PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2019 - 20 Examination
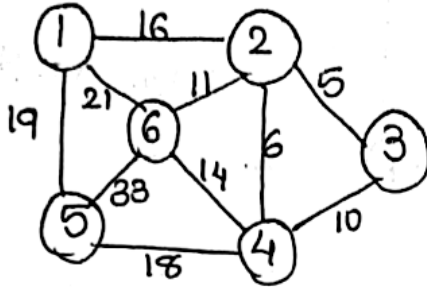
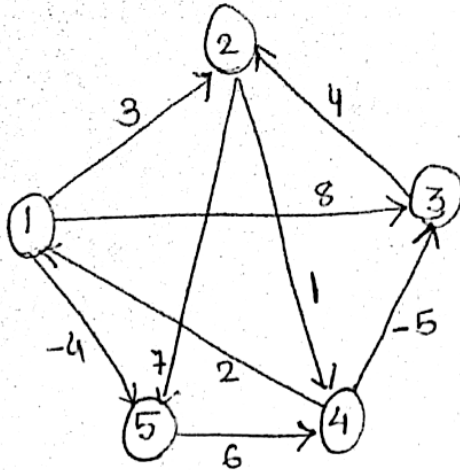|	
Semester: 2	**Date: 16/12/2019**
Subject Code: 203202152	**Time: 2.00 pm to 4.30 pm**
Subject Name: Advance Algorithm	**Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 (A) What is worst & best case scenario for QUICK sort? Write recurrence relation & derive time complexity for both cases. **(05)**

(B) What is divide & conquer approach in algorithm? Write pseudo code for calculating power(x,n) i.e. x^n using divide & conquer approach.? What is time complexity of solution? **(05)**

(C) Define following with respect to NP theory: P, NP, NP-complete, NP-hard with example. **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**

(A)Explain selection sort with example, pseudo code.

(B)Draw MST (step by step) for following graph using kruskal's algorithm :

(C)Write masters theorem for divide and conquer approach. Write recurrence relation of merge sort and binary search and solve using masters theorem.

(D) What is Approximation Algorithm? Explain with example?

Q.3 A)Find all pair shortest path for following graph using Floyd warshall's algorithm **(07)**

(B) Write pseudo code for graph coloring using backtracking. i.e. color the graph with minimum number of color so that no two adjacent nodes have same color. Use adjacency matrix representation. **(08)**

OR

(B) What is blossom? How to detect it using Edmonds' Algorithm? **(08)**

Q.4 (A) What is linear programming? Explain simplex method? **(07)**

OR

(A) Write proof : "CLIQUE is NP-complete" **(07)**

(B) What is Depth first Search? How it can be used for detecting existence of cycle in graph? Explain with algorithm/pseudo code **(08)**