

Total No. of Questions : 8]

SEAT No. :

PB-4462

[Total No. of Pages : 3

[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]

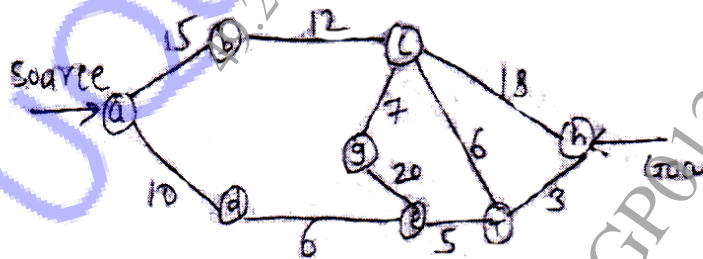
- i) Graph
- ii) Adjacency List
- iii) Adjacency Matrix

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]

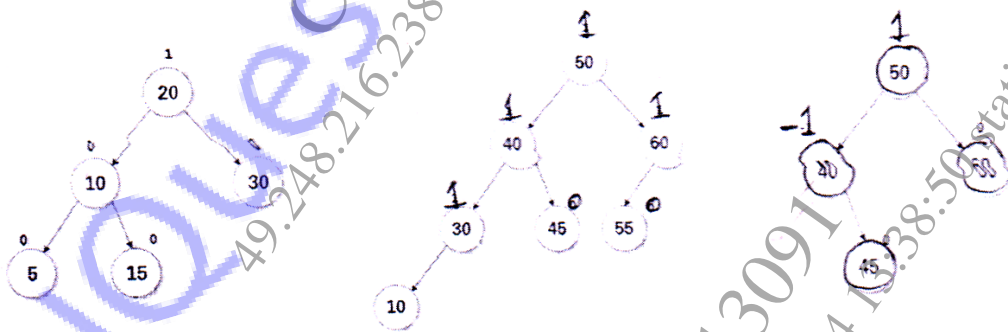
- i) Graph
- ii) BFS
- iii) DFS

P.T.O.

- Q3) a)** Explain following terms w.r.t. symbol table : [6]
- Insert & lookup operations
  - Advantages
  - 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-O 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]
- Delete 30
  - Delete 55
  - 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]

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