Roll No……. **10378**

MCAI D-13

DESIGN AND ANALYSIS OFALGORITHM

Paper—.MCA—303

Time allowed: 3 hours] [Maximum Marks : 80

Note: Attempt five questions in all. Question No. 1 is compulsory. Attempt four more questions selecting one question from each unit.

Compulsory questions 3X8=24

1. (i) Why do we use asymptotic notations in the study of algorithms?

(ii) Show that Quick sort algorithm takes 0 (n2) time in worst case.

(iii) List the differences between Greedy method and dynamic programming.

(iv) List the differences between Insertion sort and selection sort.

(v) Define Cook's theorem.

(vi) Define B-tree and its characteristics.

(vii) Prove that:

an = 2 an-1 + 1 ; a1 = 1 is of order 2".

(viii) If any NP-complete problem belongs to class P, then is P = NP?

Unit - 1

2. (a) Consider the following recurrences

T (n)=T(n/3)+T(2n/E)+n

Obtain asymptotic bound using recursion method. 7

(b) Discuss structure design methodology in detail. 7

3. (a) Write Kruskal's algorithm to find a minimum spanning tree of a graph. 7

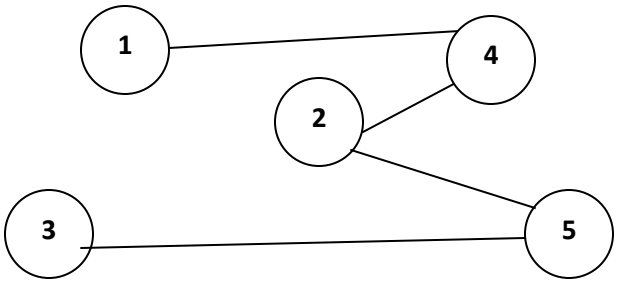
(b) Define Linear and Quadratic Problem with an example. 7

Unit—2

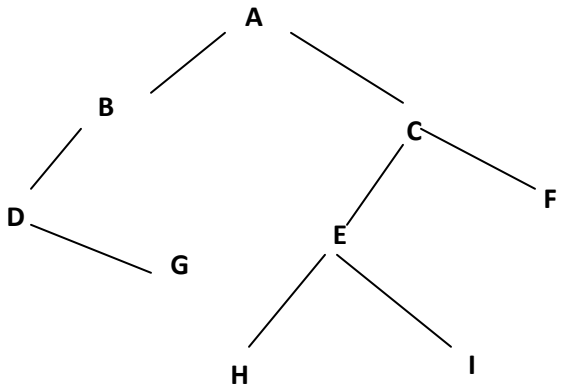
4. (a) Describe any four features of Top-down approach to algorithm design. 7

(b) Discuss any searching technique in detail. Also provide an example. 7

5. (a) Traverse the graph given below using DFS traversal. Indicate. the order of the nodes visited. Start with node '4'



(b) Write the results after traversing the tree in order and pre order.



Unit—3

6. (a) Lower bound theory says when to stop searching for better algorithms. Explain with examples. 7

   (b) List out any two applications of linked list and two advantages of doubly linked list. 7

7. (a) Define the following using examples
   (i) Adjacency Matrix
   (ii) Path Matrix
   (Iii) Adjacency List Matrix. 14

Unit—4

8. (a) What is Approximation algorithm ? Discuss any algorithm/ techniques in detail. 7

   (b) Define adversary arguments in detail . 7

9. Write short note on any two :

   (a) Branch and Bound

   (b) Software testing

   (c) Comparision trees. 7X2=l4