Bharatiya Vidya Bhavan's

# SARDAR PATEL INSTITUTE OF TECHNOLOGY

(Autonomous Institute Affiliated to University of Mumbai)

Munshi Nagar, Andheri (W), Mumbai – 400 058.

**MSE - Oct 2022**

**Max. Marks: 20** **Duration: 60 Min.**

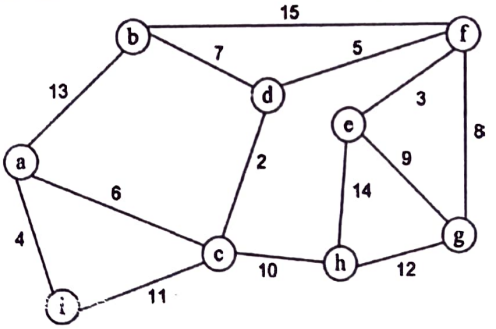
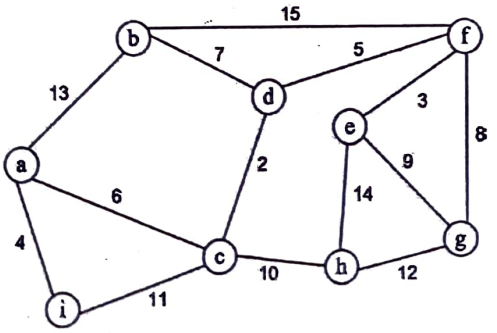
**Class: MCA** **Semester: II**

**Course Code: MC507**

**Name of the Course: Design and Analysis of Algorithms**

**Instruction:**

1) **All questions are compulsory.**
2) **Draw neat diagrams.**
3) **Assume suitable data if necessary but justify the same.**

| Q. No. | Question | Max. Marks | CO-BL |
|---|---|---|---|
| Q. 1 | Define the following terms with at least two examples of each.<br>i) Big O Asymptotic Notation ii) Ω Asymptotic Notation iii) Big θ Asymptotic Notation | 5 | CO1-2 |
| Q. 2 | Consider the following two sequences X=abdceadklbac and Y=adkalc. Find the ***Longest Common Subsequence*** using Dynamic Programming Approach. Show all intermediate solutions and directions in terms of matrices of all common sub-sequences of X and Y. | 5 | CO3-3 |
| Q. 3 | Find the solution to the following recurrence relation using both ***Master Theorem*** and ***Recursion Tree Methods***.<br>$T(n)=3T(n/2)+n$ | 5 | CO1-4<br>CO2-3 |
| Q. 4 | Find Minimum Spanning Tree for the following Graph using ***Prim's MST Algorithm*** with root as "a". Show all intermediate steps in terms of Cuts.<br>  <br>**OR**<br>Find Minimum Spanning Tree for the following Graph using ***Kruskal's MST Algorithm***. Show all intermediate steps in terms of Disjoint sets.<br>  | 5<br><br>5 | CO3-3<br><br>CO3-3 |