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**BCACAC 210**

**Credit Based Third Semester B.C.A. Degree Examination, Nov./Dec. 2018**

**(Common to all Batches)**

**DATA STRUCTURES**

Time : 3 Hours

Max. Marks : 80

**Note :** Answer **any ten** questions from **Part A** and **one full** question from **each** Unit of **Part B**.

**PART – A**

1. a) Define non-linear data structure. Give example. (10×2=20)  
b) Write the value of  $\lceil 1.25 \rceil$ ,  $\lfloor 15.7 \rfloor$ ,  $\text{INT}(-8.9)$ ,  $|11.11|$ .  
c) List any four data structure operations.  
d) List the advantages of linked lists over arrays.  
e) What is sorting ? Why is it necessary ?  
f) What is stack ? Write any two applications of stacks.  
g) What is a queue ? Why queue is called FIFO list ?  
h) What is recursion ?  
i) Write prefix and postfix equivalents of  $(a + b) * (c - d)$ .  
j) Define adjacency matrix.  
k) What is binary search tree ? Give example.  
l) Define graph and multigraph.

**PART – B**

**Unit – I**

2. a) Explain algorithmic notations for selection control structure.  
b) Trace Bubble sort for the following data  
65, 25, 9, 75, 20, 12, 40, 32, 51  
c) Explain the concept of binary search technique with example. (5+5+5)
3. a) List and explain algorithmic notations for iteration logic.  
b) Write an algorithm to search for a number using linear search.  
c) Explain row-major and column major representation of two dimensional arrays with example. (3+6+6)

P.T.O.

**Unit – II**

4. a) Write algorithm to insert a node into a doubly linked list. Also draw the diagram to represent the same.
- b) Sort the following numbers using Insertion sort  
40, 11, 33, 77, 88, 22, 90, 66
- c) What are circular linked lists ? Explain with a figure to delete a node at the end of the same. **(5+5+5)**
5. a) Write an algorithm to insert a node after a given node in a singly linked list.
- b) Write an algorithm to merge two sorted arrays.
- c) Explain shell sort with example. **(5+5+5)**

**Unit – III**

6. a) Write algorithm to perform PUSH and POP operations on stacks using arrays.
- b) Evaluate the following postfix expression  
50, 40, +, 18, 14, -, 2, ^, +
- c) Write a note on De-queue and priority queues. **(4+7+4)**
7. a) Write algorithm to perform queue operations using array.
- b) Convert  $((A + B) * D) ^ (E - F)$  to postfix using stack.
- c) Write recursive algorithm to find fibonacci series. **(5+6+4)**

**Unit – IV**

8. a) Draw binary tree for the following list of numbers and traverse the same using in order, pre order and post order 40, 60, 50, 33, 35, 56, 78, 90, 55, 11.
- b) Explain linked representation of graph with example.
- c) Define the following tree terminology :
- |             |                     |
|-------------|---------------------|
| i) Siblings | iii) Node           |
| ii) Path    | iv) Degree of node. |
- (7+4+4)**
9. a) Construct tree for the given infix expression :  
 $[a + (b - c)] * [(d - e) / (f + g - h)]$  traverse it in In order, post order and pre order.
- b) Explain the linked list representation of a binary tree with example.
- c) Write algorithm for breadth first search traversal for a graph. **(6+4+5)**
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