The Open University of Sri Lanka
B.Sc./B.Ed. Degree Programme – Level 04
No Book Test (NBT) – 2024/2025
Applied Mathematics
ADU4302- Vector Calculus
Duration : One Hour

Date : 04-10-2024 **Time : 9.00 a.m. – 10.00 a.m.**

Answer All Questions.

1. Find the surface integral of the function $f(x,y) = \sin x \cos y$, defined over the region $R = \left\{(x,\ y) | \frac{\pi}{6} \leq x \leq \frac{\pi}{3},\ \frac{\pi}{6} \leq y \leq \frac{\pi}{3}\right\}$.

2. Find the surface integral of the function $f(x,y) = x^2 + y^2$ defined over the region bounded by $y = 2x$ and $y = x^2$.

3. Evaluate the surface integral of the function $f(x,y) = x + y$ defined over the region R where $R = \{(x,\ y)\ /\ 1 \leq x^2 + y^2 \leq 4,\ x \leq 0\}$.

4. Find the volume of the region bounded by the cone $z = 2 - \sqrt{x^2 + y^2}$ and the xy- plane.

5. Using Spherical polar coordinates, evaluate the volume integral of the function $f(x,y,z) = z$ defined over the region bounded above by the hemisphere $x^2 + y^2 + z^2 = 16$ with $z \geq 0$ and below by the cone $2z = \sqrt{x^2 + y^2}$.