

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

**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2015/2016**

**SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY**

**SMA 2101: CALCULUS I**

**DATE: DECEMBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

a) Evaluate  [3 marks]

b) If y = 6x5 +4x4 = 9x3 -1, find  [4 marks]

c) Find the derivative of f(x) = 6x2 + 3x +2 from first principles. [5 marks]

d) Differentiate the following functions:

1. y = x3 cos 3x [4 marks]
2. y =  [4 marks
3. y = (4x3 – 3x)6 [4 marks]

e) Determine the equation of the tangent and normal to the

curve y = x2-x-2 at the point (1, -2). [6 marks]

**QUESTION TWO ( 20 MARKS)**

1. Evaluate :  [4 marks]
2. Given y = 4t3 - 2t2 and x = 3t2 + t, find  [6 marks]
3. If y = cos x – sin x, evaluate x, in the range  ,

when  is zero. [5 marks]

1. Use logarithmic differentiation to differentiate

  [5 marks]

**QUESTION THREE (20 MARKS)**

1. Find the turning points of the curve y = x3 -3x + 5.

State their nature and hence sketch the curve. [10 marks]

1. The distance 5 metres moved by a car in a time, t seconds is

given by S = 

Determine:

1. The velocity at t = 3 seconds [3 marks]
2. The acceleration at t =3 seconds [3 marks]
3. The value of t when the body comes to rest [4 marks]

**QUESTION FOUR**

1. Determine the following terms:
2. Continuity of a function at a point a. [2 marks]
3. Limit of a function at a point a. [2 marks]
4. Discuss the continuity of f (x) if

 Ω [3 marks]

1. A farmer has an adjustable electric fence that is 100 m long.

He uses this fence to enclose a rectangular grazing area on three

Sides, the fourth side being a fixed edge. Find the maximum area

he can enclose . [5 marks]

1. Determine the values of  at x= 3 given that x2 +y2 = 25 [5 marks]
2. Differentiate y =  [3 marks]