Total No. of Questions : 8]

SEAT No. :

PE-4264

[Total No. of Pages : 4

[6582]-36

S.E. (Computer Engineering / AI & DS)

DATA STRUCTURES AND ALGORITHMS

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

Time : 2½ Hours] *[Max. Marks : 70*

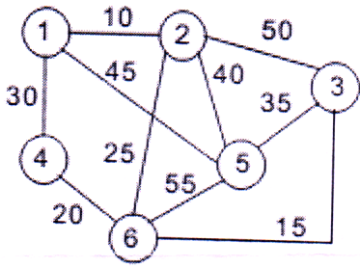
Instructions to the candidates :

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 diagram wherever necessary.*
4) *Figures to the right indicate full marks.*

Q1) a) Represent the following graphs using adjacency matrix. **[6]**

b) Explain Floyd Warshall algorithm to calculate shortest paths. **[6]**

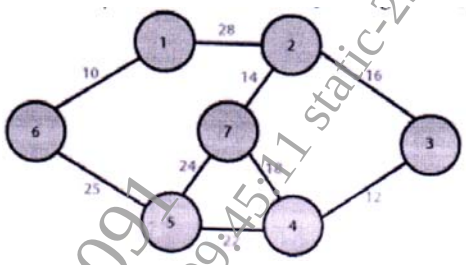
c) Construct the minimal spanning tree for the graph shown below using Kruskal's algorithm. **[6]**



OR

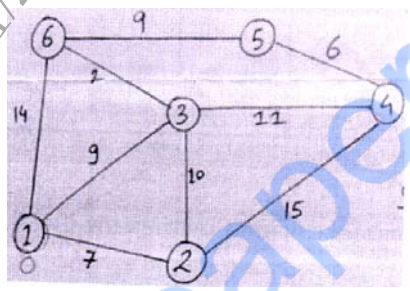
P.T.O.

Q2) a) Find the MST for the following graph using Prims algorithm. **[6]**



b) Explain Depth first traversal of a graph with example. **[6]**

c) Find Single source shortest path using Dijkstra's Algorithm. Select source as vertex 1. **[6]**



Q3) a) What is K-D tree? Show creation of 2-D tree with example. **[6]**

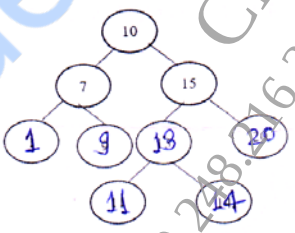
b) Consider following : **[6]**

Input: keys[] = {10, 12, 20}, freq[] = {34, 8, 50}

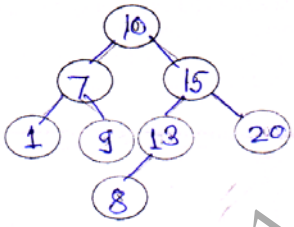
Draw all possible BSTs. Find minimum cost of the BST.

c) Do the following operations on the tree : **[6]**

i) Zig Zag Rotation



ii) Zag Zig Rotation



OR

Q4) a) Construct a AVL tree for the following data: **[6]**

5, 12, 10, 9, 8, 14, 23, 29, 28, 17

b) Define Red- Black tree, state its properties and give suitable example. **[6]**

c) i) Illustrate AA tree.

ii) Define splay tree. List the operations and rotations that can be performed on splay tree.

[6]

Q5) a) Explain the various cases of node deletion in B- tree. **[6]**

b) Build B+ tree of order 4 for the following data: **[6]**

1, 3, 5, 7, 9, 2, 4, 6, 8, 10.

c) Explain indexing and types of indexing techniques. **[5]**

OR

Q6) a) Construct a B tree of order 3 for following data: **[6]**

10, 34, 78, 45, 123, 341, 234, 167, 159, 52.83

b) Answer the following questions w.r.t. trie tree: **[6]**

i) Which of the following is not true?

a) Trie requires less storage space than hashing

b) Trie allows listing of all the words with same prefix

c) Tries are collision free

d) Trie is also known as prefix tree

ii) What can be the maximum depth of the trie with n strings and m as the maximum sting the length?

a) log2n b) log2m

c) n d) m

iii) Which of the following is true about the trie?

a) root is letter a

b) path from root to the leaf yields the string

c) children of nodes are randomly ordered

d) each node stores the associated keys

iv) Auto complete and spell checkers can be implemented efficiently using the trie.

a) True b) False

v) What traversal over trie gives the lexicographical sorting of the set of the strings?

a) postorder b) preorders

c) inorder d) level order

vi) What is/are the key feature(s) of trie tree?

a) Fast String Operations b) Efficient Prefix Searches

c) Memory Compactness d) All of the above

c) What are multiway search trees? Explain its need and applications. **[5]**

Q7) a) Differentiate between sequential & linked organization. **[6]**

b) What is indexed sequential access file organization? Write two advantages & disadvantages of it. **[6]**

c) What is Direct access file? State its advantages. **[5]**

OR

Q8) a) Differentiate between dense & sparse indices. **[6]**

b) Explain Sequential file organization and discuss their advantages and disadvantages. **[6]**

c) Describe inverted files. **[5]**

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