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**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

# University Examinations 2013/2014

**YEAR III SEMESTER I EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY**

# SMA 2102: CALCULUS II

**DATE: APRIL, 2014**  **TIME: 2 HOURS**

**INSTRUCTIONS: Answer Question ONE (Compulsory) and any other TWO questions.**

**Question One – 30 Marks**

a) Differentiate the following functions with respect to x.

1. 
2.  [5 marks]

b) Use the change of variable method to evaluate.

 [6 marks]

c) Decompose the function  into partial fractions. Hence evaluate  [6 mark]

d) Calculate the area bounded by the curve y=xex and the x-axis form x=0 to x=1.

[5 marks]

e) The region bounded by the curve   and the x-axis form x=0 to x=1 is revolved about the x-axis. Calculate the volume of the solid generated [4 marks]

f) Find the mean value of the function f(x)=sin x cos x from x =0 to  [4 marks]

**Question Two (20 Marks)**

a) Find the slope of the curve at the point where x=2. [5 marks]

b) A curve is defined parametrically by the equations.

 y=t2

Find the gradient of this curve at the point where x= [5 marks]

c) The gradient function of a curve is given as . Find the equation of this curve given that the point (0,2) lies on the curve [5 marks]

d) Find the point(s) where the curve  has turning point(s). [5 marks]

**Question Three (20 Marks)**

Evaluate the following integrals.

1.  [4 marks]
2.  [4 marks]
3.  [6 marks]
4.  [6 marks]

**Question Four (20 Marks)**

a) Calculate the length of the arc of the curve y=x2 from  to  [5 marks]

b) Calculate the exact area between the curve Y=x-x3 and the x-axis. [4 marks]

c) Evaluate  by first deriving the reduction formula of . [8 marks]

d) Show that the volume of a sphere radius r is given as  [3 marks]

**Question Five (20 Marks)**

a) Evaluate

1. 
2.  [6 marks]

b) Use the Simpson’s rule with n=4 to find the approximate value of 

[8 marks]

c) Given that Z1=3-2i, Z2=2+5i find

1.  [2 marks]
2. Z1Z2 [2 marks]
3.  [2 marks]