

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – V (NEW) EXAMINATION – WINTER 2015

Subject Code: 2150703

Date: 17/12/ 2015

Subject Name: Analysis and Design of Algorithms

Time: 10:30am to 1:00pm

Total Marks: 70

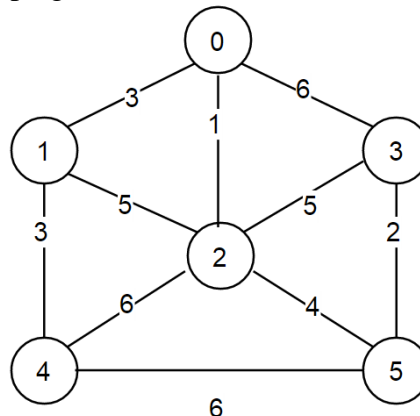
Instructions:

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

- Q.1 (a)** Define following terms **07**
(i) Quantifier (ii) Algorithm (iii) Big 'Oh' Notation
(iv) Big 'Omega' Notation (v) 'Theta' Notation

- (b)** Explain an algorithm for Selection Sort Algorithm. Derive its best case, worst case and average case time complexity. **07**

- Q.2 (a)** Write the Prim's Algorithm to find out Minimum Spanning Tree. Apply the same and find MST for the graph given below. **07**



- (b)** What is recurrence? Solve recurrence equation $T(n) = T(n-1) + n$ using forward substitution and backward substitution method. **07**

OR

- (b)** Sort the given elements with Heap Sort Method: 20, 50, 30, 75, 90, 60, 25, 10, 40. **07**

- Q.3 (a)** Write Huffman code algorithm and Generate Huffman code for following **07**

Letters	A	B	C	D	E
Frequency	24	12	10	8	8

- (b)** Write an algorithm for quick sort and derive best case, worst case using divide and conquer technique also trace given data (3,1,4,5,9,2,6,5) **07**

OR

- Q.3 (a)** Write equation for Chained matrix multiplication using Dynamic programming. Find out optimal sequence for multiplication: **07**

A1 $[5 \times 4]$, A2 $[4 \times 6]$, A3 $[6 \times 2]$, and A4 $[2 \times 7]$. Also give the optimal parenthesization of matrices.

- (b)** Using greedy algorithm find an optimal schedule for following jobs with $n=6$. **07**

Profits: (P1,P2,P3,P4,P5,P6) = (20, 15, 10, 7, 5, 3)

Deadline: (d1,d2,d3,d4,d5,d6) = (3, 1, 1, 3, 1, 3)

- Q.4** (a) Explain Depth First Traversal Method for Graph with algorithm with example. **07**
(b) Explain how to find out Longest Common Subsequence of two strings using Dynamic Programming method. Find any one Longest Common Subsequence of given two strings using Dynamic Programming. **07**
X=abbacdcb
Y=bcdbbcaac

OR

- Q.4** (a) Explain Breath First Traversal Method for Graph with algorithm with example. **07**
(b) Solve Making Change problem using Dynamic Programming. (Denominations: d1=1, d2=4, d3=6). Give your answer for making change of Rs. 9. **07**
- Q.5** (a) Explain Backtracking Method. What is N-Queens Problem? Give solution of 4-Queens Problem using Backtracking Method. **07**
(b) What is Finite Automata? Explain use of finite automata for string matching with suitable example. **07**

OR

- Q.5** (a) Define P, NP, NP complete and NP-Hard problems. Give examples of each. **07**
(b) Give and explain Rabin-Carp string matching algorithm with example. **07**
