

The Open University of Sri Lanka
 B.Sc Degree Programme
 No Book Test (NBT)- 2017/2018
 Applied Mathematics - Level 04
 ADU4302/ADE4302 – Vector Calculus
 Duration :- One Hour



Date:- 23. 07. 2018

Time:- 4.15 p.m. - 5.15 p.m.

Answer All Questions.

1. (a) Find the surface integral of the function $f(x, y) = \frac{1+3x^2}{1+y^2}$ defined over the region bounded by $x=1$, $x=2$, $y=0$ and $y=1$.

(b) Using surface integral, find the area of the region bounded by $y = x^2 + 1$ and $y = x + 3$.

(c) Using plane polar coordinates, evaluate the surface integral of the function $f(x, y) = x^2 + y^2$ defined over the region bounded by $1 \leq x^2 + y^2 \leq 4$, $y \geq 0$.

2. (a) Find the volume integral of the function $f(x, y, z) = x + y + z$ defined over the cuboid given by $0 \leq x \leq 1$, $0 \leq y \leq 2$ and $0 \leq z \leq 3$.

(b) Using Cylindrical polar coordinates, find the volume integral of the function $f(x, y) = \sqrt{x^2 + y^2}$ defined over the region bounded by the surfaces $z = a^2 - x^2 - y^2$, and $z \geq 0$.

(c) Using Spherical polar coordinates, find the volume integral of the function $f(x, y, z) = x^2 + y^2 + z^2$ defined over the region bounded by the surface $x^2 + y^2 + z^2 = 1$.