

GRAPH THEORY

Tutorial – 1

1) Prove or disprove:

The complement of a simple disconnected graph must be connected.

2) Let v be a cut-vertex of a simple graph G . Prove that,
[complement $(G) - v$] is connected.

- 3) Let P and Q be paths of maximum length in a connected graph G . Prove that, P and Q have a common vertex.
- 4) Prove that, every connected simple graph with an even number of edges decomposes into paths of length 2.

- 5) Prove that a graph G is bipartite if and only if every sub-graph H of G has an independent set consisting of at least half of $V(H)$.
- 6) Prove that every n -vertex graph with at least n edges contains a cycle.