NP – 393

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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.

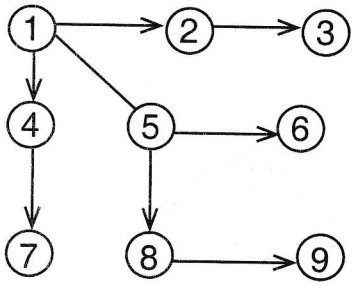
    73 + 84 – *.

11) Construct a Binary Search Tree (BST) for the given list.

2	7	3	11	5	15	8	19

P.T.O.

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**

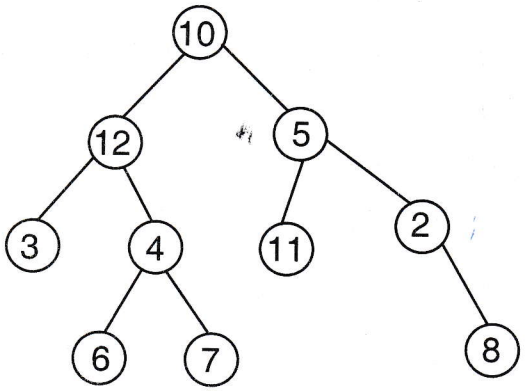
15) a) Explain recursion with an example. **4**

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**