PES UNIVERSITY	**Unit 1: Partial Differentiation** **Assignment**	**2023**

Class - 11

Lagrange's Method of Undetermined Multipliers - Problems

1. Find the maximum and minimum distance from the point (1,2,2) to the sphere $x^2 + y^2 + z^2 = 36$. **Ans: Maximum distance =9 and minimum distance=3**
2. If x, y, z are the lengths of the perpendiculars dropped from any point P to the three sides of a triangle of constant area A, find the minimum value of $x^2 + y^2 + z^2$. **Ans:** $\frac{4A^2}{a^2+b^2+c^2}$
3. A wire of length b is cut into two parts which are bent in the form of a square and circle respectively. Find the least value of the sum of the areas so found. **Ans:** $\frac{b^2}{4(\pi+4)}$
4. Use Lagrange multipliers to find the maximum and minimum values of the function $f(x, y) = 3x + y$ subject to the condition $x^2 + y^2 = 10$. **Ans: Maximum at (3,1) and the minimum at (-3,-1).**
5. Find the maximum and minimum of $f(x, y, z) = xyz$ on the ellipsoid $x^2 + 2y^2 + 3z^2 = 36$. **Ans: Maximum and Minimum values are** $\pm\frac{2}{\sqrt{3}}$