

Total No. of Questions : 8]

P649

SEAT No. :

[Total No. of Pages : 3

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S.E. (Computer Engineering)

DATA STRUCTURES AND ALGORITHMS

(2019 Pattern) (Semester - II)

Time : 2½ Hours]

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

[Max. Marks : 70

Q1) a) Draw any directed graph with minimum 6 nodes and represent graph using adjacency matrix, adjacency list and adjacency multi list. **[6]**

b) Consider the graph represented by the following adjacency matrix : **[6]**

	1	2	3	4	5	6
1	0	6	1	5	0	0
2	6	0	5	0	3	0
3	1	5	0	5	6	4
4	5	0	5	0	0	2
5	0	3	6	0	0	6
6	0	0	4	2	6	0

Find minimum spanning tree of this graph using prim's Algorithm.

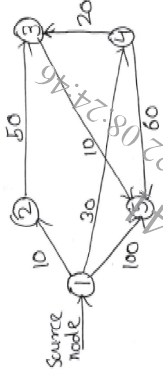
c) Write a short note on topological sorting. **[6]**

OR

Q2) a) Write non-recursive pseudo for Depth-First Search (DFS). **[6]**

b) Consider the given graph and find the shortest path by using Dijkstra's algorithm. From source to all other nodes. **[6]**

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c) Show BFS and DFS for the following graph with starting vertex as 1. Explain with proper steps. **[6]**



Q3) a) Explain with example **[6]**

- i) Red - Black Tree
- ii) Splay Tree

b) Construct AVL tree for following sequence of keys. **[6]**

1, 2, 3, 4, 8, 7, 6, 5, 14, 10

c) What is OBST in data structure? and what are advantages of OBST? **[5]**

OR

Q4) a) Explain the following: **[3]**

- i) Static and dynamic tree tables with suitable example
- ii) Dynamic programming with principle of optimality.

b) Write short note on: **[6]**

- i) AA tree
- ii) K - dimensional tree

c) Explain AVL tree rotations with example. **[5]**

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- Q5)** a) Construct B tree of order 5 for the following data: [6]
78, 21, 14, 11, 97, 85, 74, 63, 45, 42, 57
- b) Explain B+ tree deletion with example. [6]
- c) What is B+ tree? Give structure of it's internal node. What is the difference between B and B+ tree. [6]

OR

- Q6)** a) Build B+ tree of order 3 for the following data: [6]
F, S, Q, K, C, L, H, T, V, W, M, R
- b) Write an algorithm of B tree deletion. [6]
- c) Explain with example trie tree. Give advantage and applications of trie tree. [6]

- Q7)** a) Define sequential file organization. Give it's advantages and disadvantages. [6]
- b) What is file? List different file opening modes in C++. Explain concept of inverted files. [6]
- c) Write short note on external sort. [5]

OR

- Q8)** a) A write a C++ program to create a file. Insert records into the file by opening file in append mode. Search for a specific record into file. [6]
- b) Sort the following elements using two way merge sort with $m = 3$. [6]
20, 47, 15, 8, 9, 4, 40, 30, 12, 17, 11, 56, 28, 35
- c) Explain indexed sequential file organization. Compare it with direct access file. [5]