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BCACAC 232

**Third Semester B.C.A. Degree Examination, April 2021
(Choice Based Credit System)
(2020-21 Batch Onwards)
DATA STRUCTURES**

Time : 3 Hours

Max. Marks : 80

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

PART – A

1. a) Write the algorithmic notation for Input/Output statements. **(10×2=20)**
- b) Define linear array. Give the formula to find the location of a particular element in one dimensional array.
- c) What is sparse matrix ? Give an example.
- d) What do you mean by sequential search ?
- e) What do you mean by sorting ? Mention any two sorting techniques.
- f) Define circularly linked list. Give its diagram.
- g) How does Stack differ from queue ?
- h) Evaluate $AB+CD^*/$ with proper step. Assume $A = 2, B = 3, C = 5, D = -5$.
- i) Define dequeue. What are its types ?
- j) What is a binary search tree ? Give an example.
- k) What is complete binary tree ?
- l) Define path matrix.

PART – B

Unit – I

2. a) Write the classification of data structure and briefly explain it.
- b) Write an algorithm to find the maximum element in an array.
- c) How do you represent polynomial using arrays ? Explain with an example.

(5+5+5)

P.T.O.



3. a) List and explain the various operations performed on data structure.
 b) Write a note on iteration logic.
 c) Write an algorithm to delete an element from a linear array. (5+6+4)

Unit – II

4. a) Write an algorithm for insertion sort.
 b) Trace the bubble sort algorithm for the following data :
 35, 52, 28, 86, 66, 23, 15, 57.
 c) Write an algorithm to insert an item at the beginning of a linked list. (5+6+4)
5. a) Write an algorithm for selection sort.
 b) Trace radix sort technique for the following data :
 352, 175, 361, 423, 538, 128, 351, 543, 366.
 c) Write an algorithm to delete a node following a given node of a linked list. (5+6+4)

Unit – III

6. a) Write an algorithm to insert an element into a queue using linked list.
 b) Write an algorithm to evaluate postfix expression.
 c) Convert the following infix expression into postfix expression using stack status.
 $Q : ((A + B) * D) \uparrow (E - F).$ (5+5+5)
7. a) Write an algorithm for PUSH and POP operations using arrays.
 b) Write an algorithm to delete an element from a queue using linked list.
 c) Evaluate the following postfix expression showing the stack status.
 $P : 3, 1, +, 2, \uparrow, 7, 4, -, 2, *, +, 5, -.$ (5+5+5)

Unit – IV

8. a) Define the following terms with respect to tree.
 i) parent ii) left child iii) terminal node
 iv) branch v) depth of a tree
 b) Draw the binary search tree for the following list of numbers and traverse it in preorder, inorder and postorder.
 14, 15, 4, 9, 7, 18, 40, 35, 16, 13.
 c) Write an algorithm for Depth First Search (DFS) for a graph. (5+5+5)
9. a) With an example, explain linked representation of binary tree.
 b) Draw the binary tree for the following :
 INORDER : D, B, E, A, F, C, H, G
 POSTORDER : D, E, B, F, H, G, C, A
 c) Write an algorithm for Breadth First Search (BFS) for a graph. (5+5+5)