

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

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2013/2014**

**EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE FINANCIAL ENGINEERING**

**STA 2105: CALCULUS FOR STATISTICS II**

**DATE: December 2013 TIME: 2 HOURS**

**INSTRUCTIONS:**

**ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (20 MARKS)**

1. Discuss the stationary points of the curve y=x3- and sketch the curve (5marks)
2. Given that X=t2-4t-6

Y=t3-2t2+10 where t is a parameter, find the value of

 (4marks)

1. The marginal revenue function for output x is given by MR=, find the total revenue function and demand equation (4marks)
2. Use trapezoidal rule to estimate the integral using n=4 correct to four decimal point. (4marks)
3. Evaluate the following integrals
4. (3marks)
5. (4marks)
6. A company manufactures two types of wood-burning stoves: a free-standing model and a fire place-insert model. The cost function for producing x freestanding and y fireplace-insert stoves is =32 +175x+205y+1050. Find the marginal costs

 when X=80 and y=20 (4marks)

1. Given ~~Z~~1=6-5 ~~Z~~2=-7-3 Find  as simple as possible (2marks)

**QUESTION TWO (20 MARKS)**

1. Evaluate the following integrals
2. (3marks)
3. (3marks)
4. Find the equation of the Normal line to the curve

X2y-xy2+x2+y2=0 at (1, 1) (4marks)

1. The demand function for Dell computers, manufactured by a company is given by

= where S is the unit price per unit in $ and X is quantity demanded per week in hundreds. Use Simpson’s rule to estimate the consumer’s surplus if the market price is of the disc $20 with n=8 correct 4dp. (10marks)

**QUESTION THREE**

1. Evaluate the following integrals
2. (4marks)
3. (4marks)
4. Resolve in partial functions hence evaluate (6marks)
5. An electric manufacturing company makes small household switches. The company estimates the marginal revenue function for these switches to be MR= where x represents the number of units (in thousands). What is the total revenue function? (6marks)

**QUESTION FOUR**

1. A bank pays interest at the rate of 6% per annum compounded continuously. If a person places sh.1000 in the bank each year, how much will be in his account after 3 years? (4marks)
2. Let X=1000 and y=500 in the Cobb-Douglas production function

F(x, y) =100x0.6y0.4

1. Find the marginal productivity of labour,
2. Find the marginal productivity of capital, (6marks)
3. i) Given ~~Z~~1=6-3

~~Z~~2=5+4 Find ~~Z~~1~~Z~~2 and write your result in polar form (4marks)

 ii) By Demoivre’s theorem real part of cos3 as a function of cosine only (3marks)

1. Sketch the graph of f(x)= by identify all the asymptotes (3marks)