MC- 405 GRAPH THEORY

Assignment-III

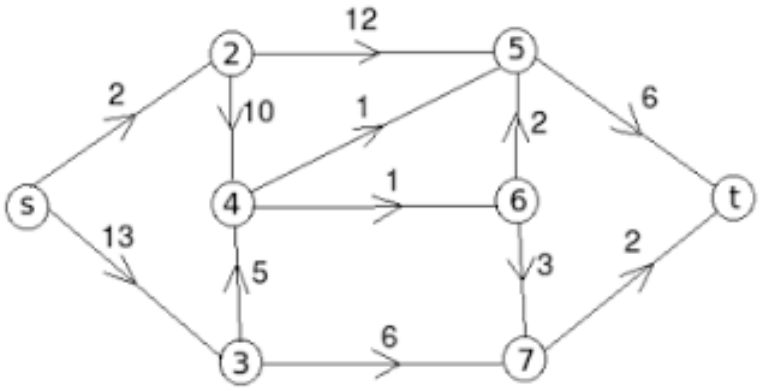
1. Prove that for a graph G with n vertices and e edges,

$$\text{vertex connectivity} \leq \text{edge connectivity} \leq \frac{2e}{n}$$

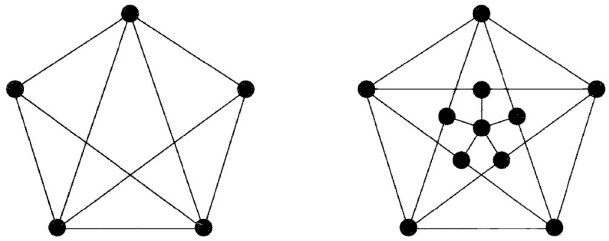
2. Define a separable graph.Prove that in a non-separable graph G set of edges incident on each vertex of G is a cut-set.

3. Define the capacity of a cut-set.Prove that the maximum flow possible between two vertices a and b in a network is equal to the minimum of capacities of all cut-sets with respect to a and b.

4. Describe Ford-Fulkerson Algorithm for maximum flow and hence find maximum flow for the network given below.



5. Find the chromatic number of each of the graph given below.



6. Prove that a nonempty graph G is bicolourable if and only if G is bipartite.

7. Define Complete matching in a graph.Find the number of complete matchings in $K_{n,n}$,a complete bipartite graph with n vertices in each subset.

8. Define Perfect matching in a graph.Find the number of perfect matchings in:

   (a) K_{2n} ,a complete graph with $2n$ vertices

   (b) C_{2n} ,a cycle with $2n$ vertices