

**IT402 - Data Structures**

P. Pages : 2

Time : Three Hours



**GUG/W/16/3913**

Max. Marks : 80

- Notes :
1. Same answer book must be used for all questions.
  2. All questions carry marks as indicated.
  3. Due credit will be given to neatness and adequate dimensions.
  4. Assume suitable data wherever necessary.
  5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain searching and its types. 8  
b) Sort the following array using Radix sort. 8  
[108,99,703,89,631,432,566,41,10,93]

**OR**

2. a) Write a brief note on primitive and non-primitive data structures. 8  
b) Write a program to find a given element in a array of size 10. 8
3. a) Describe memory allocation and garbage collection. 8  
b) Explain linked list (singly link). Give advantages and disadvantages of singly linked list. 8

**OR**

4. a) Write a function to count number of nodes in a doubly linked list. 8  
b) Explain circular linked list. Also explain operations performed on circular linked list. 8
5. a) Explain Stacks. Write about the following stack functions: 10  
i) pop ()  
ii) push ()  
iii) traverse ()  
Write C functions for the above.  
b) Explain Recursion with the help of tower of Hanoi problem. 6

**OR**

6. a) Explain Queues. Write advantages and disadvantage of queues. 8  
b) Write a short note on : 8  
i) Priority queue.  
ii) Multiple stacks.

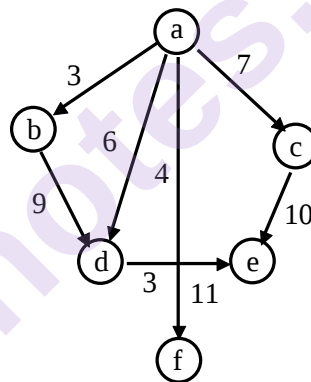
7. a) Write about trees and terminologies of tree. 8  
 b) Explain and write functions for tree traversals inorder, preorder and postorder. 8

**OR**

8. a) Explain threaded binary tree with suitable example. 8  
 b) What is Balanced factor? Explain AVL trees. 8
9. a) Write short note on : 10  
 i) Breadth first search.  
 ii) Depth first search.
- b) What are the applications of graph? 6

**OR**

10. a) Draw the spanning tree for the following graph using prim's algorithm. 8



- b) Explain the following w.r.t graph:- 8
- |                       |                        |
|-----------------------|------------------------|
| i) Complete graph.    | ii) Weighted graph.    |
| iii) Degree of graph. | iv) Adjacent vertices. |
| v) Adjacency matrix.  | vi) Adjacency list.    |
| vii) Cycle.           | viii) Path.            |

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