

Total No. of Questions : 8]

SEAT No. :

P9111

[6179]-236

[Total No. of Pages : 4

**S.E. (Computer Engineering) (Artificial Intelligence & Data
Science Engineering)**

**DATA STRUCTURES AND ALGORITHMS
(2019 Pattern) (Semester - IV) (210252)**

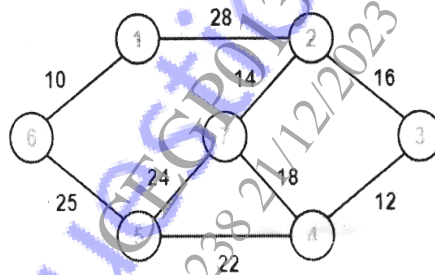
Time : 2½ Hours]

[Max. Marks : 70

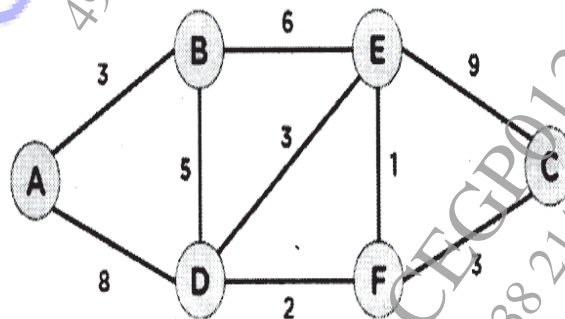
Instructions to the candidates:

- 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 diagrams wherever necessary.
- 4) Figures to the right indicate full marks.

- Q1)** a) Write Floyd Warshall Algorithm. [6]
- b) Construct stepwise minimum spanning tree (MST) for the given graph using Prim's Algorithm. Also calculate sum of all weights. Start from vertex 1. [6]



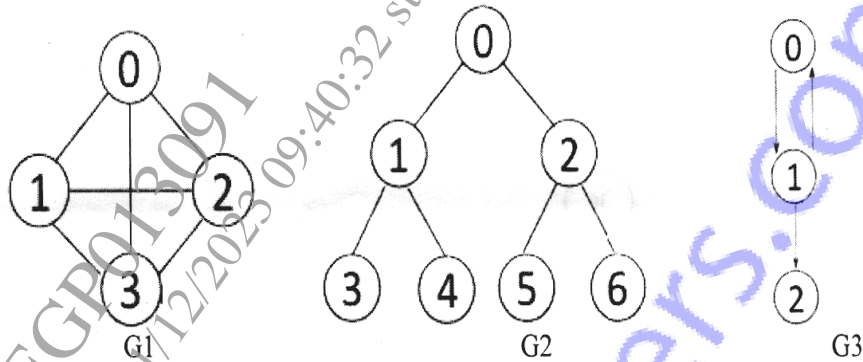
- c) Apply Dijkstra's Algorithm for the graph given below, and find the shortest path from node A to node C. [6]



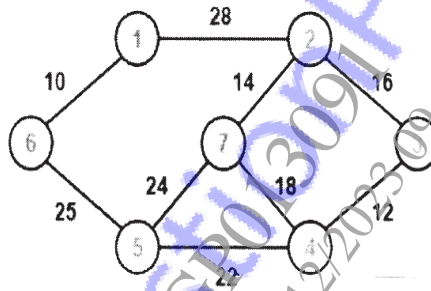
OR

P.T.O.

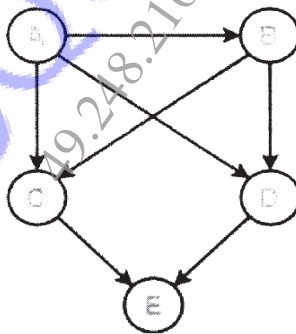
- Q2) a) Define indegree & outdegree of a directed graph. Write degree for G1 & G2. Write indegree & outdegree of each vertex for G3 graph. [6]



- b) Construct the minimum spanning tree (MST) for the given graph using Kruskal's Algorithm. [6]



- c) Find the number of different topological orderings possible for the given graph. [6]



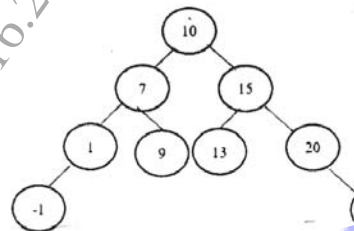
- Q3) a) Construct AVL tree for insertion of following data: [6]

9, 15, 20, 8, 7, 13, 10.

- b) Draw splay tree after [6]
- Zig rotation
 - Zag rotation for following tree-



- Zig Zig Rotation
- Zag Zag Rotations for following tree-



- c) Create 2D tree for following data: [6]
 (3, 6), (17, 15), (13, 15), (6, 12), (9, 1) (2,7), (10, 19).
 Also plot all the points in XY plane.

OR

- Q4)** a) Construct AVL tree for insertion of following data: [6]
 63, 9, 19, 27, 18, 108, 99, 81.
- Define Red Black tree. List its properties. Give example of it. [6]
 - Write the functions for split & skew operations in AA tree. [6]

- Q5)** a) Create a B- Tree of order 5 from the following list of data items: [9]
 30, 20, 35, 95, 15, 60, 55, 25, 5, 65, 70, 10, 40, 50, 80, 45
- Explain following indexing techniques: [8]

- Primary
- Secondary
- Sparse
- Dense

OR

Q6) a) Create a B+Tree of order 3 from the following list of data items: [9]
1, 3, 5, 7, 9, 2, 4, 6, 8, 10

b) Define trie tree. Compare trie tree with hash table. Draw trie tree for following data: bear, sell, bell, bid, stock, bull, buy, stop. [8]

Q7) a) Explain sequential & direct access file organization. Also list two advantages & disadvantages of same. [9]

b) Explain Indexed sequential access file organization. Also list two advantages & disadvantages of same. Compare sequential & indexed sequential file organization. [8]

OR

Q8) a) What is linked organization? Explain inverted file and coral rings with respect to linked organization. [9]

b) Explain multilist files & cellular partitions. [8]

