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**311302**

**Jan. 2022**

**BCA - IIIrd SEMESTER**

**Data Structures (BCA-17-202)**

Time : 90 Minutes]

[Max. Marks : 25

*Instructions :*

1. *It is compulsory to answer all the questions (1 mark each) of Part-A in short.*
2. *Answer any three questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

**PART - A**

1. (a) Differentiate between array and linked list. (1)
- (b) Differentiate between linear search and binary search. (1)
- (c) Define LIFO. (1)
- (d) List various applications of stack. (1)
- (e) Differentiate between queue and circular queue. (1)
- (f) Define threaded-lists. (1)
- (g) Differentiate between data type and data structure. (1)
- (h) Define sparse arrays. (1)

- (i) Define time-space complexity. (1)
- (j) Define push and pop operation. (1)

### PART - B

- 2. (a) Write an algorithm to count the number of nodes in a Singly Linked List. (3)
- (b) What is DEQUEUE? (2)
- 3. (a) Define Big Oh, Big Omega and Big Theta Notations. (2)
- (b) Write an iterative algorithm to perform in order traversal of a binary tree. (3)
- 4. Write an algorithm to convert a given infix expression to postfix expression. Trace the steps involved in converting the given infix expression  $((A+B)^C) - ((D*C)/F)$  to postfix expression. (5)
- 5. (a) Write algorithms for DFS and BFS traversal on a graph. (3)
- (b) Derive the Big - O notation for  $5n^3 + 2n^2 + 3n$ . (2)
- 6. (a) What is garbage collection? (2)
- (b) Write an algorithm to find a substring in a given string. (3)