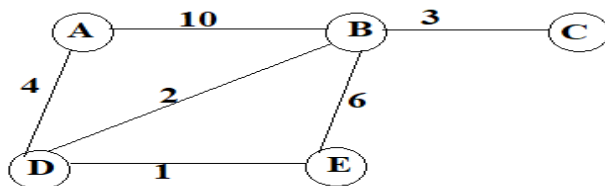


Time : 2^{1/2} Hours

Total Marks : 75

- N.B: (1) All questions are compulsory.
 (2) Figures to the right indicate full marks.
 (3) Assume additional data if necessary but state the same clearly.
 (4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.
 (5) Use of calculators and statistical tables are allowed.

- Q1 Attempt Any three of the following. 15
- a Explain divide and conquer technique with examples. 5
- b Illustration of selection sort for {40, 23, 45, 21, 35}. Discuss worst-case and average case analysis of it. 5
- c Explain Huffman code. 5
- d Explain various asymptotic notations and functions with example 5
- e Describe the running time of the recursive find-maximum subarray procedure 5
- f Explain the consecutive integer checking algorithm for computing GCD. 5
- Q2 Attempt Any three of the following. 15
- a Write a short note on BFS. 5
- b What is Dynamic programming? How are Greedy algorithms different from Dynamic programming? 5
- c Write a short note on Graph with its adjacency matrix and adjacency list? 5
- d Define longest-common-subsequence problem. Give algorithm to solve this problem. 5
- e Write a short note on graph representation with its Explain Dijkstra's Algorithm With an example. 5
- f What is a minimum spanning tree? Consider the following connected graph. Determine the minimum spanning tree in it using Prim's algorithm. 5



- Q3 Attempt Any three of the following. 15
- a What is meant by NP Hard problem? 5
 - b Explain Chinese remainder theorem. 5
 - c Write a short note on the subset sum problem. 5
 - d Write a short note on elementary number theoretic notations. 5
 - e Give a greedy approximation algorithm to solve the set-covering problem 5
 - f What are finite groups in modular arithmetic? Give example. 5
- Q4 Attempt Any three of the following. 15
- a What is data in research? Why data need to be analyzed? 5
 - b Write a short note on research process? 5
 - c Explain Review of research. 5
 - d What is the methodology of a research? Give an example. 5
 - e Write a short note on Internet Research. 5
 - f Explain Quantitative data analysis? 5
- Q5 Attempt Any three of the following. 15
- a Explain Hiring Problem. 5
 - b Explain vertex cover problem. 5
 - c Write a short note on Reviewing literature. 5
 - d Explain Greedy technique with examples. 5
 - e Explain subset problem in details 5
 - f Explain RSA public Key Cryptosystem. 5
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