

B.E.-Computer Technology Sem IV
CT402 - Data Structures

P. Pages : 2

Time : Three Hours



GUG/S/18/3884

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.

1. a) What is Data abstraction? Why stack and Queues are called abstract data type? 6
- b) Define data structure and explain its types by giving example. 6
- c) Explain Row major ordering and column major ordering in arrays. 4

OR

2. a) What is linear search? Write a program to implement linear search. 8
- b) Sort the following array using insertion sort. 8
77, 33, 44, 11, 88, 22, 66, 55.
Write the algorithm and give the time complexity of same.

3. a) Write a C function for stack operations PUSH and POP. 8
- b) Convert the following infix expression to post – fix and prefix. 8
i) $(A + B \uparrow D) / (E - F) + G$ ii) $A * (B + D) / E - F * (G + H / K)$

OR

4. a) Write an algorithm to insert an element in priority queue. What is difference between Circular queue and linear queue. 8
- b) Evaluate the following postfix expression. 8
i) 1, 2, 7, 3, -, 1, 2, 1, 5, +, *, + ii) 6, 2, 3, +, -, 3, 8, 2, 1, +, *, 2, ^, 3, +

5. a) Write a function to reverse a singly linked list. 8
- b) What is dynamic memory management? Explain calloc () malloc () function with example. 8

OR

6. a) What is linked list? Explain various types of linked list. 8
- b) Give an explain the structure of a node of doubly linked list. Also explain insertion operation in doubly linked list. 8

7. a) Explain the following tree terminologies: 8
i) Binary tree. ii) Degree of a tree.
iii) Complete binary tree. iv) Strictly binary tree.
v) Path vi) Height of tree.
vii) Forest. viii) Siblings.

b) Write a iterative function to traverse a binary tree in preorder. 8

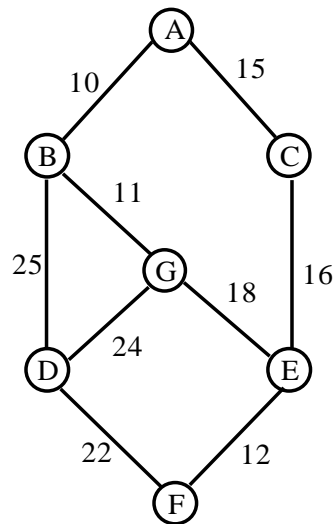
OR

8. a) Construct a B-tree of order 5 by inserting the following keys:- 1, 12, 8, 2, 25, 5, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55, 45. 8

b) Explain single rotation and double rotation in AVL tree. 8

9. a) Explain with example. 8
i) Adjacency matrix. ii) Adjacency list.

b) Find minimum cost spanning tree using. 8
i) Kruskal algorithm. ii) Prim's algorithm.



OR

10. a) Explain graph traversal techniques with example. 8

b) Illustrate DFS transversal for following graph. 8

