NP – 315

9

# I Semester B.C.A. Degree Examination, March/April 2023
## (NEP) (2021-22 and Onwards) (F+R)
## COMPUTER SCIENCE
## Data Structures



Time : 2½ Hours  Max. Marks : 60

***Instruction*** : *Answer **all** Sections.*

SECTION – A

Answer **any four** questions. **Each** question carries **2** marks : **(4×2=8)**

1. Define data structure. List out any two operations of data structure.
2. Write ADT of an array.
3. What is queue ? And mention its types.
4. Mention the different ways of tree traversal.
5. What is 'B' Tree ? Mention its operation.
6. Define any two collision resolution in Hashing.

SECTION – B

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

7. What is algorithm ? Explain time and space complexity of algorithm.
8. Write an algorithm to delete a node in the queue.
9. Evaluate the following infix to prefix
   Q = (A + B) / (C * D ).
10. Explain AVL tree with its operation.
11. Explain DFS algorithm through stack concept.
12. Explain quick sort algorithm.

P.T.O.

## SECTION – C

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

13. a) Explain Asymptotic notation with example. **4**

    b) Write the 'C' program to display sparse matrix and its transpose. **4**

14. a) Explain array concepts with its classification. **4**

    b) Write an algorithm to insert an element to the given array A = {10, 30, 40, 50}. Insert element 20 at the position 2. **4**

15. What is stack ? Explain PUSH and POP operation algorithm with example. **8**

16. a) Write an algorithm for bubble sort. **3**

    b) Sort the following elements using bubble sort. **5**

| 38 | 47 | 24 | 42 | 17 |
|---|---|---|---|---|

17. a) What is 'BST' ? **2**

    b) Construct a BST for the given list : **6**

| 56 | 38 | 10 | 65 | 72 | 44 | 50 |
|---|---|---|---|---|---|---|

18. a) Define Hashing. Explain Hash table and Hash function. **3**

    b) Write 'C' program for Linear search. **5**