102 / SE102CS - Data Structure & Algorithms

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Notes : 1. All questions are compulsory.

1. a) Convert following infix to postfix. **8**

   i) (A+B*C) X (E/F)+G

   ii) (A/B +C) / (E*F)/G

   b) What is algorithm? Draw and explain all asymptotic notations of algorithm. **8**

OR

2. a) Write short note on: **8**

   i) Time complexity.

   ii) Space complexity.

   b) Explain stack. Write the functions of push and pop operation. **8**

3. a) What is singly linked list? Write a function to insert a node at the given positions. **8**

   b) Write a program to implement circular linked list. **8**

OR

4. a) Evaluate the given postfix expression using stack. **8**
   6,2,3, +,-3,8,2,1,+,*,2, ,3,,+,+,+.

   b) Write a function to reverse the singly linked list. **8**

5. a) What are structures? Create a structure for students database. Take attributes as [ROLLNO, Name, Marks, Address] **8**

   b) Write a program to implement circular queue. **8**

OR

6. Describe singly linked list with example and memory representation. Also write functions for the following. **8**

   i) Create a list of n nodes.

   ii) Traverse a list.

7. a) Describe the following. **8**

      i) Priority queues.

      ii) Deques.

    b) Describe following representation of graph: **8**

      i) Adjacency matrix.   ii) Adjacency list.

      iii) Multilist.   iv) Path matrix.

<div align="center">OR</div>

8. a) Explain prim's algorithm to find minimum cost spanning tree with suitable examples. **8**

    b) Write a complete algorithm for Breadth first search with suitable example. **8**

9. a) Write a C program for selection sort. **8**

    b) Write the complete snapshots to sort the elements by using Bucket sort algorithm. 24, 47, 80, 40, 10, 50, 68, 90. **8**

<div align="center">OR</div>

10. a) What is Hashing? What is collisions? Explain linear probing technique in collision resolution technique. **8**

    b) What is Heap sort? Sort the following list of an element using max heap tree 6, 5, 3, 1, 8, 7, 12, 4. **8**

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