

ET504M - Data Structures and Algorithms

P. Pages : 2

Time : Three Hours



GUG/W/23/13925

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Assume suitable data wherever necessary.
 3. All questions are compulsory.

1. a) For a certain problem, Mohit and Rohit wrote a solution in a frequency of $N^3 + 25$ and $2N^2 + 800$ respectively. **8**
- 1) What are the Big-O requirements of each algorithm.
 - 2) Check both the solution for the value of N in the range from 3 to 10 And conclude whose solution is better or not on O-notation basis.

- b) Explain ADT with suitable example. **8**

OR

2. a) Write a C code to implement binary search algorithm. **8**

- b) What is searching process and explain linear search with example. **8**

3. a) Write a C program to implement doubly linked list. **8**

- b) Write a program to implement stack, using linked list. **8**

OR

4. a) Write algorithm for doubly linked list for insertion at beginning and at particular position and also state their complexity. **8**

- b) Consider the following elements {2, 3, 4, 5, 6, 7, 8}. Show the above elements in circular linked list and perform the following operations: **8**

1) insert element = 10 at the beginning of the list.

2) delete at the last element of the list.

Illustrate the representation of linked list at each stage with neat sketches and links and state complexity at each operation.

5. a) Convert the following infix into prefix and postfix expression. **16**

1) $A * B + C / D$

2) $(A + B) * C / D + E ^ F / G$

OR

6. a) State and explain applications of stack. **8**

- b) Explain double ended queue with neat sketch and write algorithm for following: 8
 1) insertion at front
 2) deletion at front

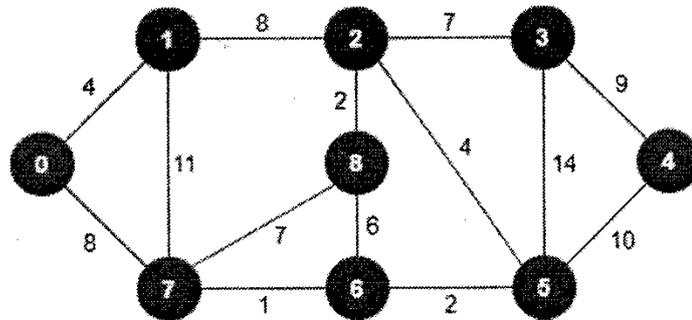
7. a) What is heighted balanced tree and write an algorithm for insertion a node in it. 8
 b) Write an algorithm to search a node in a binary search tree with example. 8

OR

8. a) Explain threaded binary tree with neat sketch. 8
 b) Define BST and write difference between binary tree and BST. 8
9. a) Write algorithm for bubble sort and explain it with an example. 8
 b) Sort the below array with Radix sort algorithm and show each iteration and number of comparison to sort: 8
 Array = {13, 15, 28, 09, 04, 18}

OR

10. a) Find the minimum spanning tree for below graph using Krushkal algorithm. 8



- b) Explain BFS with example. 8
