



- Notes : 1. All questions carry marks as indicated.  
2. Due credit will be given to neatness and adequate dimensions.

1. a) What is asymptotic notation? Discuss time and space complexities with an example. **6**  
b) Explain Divide and conquer strategy. Write a function to implement binary search using above strategy. **7**

**OR**

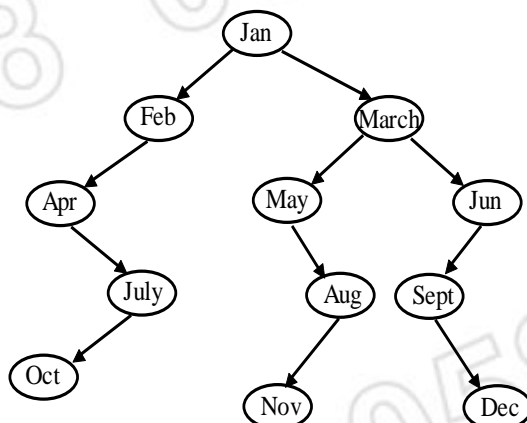
2. a) What is top down and bottom up programming? Discuss with an example. **7**  
b) What is an Algorithm? State and explain the different properties of Algorithm. **6**
3. a) Write an algorithm to convert infix expression into postfix expression. Convert the following expression in postfix form.  $A+(B+C*D)/(E*F)$ . **8**  
b) Explain concept of stack. Write push and pop function related with stack operation. **6**

**OR**

4. a) Comment on Array as a data structure. Explain the concept of Queue, Dequeue and priority queue with an example of each. **8**  
b) What are the advantages of circular queue over simple queue? **6**
5. a) Write a 'C' program to insert a node and delete a node from any specified position in the linked list. **8**  
b) Write difference between single and doubly linked list. **5**

**OR**

6. a) State and explain concept of circular linked list. Write an algorithm for insertion and deletion with all possibilities. **6**  
b) Write a program to count the number of nodes present in a linked list. **7**
7. a) Write inorder, preorder and postorder traversal for the following tree. **7**



b) What is Binary search tree? Write a function to delete an item from binary search tree. 6

OR

8. a) Write an algorithm to count the number of Leaf nodes in binary tree. 7

b) Explain: 6

i) Threaded binary tree.

ii) B - Trees.

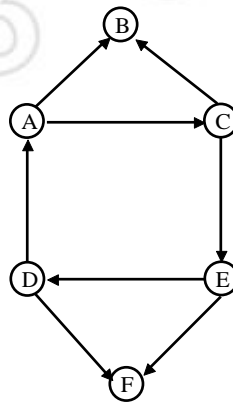
9. a) A minimum spanning tree T of a weighted graph G. is a spanning tree of G which has the minimum weight among all the spanning trees of G. Describe an algorithm to find a minimum spanning tree T of a weighted graph G. 6

b) Explain Dijkstra's Algorithm in detail. 7

OR

10. a) Write a procedure to implement depth first search. 6

b) Write down breadth first and depth first search traversal order starting at A for the given graph. Draw DFS and BFS trees. 7



11. a) Give the algorithm for bubble sort. Explain this algorithm by using the list 5, 6, 11, 1, 15, 10, 0 Sort the list in ascending order. 7

b) Using division method of hashing, store the following values in a hash table of size 11, 25, 45, 96, 101, 102, 162, 197, 201. 7

OR

12. a) Explain Hashing Techniques and collision Handling mechanism. 7

b) Explain the Binary searching Technique with example. What is its complexity? Justify your answer. 7

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