

Level: Bachelor

Semester: Fall

Year : 2017

Programme: BE

Full Marks: 100

Course: Analysis and Design of Algorithm

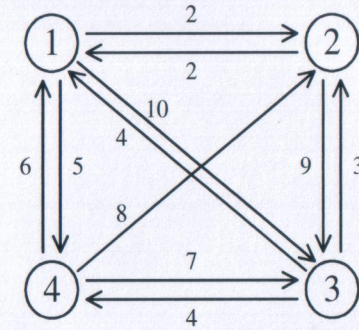
Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

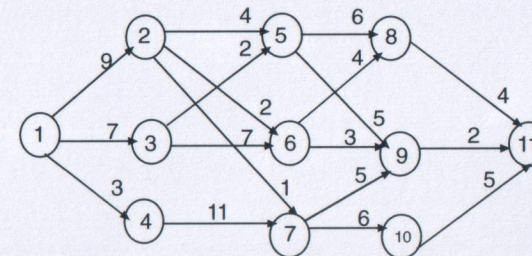
Attempt all the questions.



	1	2	3	4
1	$\infty$	2	10	5
2	2	$\infty$	9	$\infty$
3	4	3	$\infty$	4
4	6	8	7	$\infty$

1. a) Explain the term Big-oh, Big-omega and Big-Theta. Show that the function  $f(n)=6n^2+4n+2$  is Big theta of  $n^2$ . 8
- b) Explain the RAM model of algorithm analysis and justify that this method is machine independent. What are the advantages of using Randomize algorithm? 7
2. a) For this recurrence relation  $T(n) = 2T(n/2) + n^2$  find the run time of algorithm using recursion tree method and by master method. 10
- b) Prove that quick sort worst case efficiency is  $T(N)=O(N^2)$  5
3. a) Compute the running time of conventional matrix multiplication and how would you improve the running time with Strassen's Algorithm for matrix multiplication. 8
- b) What do you understand by dynamic programming? Compare it with the greedy method of problem solving. 7
4. a) Using greedy approach find the optimal merge following sorted files. {12,34,56,73,24,11,34,56,78,91,34,91,45} 8
- b) Find optimal solution to 0-1 knap sack problem where number of element  $n=5$  and the size of knapsack=6 for following items using dynamic programming. 7
1.  $W=2$       2.  $W=3$       3.  $W=4$       4.  $W=5$       4  $W=6$   
 $V=3$        $V=4$        $V=5$        $V=6$        $V=2$
5. a) Find the cost of travelling from vertex one to rest of the vertex for a sales man having minimum cost, traversing all the cities. 8

- b) Explain backtracking algorithm and write down the Backtracking algorithm for N-queen problem. 7
6. a) Consider a string  $X=a,a,b,ab$  and  $Y=b,a,b,b$ . Consider each insertion and deletion has unit cost and a change cost 2. Find minimum cost of edit sequence that transform  $X$  to  $Y$ , along with cost table along side. 7
- b) Find the shortest path in the following multistage graph using dynamic programming from vertex 1 to vertex 11. 8



7. Write short notes on: (Any two) 2x5
- a) Hamiltonian Cycle
- b) Graph Traversal
- c) Graph Coloring problem