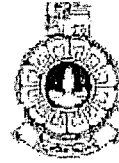


The Open University of Sri Lanka  
B.Sc Degree Programme  
No Book Test (NBT)- 2016/2017  
Applied Mathematics - Level 04  
APU2143/APE4143 – Vector Calculus  
Duration :- One Hour



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Date:- 29. 05. 2017

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

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Answer All Questions.

1. (a) Find the surface integral of the function  $f(x, y) = \frac{1+x^2}{\sqrt{1-y^2}}$  defined over the region bounded by  $x=1$ ,  $x=2$ ,  $y=\frac{1}{2}$  and  $y=1$ .
- (b) Using surface integral, find the area of the region bounded by  $y^2 = 2x+4$  and  $y=x-2$ .
- (c) Using plane polar coordinates, evaluate the surface integral of the function  $f(x, y) = e^{-x^2-y^2}$  defined over the region bounded by  $1 \leq x^2 + y^2 \leq 9$ ,  $x \geq 0$  and  $y \geq 0$ .
2. (a) Find the volume integral of the function  $f(x, y, z) = xyz$  defined over the cuboid given by  $0 \leq x \leq 1$ ,  $-1 \leq y \leq 2$  and  $0 \leq z \leq 3$ .
- (b) Using Cylindrical polar coordinates, find the volume integral of the function  $f(x, y, z) = x^2 + y^2$  defined over the region bounded by the surfaces  $z = x^2 + y^2$ ,  $x = 0$ ,  $y = 0$  and  $z = 1$ .
- (c) Using Spherical polar coordinates, find the volume integral of the function  $f(x, y, z) = z^2$  defined over the region bounded by the surfaces  $x^2 + y^2 + z^2 = 1$ ,  $x = 0$ , and  $y = 0$ .