

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER- V (OLD) • EXAMINATION – WINTER 2017

Subject Code: 150703

Date: 08-11-2017

Subject Name: Design and Analysis of Algorithms

Time: 10:30 am to 01:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

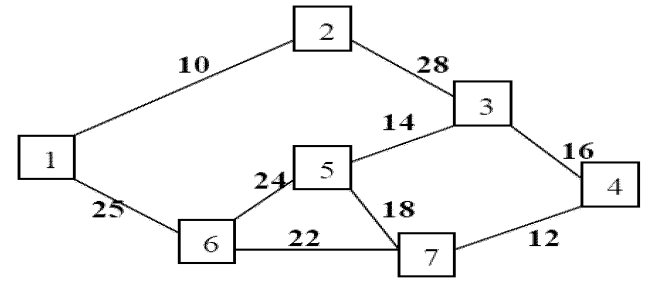
- Q.1** (a) What is algorithm? Explain with example. Which are the characteristics of algorithm? **07**
- (b) Discuss best case, average case and worst case asymptotic analysis. When do best case, average case and worst case occur if you want to find out an item from an array of n items. **07**
- Q.2** (a) Sort the following list using Merge Sort Algorithm : **07**
<25,15,23,16,5,1,34,11,22,12,23>
- (b) Explain binary search with example. What are the differences between sequential search and binary search? **07**

OR

- (b) Write and analyze an insertion sort algorithm to arrange n items into ascending order. **07**
- Q.3** (a) What are the differences between greedy approach and dynamic programming approach? Given n jobs J1 , J2,Jn having execution deadlines d1 , d2, ..., dn. Design an algorithm using greedy approach to schedule these jobs as per earliest deadline first. **07**
- (b) Explain accounting method of amortized analysis for stack. **07**

OR

- Q.3** (a) Generate minimum spanning tree using Kruskal's algorithm for the following graph. **07**



- (b) Explain the following terms with example: articulation point, dense graph, acyclic directed graph. **07**

Q.4 (a) Solve the following Knapsack problem using Dynamic Programming method. **07**
Number of items $n = 4$ and the capacity of knapsack $W = 5$.

Item	Weight (w)	Profit (p)
1	2	3
2	3	4
3	4	5
4	5	6

(b) Discuss depth-first search along with its applications. **07**

OR

Q.4 (a) Design and analyze an algorithm to solve Knapsack problem using backtracking. **07**

(b) Explain how to find out Longest Common Subsequence of two strings using dynamic programming method. Find the Longest Common Subsequence of given two strings $S1 = 10010101$ and $S2 = 010110110$. **07**

Q.5 (a) Explain string matching with finite automata. **07**

(b) Explain the following terms with example: class P, class NP, NP-hard problem. **07**

OR

Q.5 (a) How many spurious hits does the Rabin-Karp matcher encounter in the text $T = 3141592653589793$ when looking for the pattern $P = 26$ with working modulo $q = 11$? **07**

(b) Explain Backtracking Method. What is N-Queens Problem? Give solution for 4-Queens Problem using Backtracking Method. **07**
