P649

[5869]-277

S.E. (Computer Engineering)
DATA STRUCTURES AND ALGORITHMS
(2019 Pattern) (Semester - II)

Time : 2½ Hours]   *[Max. Marks : 70*

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.*

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

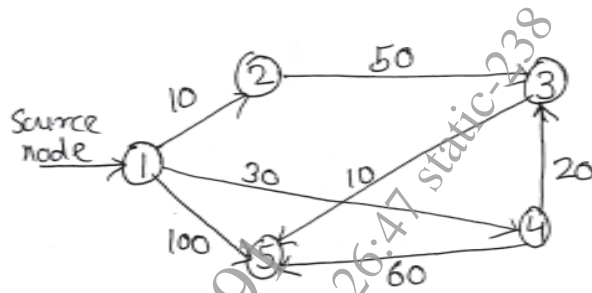Find minimum spanning tree of this graph using prim's Algorithm.

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]**

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, 11, 10

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

OR

Q4) a) Explain the following:
   i)   Static and dynamic tree tables with suitable example. **[3]**
   ii) Dynamic programming with principle of optimality. **[3]**

b) Write short note on: **[6]**
   i)   AA tree
   ii) K - dimensional tree

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

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 delection with example. **[6]**

c) What is B+ tree? Give structure of it's internal note. What is the difference between B and B+ tree. **[6]**

OR

Q6) a) Build B+ tree of order 3 for the following data:
F, S, Q, K, C, L, H, T, V, W, M, R **[6]**

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.
20, 47, 15, 8, 9, 4, 40, 30, 12, 17, 11, 56, 28, 35 **[6]**

c) Explain indexed sequential file organization. Compare it with direct access file. **[5]**

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