**ST. JOSEPH’S UNIVERSITY, BENGALURU -27**

Registration Number:

Date & Session: 8-12-2022 ( 1pm)

**M.Sc. – I SEMESTER**

**SEMESTER EXAMINATION: OCTOBER 2022**

**(Examination conducted in December 2022)**

**CS 7321 –Design and Analysis of Algorithms**

**Time: 2 ½ Hours Max Marks: 50**

**This paper contains 2 printed pages and 3 parts**

**PART-A**

**Answer all THE questions (5 X 1 = 5)**

1. Give an example of sorting algorithm for Divide and Conquer method?
2. Identify the approach of Floyd Warshall algorithm.
3. Which notation gives the worst-case complexity of an algorithm ?
4. Find how many bins required from the given weight and capacity.

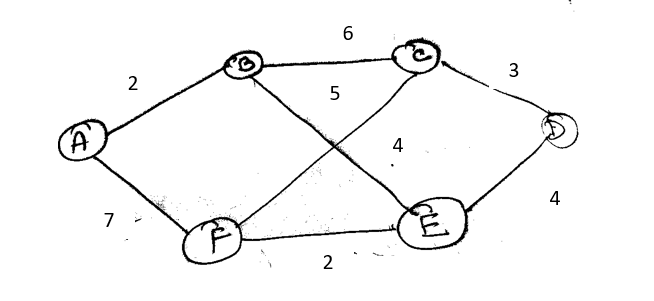
weight [] = {4, 8, 1, 4, 2, 1}, Bin Capacity c = 10

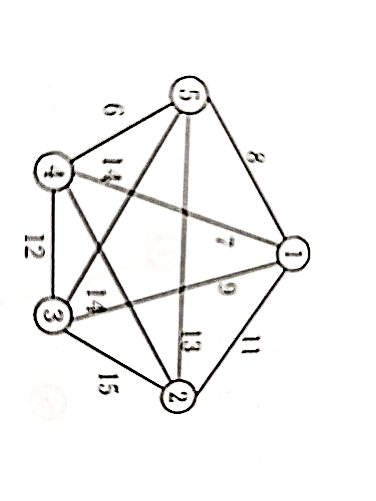
1. Name any two NP Complete Problems.

**PART- B**

**Answer any FIVE questions (5 X 3 = 15)**

1. How will you define asymptotic notations with growth functions and explain it with mathematical representation.
2. Define an algorithm? Write a recurrence relation for binary search and analyze it.
3. Consider fractional Knapsack problem and find the optimal solution using decreasing order of profits, where M = 15 ,(p1,p2,p3…p7) = (10,5,15,7,6,18,3) and (w1,w2….w7) =(2,3,5,7,1,4,1).
4. Solve the following problem using Djikstra algorithm





1. Explain Hamiltonian cycle with an example
2. Discuss about BFS algorithm and its applications.
3. Find the minimum cost spanning tree using kruskal ‘s method

**PART- C**

**Answer any THREE questions**

**(3 X10 = 30)**

1. Sort the following elements using merge sort algorithm and trace it

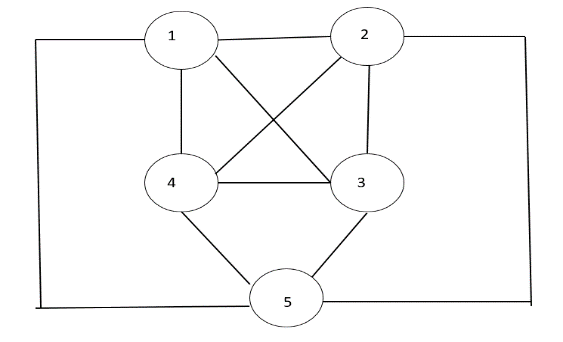
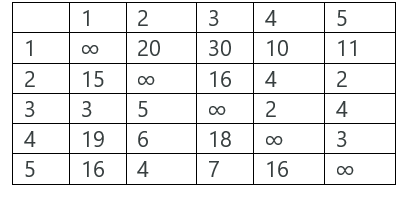
40 60 30 50 10 20 (5 Marks)

1. Explain about Floyd Warshall algorithm (5 Marks)

a)Explain graph coloring problem **(**3 marks)

b**)** Explain 8 Queens Problem with an example (7 marks)

1. Solve the following travelling salesman Problem using branch and bound technique



a) Elaborate non deterministic algorithm (5 Marks)

b) Cook Theorem (5 Marks)