Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) / (ETE) (2011 Onwards)

B.Tech.(Electronics Engg.) (2012 Onwards)

(Sem.–5)

DATA STRUCTURES

Subject Code : BTCS-304

Paper ID : [A2102]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

(a) Differentiate between linear and non-linear data structures.

(b) Find the infix and prefix equivalents of the following expressions and evaluate the same showing contents of Stack at various stages.

a) 5 12 3 2 2 ^ * / –

b) 16 4 2 – * 12 5 2 – / +

(c) Define the term Heap and its use.

(d) What is dangling pointer and the solution for handling them?

(e) What do you mean by the complexity of an algorithm?

(f) Discuss priority queue and its use.

(g) What is Graph? How it is different from a tree?

(h) What do you mean by recursion and its demerits?

(i) What is dynamic memory management?

(j) Differentiate between stacks and queues.

SECTION-B

2. Discuss the representation of two-dimensional (2-D) arrays in memory using sequential mapping. Also derive an expression for addressing an arbitrary element of a 2-D array.(5)

3. Write a routine INFIX which will accept a character string of Operators and operands representing Postfix expression and will create an equivalent fully parenthesized infix form of the original postfix. Can you implement this routine without Stack? (5)

4. Name various tree traversal algorithms. Make a binary search tree from the given data and. traverse tree using all traversal algorithms :

   23 7 92 6 12 14 40 44 20 21 (5)

5. What is Queue and its applications? Write the algorithms/programs for InsertQ and DeleteQ operations. (5)

6. What is Doubly Link list and its advantages over single link list? Write a program/algo to delete an element with value 'Val' from the doubly link list pointed by pointer START. (5)

SECTION-C

7. Write an algorithm to create a circular link-list of integers and to traverse it in the backward direction. (10)

8. Explain Merge sort in detail and trace. the algorithm step wise using following data :

   78 21 14 97 87 62 74 85 76 45 84 22 (10)

9. Write note on the following :

   (a) Hashing schemes (5)

   (b) AVL trees (5)