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 **MLR15**

**Code No: A10504**

**MLR INSTITUTE OF TECHNOLOGY**
(An Autonomous Institution)
B.Tech I Year II Sem Examinations- June-2016

**DATASTRUCTURES**(Common to CSE/IT/ECE/AERO)

Time: 3 hours Max.Marks :75

Note: 1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 25 marks. Answer all Questions in part A.
 3. Part B consists of 5 units. Answer any one full question from each unit. Each question carries 10
 Marks and may have a,b,c as sub questions.

 **PART-A (25 Marks)**

1. a) Define Data Structure (2 M)

 b) List the ADT of Stack (2 M)

 c) What are the operations of queues (2 M)

 d) Calculate the time complexity of Shell sort. (2 M)

 e) Define a Tree. (2 M)

2. a) Explain Big-oh, Omega & Theta Notations (3 M)

 b) Write an algorithm for Push operation of stack (3 M)

 c) Write an algorithm for Dequeuing element from queue (3 M)

 d) Explain Linear Search algorithm (3 M)

 e) Explain a complete binary tree & number of nodes in a complete binary tree of height ‘H’ (3 M)

 **PART-B (50 Marks)**

3. Write a C program to read a given a linked list and two integers M and N. Traverse the linked list such that you retain M nodes then delete next N nodes, continue the same until end of the linked list. (Example: Input: M = 2, N = 2, Linked List: 1->2->3->4->5->6->7->8 : Output: Linked List: 1->2->5->6).

 (10 M)

(OR)

 4. a) Write a C program to implement a singly linked list. (5 M)

 b) What are the advantages and disadvantages of doubly linked list over singly linked list? Explain the applications of doubly linked lists. (5 M)

5. Write a C Program to implement stack using arrays (10 M)

(OR)

6. Write a C program to implement a Stack which a restriction that, the fist two elements which are to be pushed are 0 & 1, later you can only push an element which is equal to sum of last two elements of stack.(i.e. when all elements are popped you will see a reverse order of Fibonacci series).

 (10 M)

7. Write a C program that insert only palindrome numbers in Queue using arrays. (10 M)

(OR)

8. a) Write any four applications of Queues in computing environment. (5 M)

 b) List the advantages and disadvantages of linked representation over array representation of queue. (5 M)

9. Write a C program to implement bubble sort algorithm. (10 M)

(OR)

10. a) Would insertion sort be speeded up if instead it used binary search to find the correct place to insert the next item? Justify your answer. (5 M)

 b) Compare the complexities of various sorting Algorithms. (5 M)

11. Construct a binary tree for the following data items: 80, 40, 75, 30, 20, 90, 50, 100, 50, 200, 25, 80, and 150. Write the inorder, preorder & postorder notation of constructed tree. (10 M)

(OR)

12. What are tree properties? List any four applications of trees. (10 M)