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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)

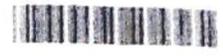
1. What are non-linear data structures ? List any two non-linear data structures.
2. State with example any two word processing operations.
3. State any four mathematical functions.
4. Compare array v/s linked list method of storage.
5. What is a sparse matrix ? Illustrate with an example.
6. State the 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

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- 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
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