P9111

[6179]-236

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]**

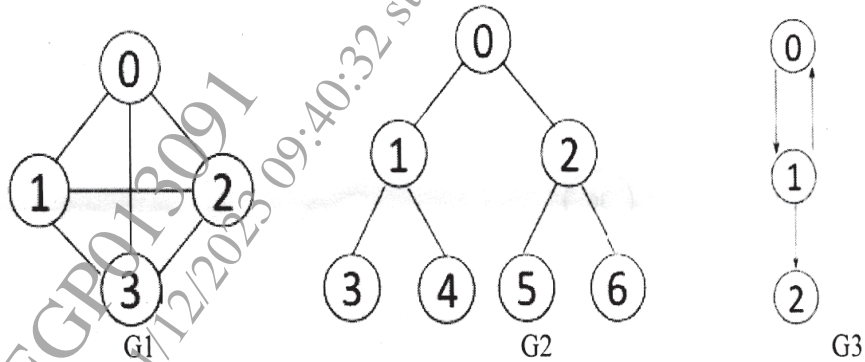   b) Construct stepwise minimum spanning tree (MST) for the given graph using Prim's Algorithm. Also calculate sum of all weights. Start from vertex 1.   **[6]**
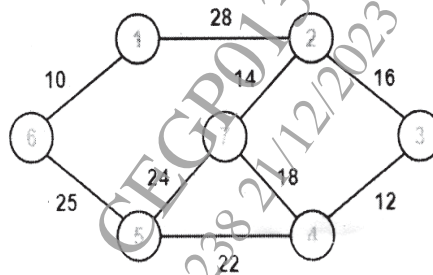
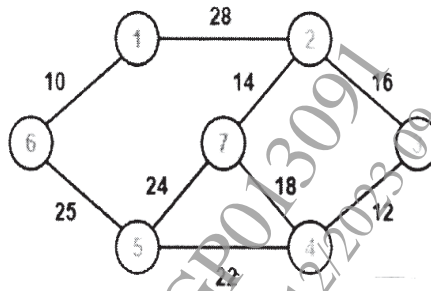   c) Apply Dijkstra's Algorithm for the graph given below, and find the shortest path from node A to node C.   **[6]**

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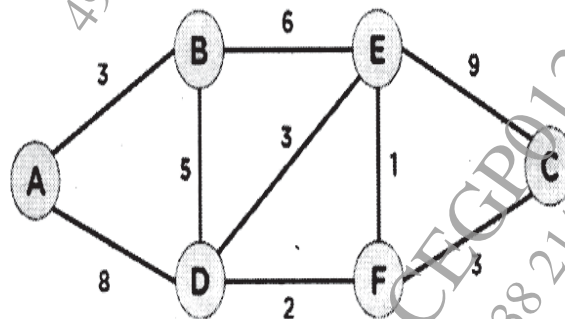
Q2) a) Define indegree & outdegree of a directed graph. Write degree for G1 & G2. Write indegree & outdegree of each vertex for G3 graph. **[6]**

G1   G2   G3

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

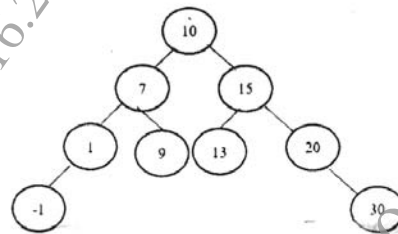c) Find the number of different topological orderings possible for the given graph. **[6]**
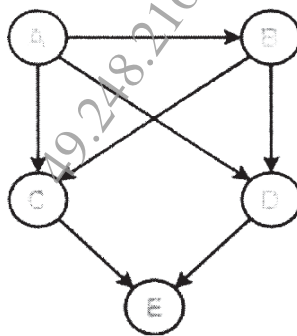
Q3) a) Construct AVL tree for insertion of following data: **[6]**

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

b) Draw splay tree after [6]

    i) Zig rotation

    ii) Zag rotation for follwoing tree-

    iii) Zig Zig Rotation
    iv) 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.

b) Define Red Black tree. List its properties. Give example of it. [6]

c) 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

b) Explain following indexing techniques: [8]
    i) Primary
    ii) Secondary
    iii) Sparse
    iv) 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]**

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