Hall Ticket Number:

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II/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION

February, 2021

Third Semester

Time: Three Hours

Common to CSE & IT

Data Structures

Maximum: 50 Marks

Answer ALL Questions from PART-A.
Answer ANY FOUR questions from PART-B.

(1X10 = 10 Marks)
(4X10=40 Marks)

Part - A

1. Answer the following: (1X10=10 Marks)
   a) What is meant by time complexity?
   b) Define Data Structure.
   c) What is the difference between arraylist and linked list?
   d) Convert (a+b)*c into reverse polish notation.
   e) Write the applications of stack.
   f) What is an expression tree?
   g) Define binary tree.
   h) What is a priority queue?
   i) Define MinHeap.
   j) What is hashing?

Part - B

2. a) Explain Asymptotic notations with an example.   5 M
   b) Write a C program to insert the element in given position of an arraylist.   5 M

3. a) What are the time complexities of following recurrence relations?   5 M

$$T(n) = 2\ T(n/2) + cn \qquad n>1$$
$$= 1 \qquad n=1$$

$$T(n) = T(n-1) + c \qquad n>=1$$
$$= 1 \qquad n=0$$

   b) Explain the routines delete and find Element in single linked list.   5 M

4. a) Explain the procedure to implement stack ADT using linked list.   5 M
   b) Explain Infix to postfix conversion with the following example.   5 M

$$((A+B)-C*(D/E))+F$$

5. a) Write a C program to implement Selection sort.   5 M
   b) Explain the procedure for evaluating postfix expression with the following example.   5 M

$$3\ 4+5*2\ 4--$$

6. Explain the insertion of the following keys into an empty Binary Search Tree.   10 M

   71, 15, 25, 36, 65, 44, 99, 8, 29, 58.

   and explain procedure for removing 65 and 15 elements from BST.

7. What is AVL Tree? Explain the insertion of the following keys into an empty AVL tree.   10 M

   15, 20, 24, 10, 13, 7, 30, 36, and 25.

   Write pre-order, in-order and post-order traversals for every insertion of key.

P.T.O.

8. a) Explain the concept of separate chaining with hash table size of 7 and modulus hash   5 M
function to insert the following elements.

      25, 33, 55, 67, 54, 84, 28, 15

  b) Write a C program to implement heap sort.   5 M

9. a) Explain the collision with a simple example and List the collision resolution techniques.   3 M

  b) Explain linear probing with a hash table size of 11 and modulus hash function to insert the   7 M
following elements.

      96, 47, 63, 87, 65, 69, 94, 61