

Time: 3 Hours

**DECEMBER 2012**

Max. Marks: 100

**PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.**

**NOTE: There are 9 Questions in all.**

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

- a. Which of the following is not the required condition for binary search algorithm?
- (A) The list must be sorted  
 (B) There should be the direct access to the middle element in any sublist  
 (C) There must be mechanism to delete and/or insert elements in list  
 (D) None of these
- b. Which of the following data structure store the homogeneous data elements?
- (A) Arrays (B) Structure  
 (C) Union (D) None of these
- c. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called
- (A) underflow (B) overflow  
 (C) housefull (D) saturated
- d. The situation when in a linked list START=NULL is
- (A) underflow (B) overflow  
 (C) housefull (D) saturated
- e. A data structure where elements can be added or removed at either end but not in the middle
- (A) Linked lists (B) Stacks  
 (C) Queues (D) Deque
- f. When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return
- (A) FAEKCDHBG (B) FAEKCDHGB  
 (C) EAFKHDCBG (D) FEAKDCHBG

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- g. Which of the following data structure is linear data structure?
- (A) Trees (B) Graphs  
(C) Arrays (D) None of these
- h. The operation of processing each element in the list is known as
- (A) Sorting (B) Merging  
(C) Inserting (D) Traversal
- i. Linked lists are best suited
- (A) for relatively permanent collections of data  
(B) for the size of the structure and the data in the structure are constantly changing  
(C) for both of above situation  
(D) for none of above situation
- j. The recursive functions are evaluated using \_\_\_\_\_
- (A) Stacks (B) Queues  
(C) Tree (D) none of these

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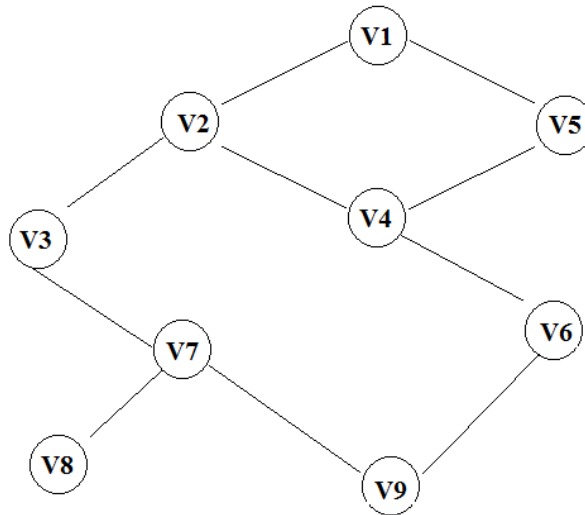
**Answer any FIVE Questions out of EIGHT Questions.  
Each question carries 16 marks.**

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- Q.2** a. What do you mean by recursion? Explain stack overhead in Recursion with example. (8)
- b. What do you mean by storage or lifetime of variables? Explain With example. (8)
- Q.3** a. Define structure. What is the difference between structure and union? Explain the difference using suitable example. (8)
- b. Discuss the main operations on sequential files. (8)
- Q.4** a. Write a program in C for carrying out addition of two arrays. (8)
- b. Write and explain bubble sort program with a suitable example. (8)
- Q.5** a. What is a stack? How is it different from queue and circular queue? Explain using suitable examples when to prefer which data structure out of these. (8)
- b. Write a complete C program to implement a queue by using an array. (8)
- Q.6** a. What is Linked-List? How it is different from Array? (6)

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- b. Write a C program to insert a new node in a sorted link list. (10)
- Q.7** a. What are the problem with singly linked list that are overcome by doubly linked list? (4)
- b. Explain how a node can be inserted in a doubly linked list. (4)
- c. Write a C program that merges two circular lists. (8)
- Q.8** a. What do you mean by a tree, binary tree, full binary tree and a complete binary tree giving suitable examples. (8)
- b. Write a C program for searching a target key in a binary search tree. (8)
- Q.9** a. What is depth-first traversal and breadth-first traversal? Give Depth-first and breath first traversal order for the following graph: (8)



- b. What do you understand by topological sort of a directed graph? Write and explain algorithm for topological sort. (8)