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3<sup>rd</sup> SEMESTER

**B.Tech.**

SUPPLEMENTARY EXAMINATION

**Feb-2018**

PAPER CODE: CO/SE-203

TITLE OF PAPER: Data Structures

Time: 3:00 Hours

Max. Marks : 70

**Note :** Attempt any 5 questions.

All questions carry equal marks.

Assume suitable missing data, if any.

Que 1. (a) Write a program to check if a given Binary Tree is Heap.

(b) Define Tree, Binary Tree and Max-Heap.

Que 2. (a) There are two linked lists A and B containing the following data:

A: 3,7,10,15,16,9,22,17,32

B: 16,2,9,13,37,8,10,1,28

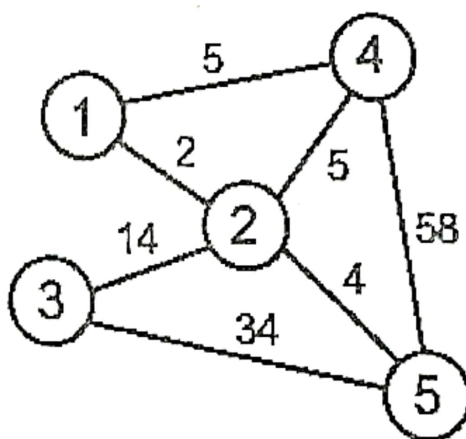
Write a program in C to create a Linked list D which contains all elements of A as well as B ensuring that there is no repetition of elements.

(b) For a Strictly Binary Tree, Number of Leaf nodes = Number of Internal Nodes + 1.

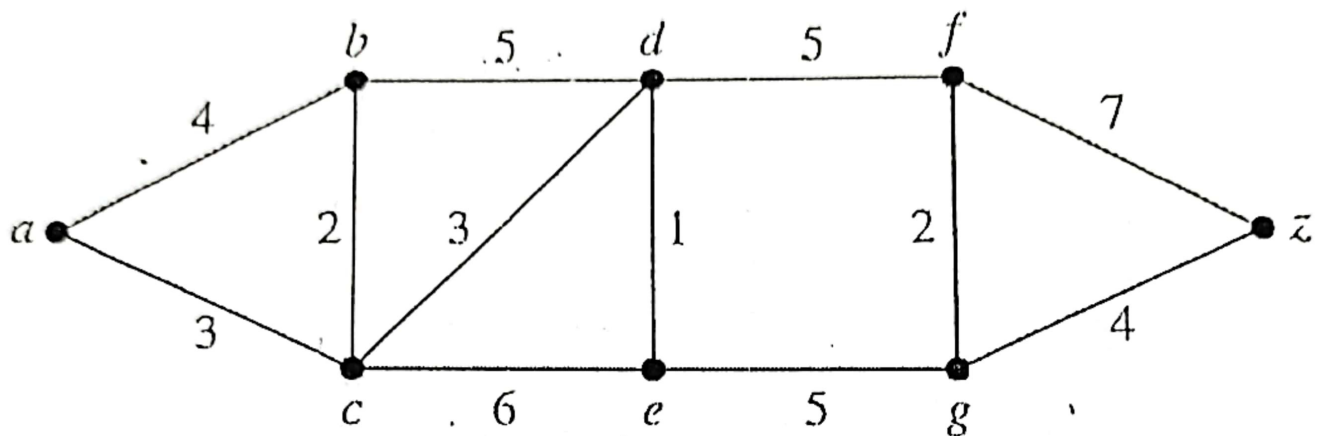
Prove it.

Que 3. (a) Write an algorithm for insertion operation in BST. Give BST formed by inserting following elements in the given order: 20 17 6 8 10 7 18 13 12 5.

(b) Define Minimum Spanning Tree. Find MST for the following graph:



Q.5 [a] Apply Dijkstra's Algorithm to find shortest path from a to z in the network below: (5)



[b]

- i. State and Prove the Handshaking Theorem.
- ii. Determine the maximum number of vertices and edges in a simple graph with  $n$  vertices. (3+2)

Q.6 [a] Prove that a graph is Euler if and only if every vertex is of even degree. (5)

[b] What is Chromatic Number. Find the chromatic number of: (5)

- i) A complete graph of  $n$  vertices,  $K_n$ .
- ii) A bipartite graph