

[6261]-36

**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) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Elaborate following terminologies : [6]

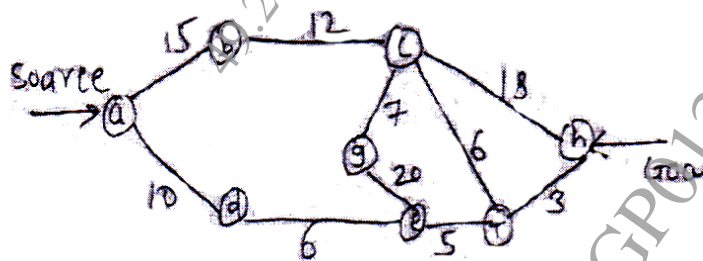
- i) Graph
- ii) Adjacency List
- iii) Adjacency Matrix

b) Differentiate between tree and graph. [6]

c) Write pseudo code for Floyd-Warshall algorithm. [6]

OR

Q2) a) Find the shortest path using Dijkstra's algorithm. Write all the sequence of steps used in algorithms. [6]



b) Write Prim's algorithm to find minimum spanning tree. [6]

c) Write the applications of : [6]

- i) Graph
- ii) BFS
- iii) DFS

P.T.O.

Q3) a) Explain following terms w.r.t. symbol table : [6]

i) Insert & lookup operations

ii) Advantages

iii) Disadvantages

b) Construct an AVL tree having the following elements : [6]

H, I, J, B, A, E, C, F, D, G

c) Insert 15, 10, 17, 7 in splay tree. [6]

OR

Q4) a) What is the need of AA tree? List the five invariants that AA tree must satisfy. [6]

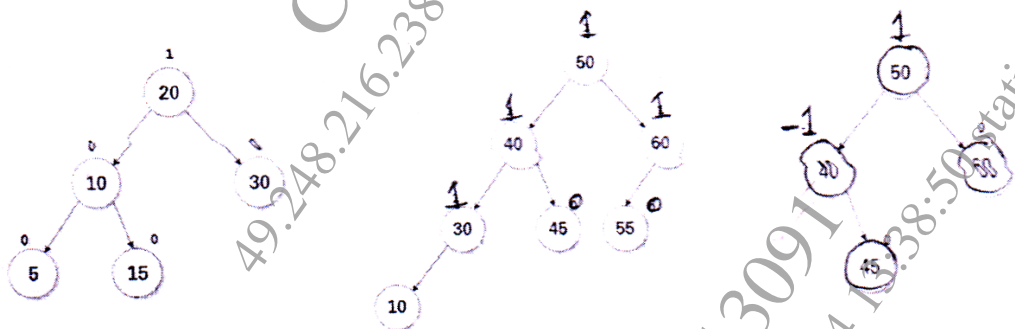
b) Who developed K-D tree? What is the purpose of K-D tree? Insert step by step (7, 8), (12, 3), (14, 1), (4, 12), (9, 1), (2, 7) and (10, 19) into K-D tree. [6]

c) Show the balanced AVL tree after deletion of mentioned node : [6]

i) Delete 30

ii) Delete 55

iii) Delete 60



Q5) a) What is indexing? What are the advantages of indexing? Discuss clustering index with example. [6]

b) Construct a B-Tree of order 3 for following data : [6]

50, 30, 21, 90, 10, 13, 20, 70, 25, 92, 80.

c) Why B+ tree? List its properties and advantages. [5]

OR

Q6) a) Explain with example trie tree. Give properties and advantages of trie tree. [6]

b) Build B+ tree of order 3 for the following : [6]

F, S, Q, K, C, L, H, T, V, W, M, R

c) What is difference between B and B+ tree? [5]

Q7) a) Explain Index Sequential file and discuss their advantages and disadvantages. [6]

b) List & explain two possible ways of representing records. [6]

c) Differentiate between indexed sequential file and direct access file. [5]

OR

Q8) a) Explain Sequential file organization and discuss their advantages and disadvantages. [6]

b) What is coral rings? Describe inverted files w.r.t linked organization. [6]

c) Explain Direct Access file. [5]
