COURSE CODE: 10B1WCI733

MAX. MARKS: 15

COURSE NAME: Graph Algorithms and Applications

COURSE CREDITS: 3

MAX. TIME: 1 Hr

Note: All questions are compulsory.

1. [5 Marks] State True or False with reasons:

a. Every Eulerian simple graph with an even number of vertices has an even number of edges.
b. A simple graph (i.e., a graph without parallel edges or self-loops) with n vertices and k components can have at most (n − k) / (n − k + 1) / 2 edges.
c. In a complete graph with n vertices there are (n − 1) / 2 edge disjoint Hamiltonian circuits, if n is an odd number ≥ 3.
d. Every tree has only one center.
e. A clique in a graph is a set of pairwise non adjacent vertices.

2. [5 Marks]

a. Prove or disprove: Every closed odd walk contains an odd cycle.
b. Prove or disprove: Every tree with average degree a have 2/ (2-a) vertices.

3. [5 Marks]

Draw the minimum spanning tree (root vertex: A) found by running Prim's algorithm on Figure 1. Prove that Prim's algorithm produces a minimum-weight spanning tree of G.
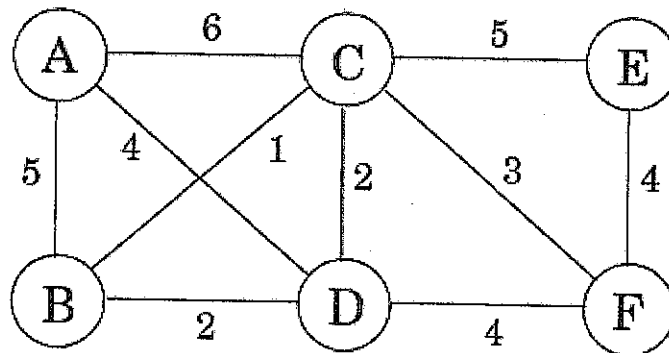

Figure 1

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