B.E. Electrical (Electronics & Power) Engineering (Model Curriculum) Semester - VI
TE203A - Data Structures and Algorithms

P. Pages : 2

Time : Three Hours

GUG/S/23/13875

Max. Marks : 80

_____

Notes : 1. All questions are compulsory.
        2. All questions carry equal marks.
        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) What is data structure? Explain different types of data structure with suitable examples. **8**

   b) What is algorithm? Explain the characteristics of an algorithm. **8**

OR

2. a) What is linear search? Explain by taking if suitable example. Also write the function for the linear search. **8**

   b) Explain the following Asymptotic Notations: **8**

     i) Big-oh

     ii) Theta

     iii) Omega

3. a) What is node in linked list? Write a C-code function for the following circular linked list operations: **8**

     i) Inserting the node at beginning.

     ii) Deleting the node of end

   b) Explain different types of linked list in detail. **8**
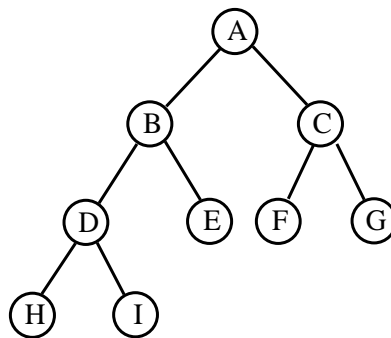
OR

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

   b) Write a function for each of the following: **8**
     i) Deleting the node from given position in singly linked list.
     ii) Traversing the node in the singly linked list

5. a) Write a C-program to implement queue using linked list. **8**

   b) What is stack? Explain difference between stack and Queue. **8**

OR

6. a) Write a menu driven program in C to implement the following function of stack: **8**

     i)   Push ( )   ii)   Pop ( )

     iii) Traverse ( )   iv) Exit ( )

    b) Write a short note on the circular Queue. **4**

    c) Convert the following infix expression to prefix expression. **4**
     i) $(A + B \uparrow D) / (E - F) + G$
     ii) $P * (Q + R) / T - G * (A + S / B)$

7. a) What is binary search Tree? Write an algorithm for creating BST. **8**

    b) Write a short note on AVL Tree. Insert the following elements in an AVL Tree. **8**
       30, 31, 32, 23, 22, 28, 24, 29, 26, 27, 34, 36

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

8. a) Draw a binary tree using given traversal of a tree: **8**
     i)   Inorder : HDIBIEKAFCG
         Preorder : ABDHIEJKCFG

     ii) Inorder : DBFEAGCLJHK
         Postorder: DFEBGLJKHCA

    b) Write a C-program for preorder, inorder and postorder. Also write preorder, postorder and inorder for the following tree: **8**

9. a) What is heapsort? Sort the following list of an element using maxheap tree: **8**
       6, 5, 3, 1, 8, 7, 12, 4

    b) Explain Dijkstra's shortest path algorithm with suitable example. **8**

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

10. a) Write a C-program for the Bubble sort. **8**

    b) Explain the following collision Resolution Techniques in detail: **8**

     i)   Linear probing   ii) Quadratic probing

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