SE – 338

# II Semester B.C.A. Examination, September 2020
## (CBCS) (F+R)
## (2014-15 and Onwards)
## COMPUTER SCIENCE
## BCA 203 : Data Structures

Time : 3 Hours  Max. Marks : 70

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

SECTION – A

Answer **any ten** questions. **Each** question carries **two** marks. **(10×2=20)**

1. What are non-linear data structures ? List any two non-linear data structures.
2. State with example any two word processing operations.
3. State any four mathematical functions.
4. Compare array v/s linked list method of storage.
5. What is a sparse matrix ? Illustrate with an example.
6. State the different types of linked lists.
7. State any two applications of stack.
8. Convert the following expression in postfix format :
   $8 * (3 + 5) / 4 - 2$.
9. What are the typical operations performed on non-primitive data structures ?
10. Compare linear queue v/s circular queue.
11. What is directed graph ? Give an example.
12. What is a binary search tree ?

SECTION – B

Answer **any five** questions. **Each** question carries **ten** marks. **(5×10=50)**

13. a) Explain the different asymptotic notations. 5
    b) What is an ADT ? Explain its relevance in the study of data structures. 5

P.T.O.

14. a) Explain with an example the working of any one string matching algorithm. 5

b) Write the 'C' functions for the following string operations : 5

i) Length of a string.

ii) String concatenation.

15. a) Write a 'C' program for sorting an array using Bubble sort technique. 5

b) Write a note on dynamic memory allocation and garbage collection. 5

16. a) What is a linked list ? Describe the node of a single linked list and the linked list operations. 5

b) Write algorithms for the following single linked list operations : 5

i) Insert a node at the beginning of a linked list.

ii) Searching a value in a linked list.

17. a) Write an algorithm for converting an infix expression into postfix expression. 4

b) Discuss the different types of queues. 6

18. a) What is a binary tree ? Explain the following : 5

i) Full/complete binary tree.

ii) Strictly binary tree.

iii) Almost complete binary tree.

b) Draw a BST for the following and perform pre order, in order and post order traversals. 5

7, 4, 9, 11, 12, 8, 3, 1, 2

19. a) What is recursion ? Write a recursive function for the tower of Hanoi problem. 5

b) Write a C program for linear search. 5

20. a) Discuss with examples the methods of graph representation. 5

b) Explain the DFS method of graph traversal. 5