

**GS-636**

II Semester B.C.A. Examination, May/June 2019
(CBCS - F+R) (2014-15 & onwards)

DATA STRUCTURES
BCA 203 : Data Structures

Time : 3 Hours

Max Marks : 70

Instruction : Answer *all* sections.**SECTION - A**Answer **any 10** questions.**10x2=20**

1. Define data structures.
2. Define Time Complexity and Space Complexity.
3. Explain row major and column major representation of multi-dimensional arrays.
4. Define dynamic memory allocation.
5. Define Sorting. Mention the different sorting techniques.
6. What is searching ? Mention the types.
7. What are the advantages of Linked List over arrays.
8. Define sparse Matrix.
9. What is Stack ? Mention the application of Stack.
10. Define overflow in case of Queue.
11. What is a directed graph ? Give an example.
12. Write the difference between Tree and Binary Tree.

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No. 16, South End Road,
BANGALORE - 560 004

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**SECTION - B**

Answer any 5 questions.

5x10=50

13. (a) Explain the classification of data structures in detail. 5
(b) Explain asymptotic notations with an example. 5
14. (a) Write an algorithm to sort 'N' numbers using Bubble Sort. 5
(b) Explain Binary search method. 5
15. (a) Define Linked list. Explain various types of Linked list. 5
(b) Write an algorithm to insert a node at the beginning of Linked list. 5
16. (a) Write an algorithm for Push & Pop Operation of a Stack. 6
(b) Write a C-Program to find GCD of two numbers using recursion. 4
17. (a) Convert an infix expression 'Q'. $Q = A + (B * C - D / E \uparrow F) * G * H$ to post fix expression. 6
(b) Write a C-Program to perform Concatenation of 2 strings without using String Function. 4
18. (a) What is a Queue ? Explain the operations performed on ordinary Queue. 6
(b) Write an algorithm to insert an element to a Circular Queue. 4
19. (a) Write Depth First Search algorithm to traverse a graph. 5
(b) What is a graph ? What are the types of graph ? Explain. 5
20. What is a tree ? Explain different tree traversal techniques with an algorithm. 10