I Semester B.C.A. Degree Examination, January/February 2025
(NEP)
(Repeaters)
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) Define time and space complexity.

2) Define ADT with an example.

3) What is Garbage collection ?

4) Define Recursion.

5) What is Binary search tree ?

6) Define collision resolution by chaining.

SECTION – B

II. Answer **any four** questions. **Each** question carries **5** marks. **(4×5=20)**

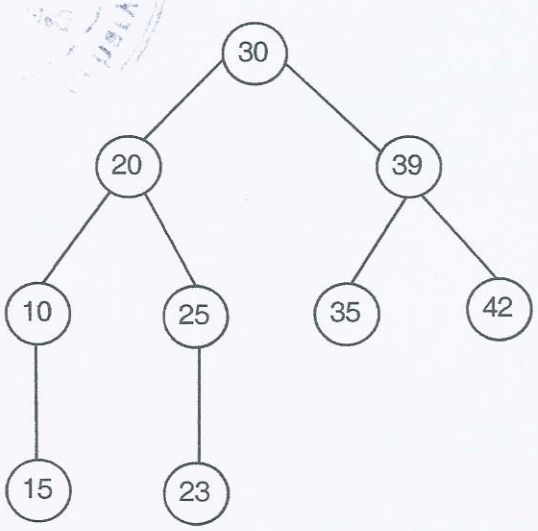
7) Explain Asymptotic notations to represent complexity of algorithms.

8) What is recursion ? Write the 'C' program to find GCD of three numbers using recursion.

9) Write an algorithm for ENQUEUE and DEQUEUE operations.

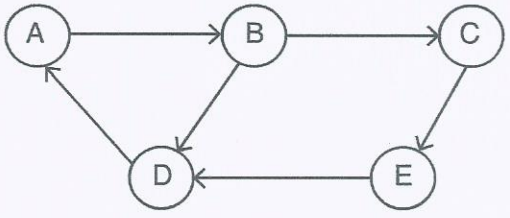
P.T.O.

10) Write pre-order, In-order, post-order traversal for the given tree :



11) Write an algorithm for selection sort. Sort the numbers {7,5,4,2,3} using the algorithm.

12) Write adjacency matrix and adjacency list for the given graph.



SECTION – C

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

13. a) Define Linear array. Write ADT of a linear array.

    b) Write an algorithm to delete an element from a linear array. **(4+4)**

14. a) Differentiate between singly linked list and doubly linked list.

    b) Explain Towers of Hanoi problem with an algorithm. **(3+5)**

15. a) Write an algorithm to evaluate postfix expression using stack.

    b) Evaluate the given postfix expression using stack. 2 3 4 * + **(4+4)**

16. a) Write an algorithm for Binary search.

    b) Search 7 using the algorithm in a list.

    {4,6,7,8,12,14,19} **(4+4)**

17. a) Explain different types of Queues.

    b) Write an algorithm for insertion of an element into a circular queue. **(3+5)**

18. a) Define Hashing. Explain Hash table and Hash function with an example.

    b) List any two probing methods and explain. **(4+4)**
