Assignment No: 1

Total Marks:-10

Note: All questions are compulsory;

Q1: Transform the equation $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} = 0$ into polar coordinates.	(2)	CO1
Q2: In a plane triangle ABC, find the maximum value of $\overline{\cos A}\ \overline{\cos B}\ \cos C$.	(2)	CO1
Q3: If $u = \dfrac{a^3}{x^2} + \dfrac{b^3}{y^2} + \dfrac{c^3}{z^2}$ where x + y + z = 1. Prove that the stationary values of u are given by $x = \dfrac{a}{a+b+c}\ or\ \dfrac{a}{\sum a}$, $y = \dfrac{b}{a+b+c}\ or\ \dfrac{b}{\sum a}$ and $z = \dfrac{c}{a+b+c}\ or\ \dfrac{c}{\sum a}$	(2)	CO1
Q4: Find the point on the surface of $z = x^2 + y^2 + 10$ nearest to the plane x+2y –z = 0.	(2)	CO1
Q5: If $\varphi(x,y,z) = 0$. Show that $\left(\dfrac{\partial y}{\partial z}\right)_x \left(\dfrac{\partial z}{\partial x}\right)_y \left(\dfrac{\partial x}{\partial y}\right)_z = -1$	(2)	CO1