PART A (4×3=12)

1. Let G be an undirected graph, prove that the sum of the degrees of vertices in G is equal to the number of edges in G.
2. Prove that K_5 and $K_{3,3}$ are nonplanar.
3. Find the rank of the matrix $\begin{bmatrix} 0 & 1 & 0 \\ -1 & 0 & -4 \\ 0 & 4 & 0 \end{bmatrix}$
4. Write the normal equations for fitting the straight-line $y = ax+b$.

PART B (3X6=18)

5. Let G= (V, E) be an undirected graph or multigraph with no isolated vertices. Then G has an Euler circuit if and only if G is connected and every vertex in G has even degree.

Or

6. Find the adjacency matrix and incidence matrix associated with the given graph.