **2** marks. **(4×2=8)**
- 1) What is non-linear data structure ? Give two examples.
 - 2) What is column major representation of multi-dimensional array ? Give an example.
 - 3) What is stack ? Write stack overflow condition.
 - 4) What is circular queue ? Write the advantage of circular queue over linear queue.
 - 5) What is AVL Tree ? Give an example.
 - 6) What is hashing ? Write any two techniques for choosing a hash function.

SECTION – B

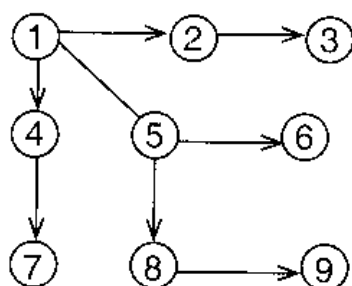
- II. Answer **any four** questions. **Each** question carries **5** marks. **(4×5=20)**
- 7) What is algorithm ? Explain best case, average case and worst case complexity of linear search algorithm.
 - 8) Write an algorithm to delete an element from an array.
 - 9) Write a C program to find GCD of three numbers.
 - 10) Evaluate the following post fix expression using stack.
73 + 84 – *.
 - 11) Construct a Binary Search Tree (BST) for the given list.

2	7	3	11	5	15	8	19
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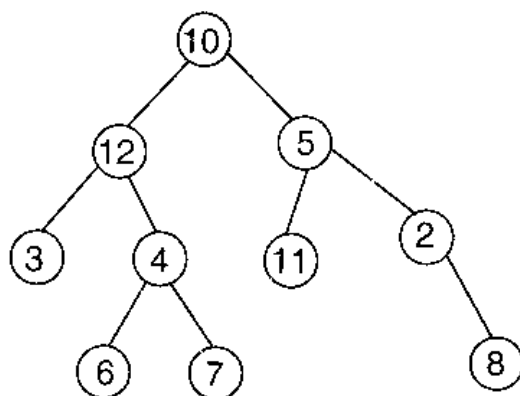
- 12) What is graph ? Explain the BFS algorithm through queue for the following graph :



SECTION – C

III. Answer **any four** questions. **Each** question carries **8** marks. (4×8=32)

- 13) a) What is abstract data type ? Explain queue as ADT. 4
 b) Write a C program to check whether a given matrix is sparse matrix or not. 4
- 14) a) Write a C function to insert an element at a position in a singly linked list. 4
 b) What is the difference between doubly linked list and circular linked list ? Give examples. 4
- 15) a) Explain recursion with an example. 4
 b) Write a program to perform selection sort. 4
- 16) What is queue ? Write the linear queue insertion and deletion function.
- 17) a) What is Binary Tree ? Write a C function to perform preorder traversal. 4
 b) Write the pre-order traversal of following binary tree. 4



- 18) a) Define collision. Explain any 3 collision resolution techniques. 4
 b) Write a C program to perform binary search. 4