

SPPU-SE-COMP-CONTENT – KSKA Git

Total No. of Questions: 8]

SEAT No. :

PA-1239

[5925]-261

[Total No. of Pages : 3

S.E. (Computer Engineering)

DATA STRUCTURES AND ALGORITHMS

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

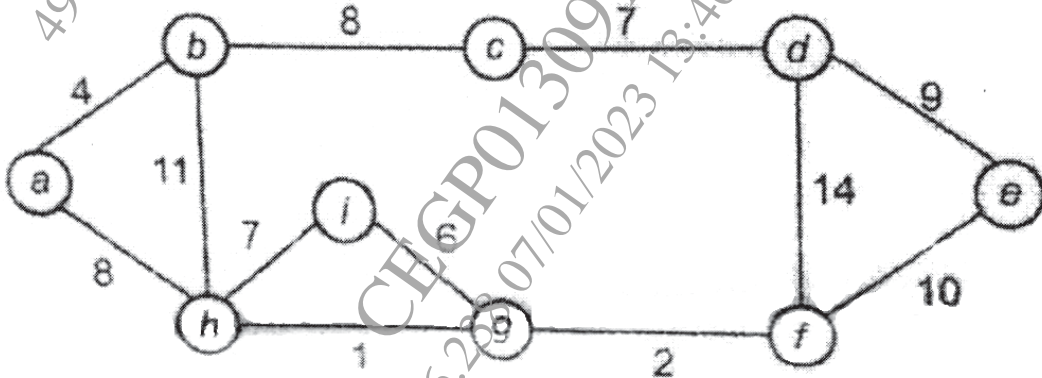
Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Find minimum spanning tree of the following graph using kruskals algorithm. [6]



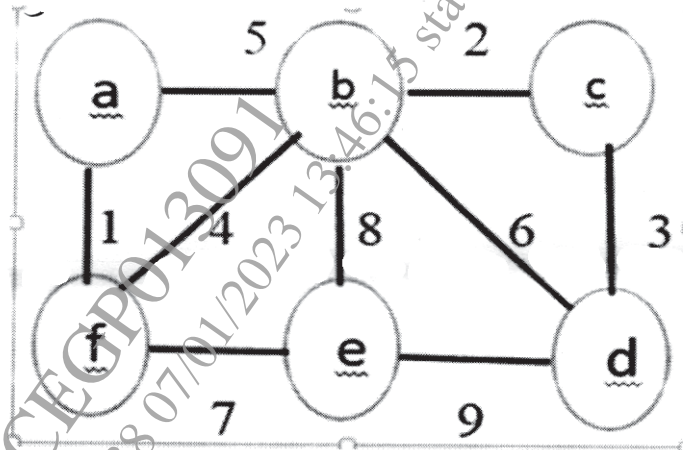
- b) Write algorithm for Breadth First Traversal of the graph. Also write its complexity. [6]
- c) Write Kruskal's algorithm for minimum spanning trees and explain with example. [6]

OR

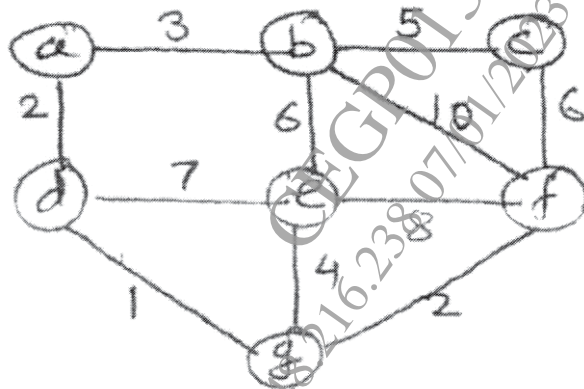
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- Q2) a) Apply Prim's Algorithm to construct Minimum Spanning Tree, for below drawn graph: Starting vertex is 'a' [6]



- b) Develop pseudo code with one example to traverse a graph using BFS. [6]
 c) Find the shortest path from a to f, in the following graph using Dijkstra's Algorithm. [6]



- Q3) a) What is OBST? List binary search tree with 3 words (w_1, w_2, w_3) = (do, if, stop) words occurs with probabilities (P_1, P_2, P_3) = (0.4, 0.5, 0.1) find expected access time in each case. [6]
 b) Build AVL tree for given sequence of data. Show balance factor of all nodes and name the rotation used for balancing the tree 40, 60, 80, 50, 45, 47, 44, 42, 75, 46, 41. [6]
 c) Write short notes on: [5]
 i) Red Black tree
 ii) Splay tree

OR

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- Q4) a)** Construct OBST for given data using dynamic programming approach. Explain stepwise. [6]

Index	0	1	2	3
Data	10	20	30	40
Frequency	4	2	6	3

- b) Demonstrate Deletion Operation in AVL with example. [6]
c) Explain following terms w.r.t. height balance tree LL, RR, LR, RL. [5]
- Q5) a)** Construct B-tree of order 4 by inserting the following data one at a time. 20, 10, 30, 15, 12, 40, 50 [6]
b) Write an algorithm to insert a node in B Tree. [6]
c) Construct the B+ Tree of order 4 for the following data: 1, 4, 7, 10, 17, 21, 31, 25, 19, 20, 28, 42. [6]

OR

- Q6) a)** Build B+ tree of order 3 for the following: 1, 42, 38, 21, 31, 10, 17, 7, 31, 25, 20, 18. [6]
b) Write an algorithm to delete a node from B+tree. [6]
c) Insert the keys to a 5-way B-tree: 3, 7, 9, 23, 45, 1, 5, 14, 25, 24, 13, 11, 08, 19, 04, 31, 35, 56 [6]

- Q7) a)** Write short notes on: [6]
i) Factors affecting the file organization
ii) Indexed sequential files
iii) Indexing techniques
b) Compare sequential indexed sequential and direct access files. [6]
c) Explain any 4 modes of opening the file in C or C++. [5]

OR

- Q8) a)** Explain following operations carried out on sequential files. [6]
i) Add
ii) Delete
iii) Search
b) Explain any 3 operations carried out on sequential file and its pseudo code. [6]
c) A file of employees records, has 'employee no' as primary key and the 'department code' and the 'designation code' as the secondary keys. Write a procedure to answer the following query – 'Which employees from systems department are above designation level 4?' [5]

