School of Mathematical Sciences
National Institute of Science Education and Research

Problem Set - 4 M 208

1. Determine all $m, n \in \mathbb{N}$ such that the complete bipartite graph $K_{m,n}$ is Hamiltonian.
2. Give example of a non-Hamiltonian graph G such that for every proper subset S of $V(G)$, $\omega(G - S) \leq |S|$, where $\omega(G - S)$ is the number of components of
3. Find the vertex and edge connectivity of Petersen graph.
4. Let G be a k-connected graph, $k \geq 1$. Prove that
   (a) for $v \in V(G)$, $G - v$ is $(k-1)$-connected.
   (b) for $e \in E(G)$, $G - e$ is $(k-1)$ connected.
5. Let G be a 3-regular graph. Then $\kappa(G) = \lambda(G)$.
6. Prove that for any positive integer a, b, c with $a \leq b \leq c$, there is a graph G with $\kappa(G) = a$, $\lambda(G) = b$ and $\delta(G) = c$.