

# **GRAPH THEORY**

## **Tutorial – 12**

- 1. Prove that every  $n$ -vertex plane graph isomorphic to its dual has  $2n-2$  edges.**
- 2. Let  $G$  be an  $n$ -vertex simple planer graph having no cycle of length less than  $k$ . Prove that  $G$  has at most  $(n-2) \cdot k / (k-2)$  edges.**
- 3. Let  $G$  be a triangulation, and let  $n_i$  be the number of vertices of degree  $i$  in  $G$ . Prove that  $\sum (6-i)n_i = 12$ .**

- 4. Prove that every simple planar graph with at least four vertices has at least four vertices with degree less than 6.**
  
- 5. Let  $G$  be a maximal planar graph. Prove that if  $S$  is a separating 3-set of  $G^*$ , then  $(G^* - S)$  has two components.**