

Total No. of Questions : 8]

SEAT No. :

PE-4264

[Total No. of Pages : 4

[6582]-36

**S.E. (Computer Engineering / AI & DS)**  
**DATA STRUCTURES AND ALGORITHMS**  
**(2019 Pattern) (Semester - IV) (210252)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

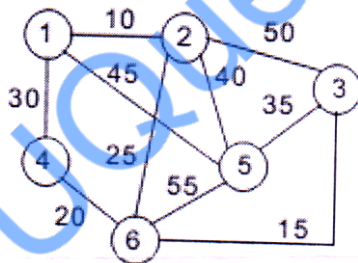
- 1) Answer to the questions Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No.4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No, 8.
- 2) Assume suitable data, if necessary.
- 3) Draw neat labelled diagram wherever necessary.
- 4) Figures to the right indicate full marks.

Q1) a) Represent the following graphs using adjacency matrix. [6]



b) Explain Floyd Warshall algorithm to calculate shortest paths. [6]

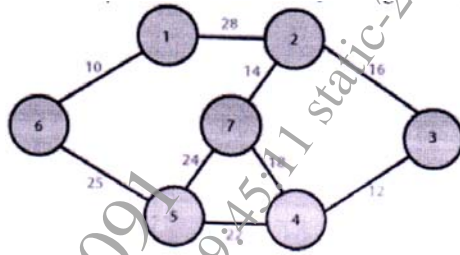
c) Construct the minimal spanning tree for the graph shown below using Kruskal's algorithm. [6]



OR

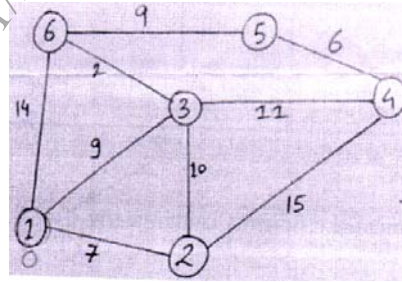
P.T.O.

Q2) a) Find the MST for the following graph using Prim's algorithm. [6]



b) Explain Depth first traversal of a graph with example. [6]

c) Find Single source shortest path using Dijkstra's Algorithm. Select source as vertex 1. [6]



Q3) a) What is K-D tree? Show creation of 2-D tree with example. [6]

b) Consider following : [6]

Input: keys[] = {10, 12, 20}, freq[] = {34, 8, 50}

Draw all possible BSTs. Find minimum cost of the BST.

c) Do the following operations on the tree : [6]

i) Zig Zag Rotation      ii) Zag Zig Rotation



OR

Q4) a) Construct a AVL tree for the following data: [6]

5, 12, 10, 9, 8, 14, 23, 29, 28, 17

b) Define Red- Black tree, state its properties and give suitable example. [6]

c) i) Illustrate AA tree.

ii) Define splay tree. List the operations and rotations that can be performed on splay tree.

[6]



- vi) What is/are the key feature(s) of trie tree?
- a) Fast String Operations
  - b) Efficient Prefix Searches
  - c) Memory Compactness
  - d) All of the above
- c) What are multiway search trees? Explain its need and applications. [5]
- Q7)** a) Differentiate between sequential & linked organization. [6]
- b) What is indexed sequential access file organization? Write two advantages & disadvantages of it. [6]
- c) What is Direct access file? State its advantages. [5]
- OR
- Q8)** a) Differentiate between dense & sparse indices. [6]
- b) Explain Sequential file organization and discuss their advantages and disadvantages. [6]
- c) Describe inverted files. [5]

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