SEMESTER EXAMINATION-2022

CLASS - IIIrd YEAR SUBJECT:DESIGN AND ANALYSIS OF ALGORITHM

PAPER CODE: BCE-C513

Time: 3 hour	**Max. Marks: 70** **Min. Pass: 40%**

Note: Question Paper is divided into two sections: **A and B.** Attempt both the sections as per given instructions.

SECTION-A (SHORT ANSWER TYPE QUESTIONS)

Instructions: Answer any five questions in about 150 words each. Each question carries six marks.	(5 X 6 = 30 Marks)

Question-1: What is time and space complexity of an algorithm?

Question-2: Prove the assertion ½ n(n-1) ε Θ(n^2).

Question-3: Prove the assertion 100n+5 ε Θ(n).

Question-4: Explain recurrence equation.

Question-5: Explain hierarchy theorems.

Question-6: Solve the following recurrence relation using Master's theorem.

$$T(n) = 3T(n/2) + n2$$

Question-7: Explain convex hull.

Question-8: Explain greedy method and its applications.

Question-9: Find the complexity of given recurrence:

$$T(n)=\{3T(n-1), \text{ if } n>0$$
$$\{1, \quad \text{otherwise}$$

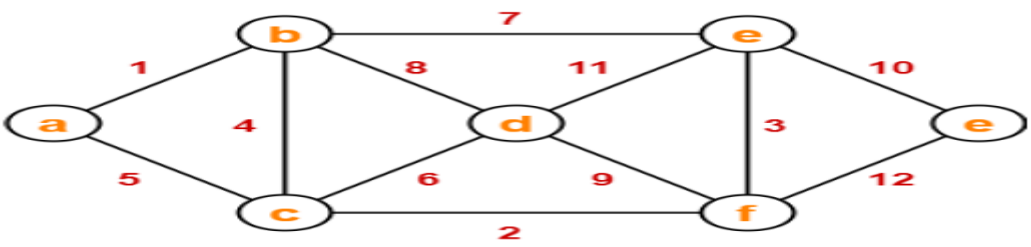
Question-10: Solve the following recurrence relation using Master's theorem.

$$T(n) = 2T(n/2) + nlogn$$

SECTION-B (LONG ANSWER TYPE QUESTIONS)

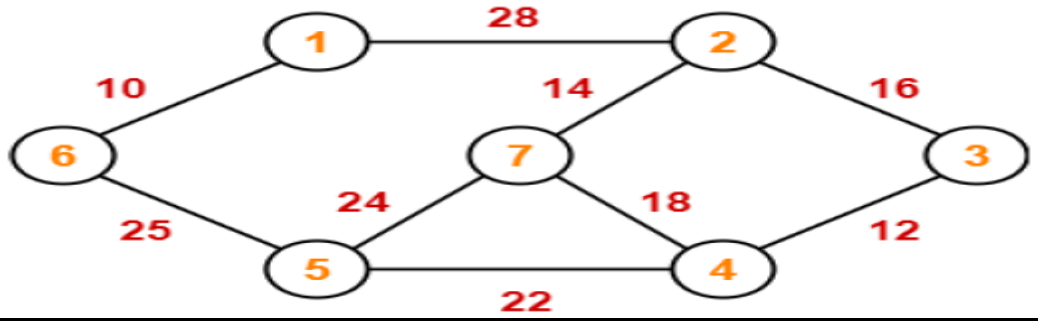
Instructions: Answer any FOUR questions in detail. Each question carries 10 marks.	(4 X 10 = 40 Marks)

Question-11: Construct the Minimum Spanning Tree (MST) for the given graph using prime's algorithm.



Question-12: Explain backtracking in detail.

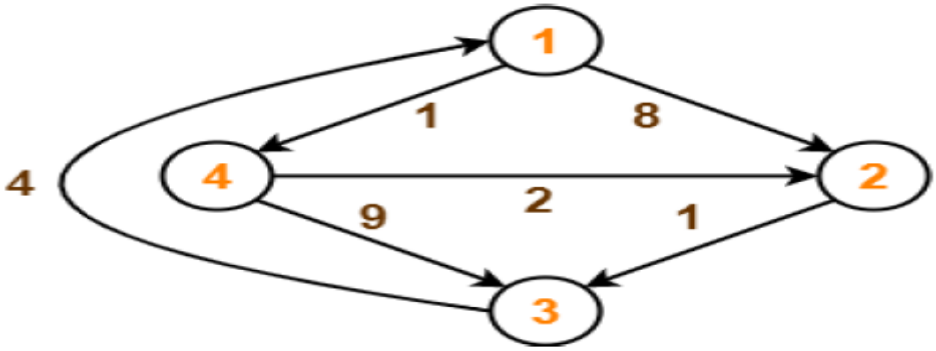
Question-13: Construct the Minimum Spanning Tree (MST) for the given graph using Kruskal's algorithm.



Question-14: Explain travelling salesman problem in detail by drawing a neat figure.

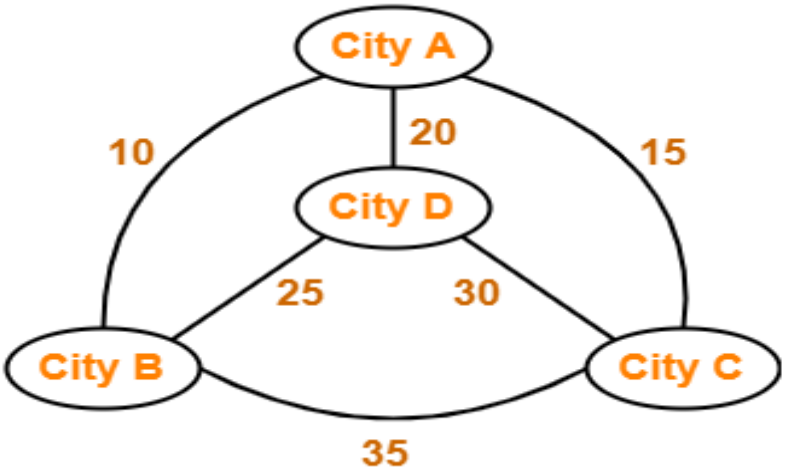
Question-15: Explain divide and conquer technique with the help of a suitable diagram.

Question-16: Using Floyd and Warshal algorithm find the shortest path distance between each pair of vertices of the diagram given below:



Question-17: Explain Dijkstra's algorithm with the help of diagrams.

Question-18: The following graph shows a set of cities and distance between every pair of cities-



If starting city is A, then find the TSP tour of the above graph.