

**MCA (Revised)**  
**Term-End Examination**  
**June, 2007**

**MCS-021(S) : DATA AND FILE STRUCTURES**

Time : 3 hours

Maximum Marks : 100  
(Weightage 75%)

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**Note :** Question number 1 is **compulsory**. Attempt any **three** questions from the rest. All algorithms should be written nearer to 'C language.

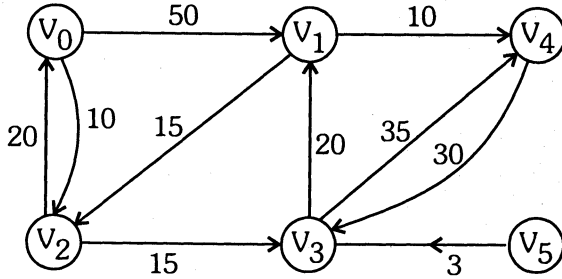
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1. (a) Define a multiple stack. Write algorithm for its implementation. 10
- (b) Write an algorithm to subtract two polynomials using linked list. 10
- (c) Write down the Quick Sort Algorithm and show each step of it using the following I/P. 10

[ 65, 70, 75, 80, 60, 65, 50, 45 ]

- (d) Write down the Dijkstra's Algorithm and list the shortest path from  $V_0$  to  $V_1$ ,  $V_2$ ,  $V_3$  and  $V_4$  using the same algorithm. 10



2. (a) Write an algorithm to implement Queue using

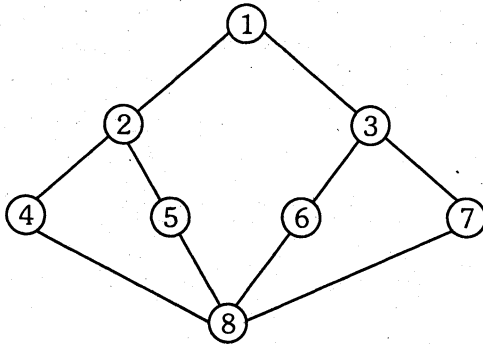
(i) Array

(ii) Linked List. 10

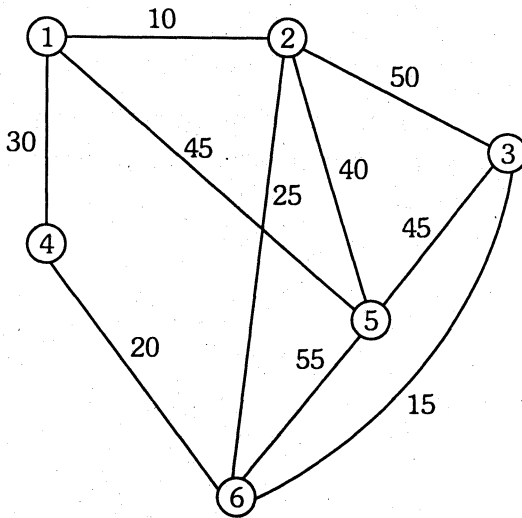
- (b) Write an algorithm for insertion sort. Find the best-case and worst-case time complexity for this algorithm. Execute your algorithm manually on the following list of numbers. 10

[ 22, 18, 16, 48, 8, 17, 9 ]

3. (a) Write an algorithm to implement DFS and BFS-spanning tree. Also find out the spanning tree for the graph shown below using the mentioned methods. 10



- (b) Show the working of Kruskal method on the following graph : 10



4. (a) Write an algorithm to perform following functions on an AVL binary tree : 10
- (i) Insert an element
  - (ii) Delete an element
- (b) Write recursive algorithm for in-order and pre-order traversal of binary tree. Also, construct the binary tree using the following pre-order and in-order traversals : 10
- Pre-order : A B G H M C D E F  
In-order : B H M G A D F E C
5. (a) Write short notes on : 10
- (i) Sequential File and Indexed File Structure
  - (ii) Asymptotic Notations
  - (iii) Sparse Matrix
  - (iv) Dynamic and Static Data Structure
- (b) Write an algorithm for evaluating postfix expression. Show working of your algorithm on the following expression. 10
- [ 9, 5, +, 6, 8, 2, /, +, \* ]