Total No. of Questions : 8]

SEAT No. :

P9111

[Total No. of Pages : 4

[6179]-236

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

DATA STRUCTURES AND ALGORITHMS

(2019 Pattern) (Semester - IV) (210252)

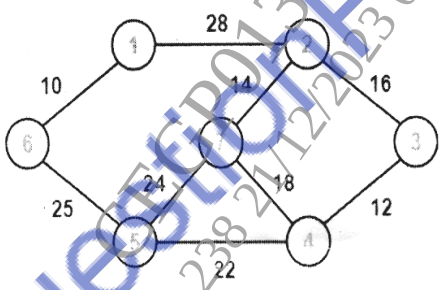
Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

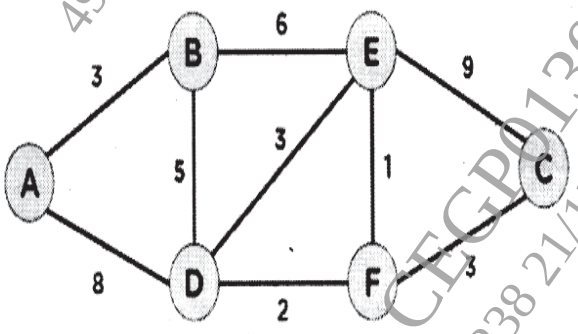
1) ***Answer to the questions Q.No.1 or Q.No.2, Q.No.3 or Q.No.4, Q.No..5 or Q.No.6, Q.No.7 or Q.No.8.***
2) ***Assume suitable data, if necessary.***
3) ***Draw neat labelled diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

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]**



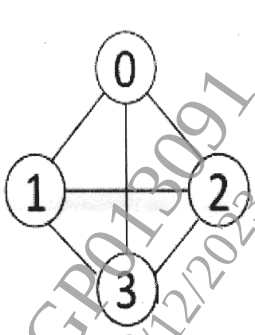
c) Apply Dijkstra's Algorithm for the graph given below, and find the shortest path from node A to node C. **[6]**



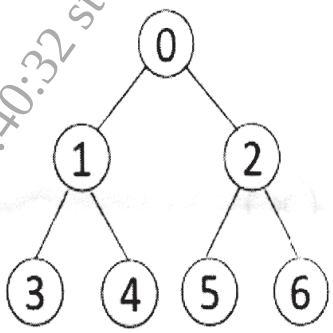
OR

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]**



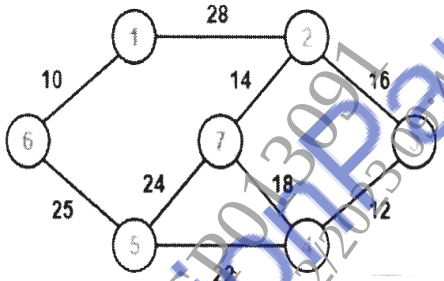
G1



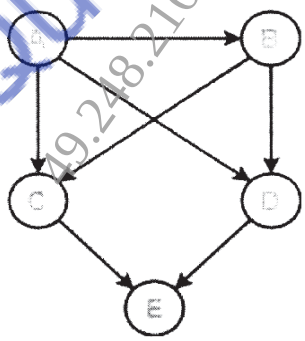
G2

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]**



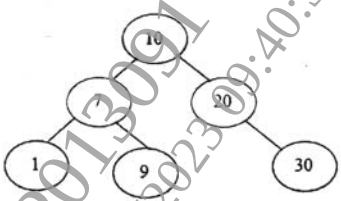
Q3) a) Construct AVL tree for insertion of following data: **[6]**

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

b) Draw splay tree after **[6]**

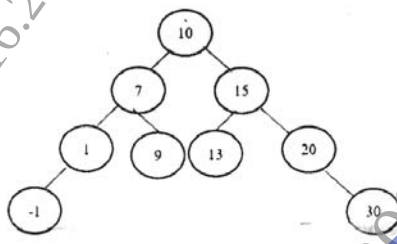
i) Zig rotation

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]**