

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

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

# **UNIVERSITY EXAMINATIONS 2014/2015**

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF COMMERCE /

BUSINESS INFORMATION TECHNOLOGY

**HBC 2103 : MATHEMATICS FOR BUSINESS**

**DATE: AUGUST 2015 TIME: 2 HOURS**

**INSTRUCTIONS:**

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

**=========================================================**

**QUESTION ONE**

1. Citing specific examples, discuss any FOUR applications of mathematical functions in business. [6 marks]
2. Using examples, demonstrate the meaning of the following concepts
3. Union of sets
4. Intersection of sets
5. Compliment of a set [6 marks]
6. Use the product rule to differentiate the function  [6 marks]
7. Show that the sum of a geometric series with first term, (a) and common ratio (r+ is given by the expression  [6 marks]
8. Use complete the square method to solve for x in the function

 [3 marks]

1. The cost of 2 mangoes are 3 bananas is 70 and the cost of one major and 4 bananas is 60. Find the cost 10 mangoes and 10 bananas [3 marks]

**QUESTION TWO**

1. Juma knows that if x (hundred) products are demanded in a particular week, the total cost function ( in thousands) is 14+3x and the total revenue function (in thousands) is 

Required:

1. Derive the total profit function [3 marks]
2. Find the profit break-even points [5 marks]
3. Calculate the level of demand that maximizes profits and the amount of profit obtained. [5 marks]
4. Determine the coordinates and nature of any turning points on the curve represented by the function  [ 7 marks]

**QUESTION THREE**

1. In an arithmetic progression the 4th term is 13 and the 7th term is 22. Determine
2. The first term and the common difference [3 marks]
3. The value of an if the nth term is 100 [4 marks]
4. The value of m if the sum of m terms of the series is 175 [5 marks]
5. A company manufactures batteries and watches by means of two process X and Y. the maximum capacity of process X is 1750 and of process Y is 4000 hours. Each unit of battery requires 3 hours in X and 2 hours in Y, while each unit of a watch requires 1 hour in X and 4 hour in Y. Calculate the number of units of each product produced if the maximum capacity available is utilized. [8 marks]

**QUESTION FOUR**

1. A company manufactures three products A , B and C each of which must go through three processes X, Y and Z for the following times:

Product Time spend

X Y Z

A 3 3 1

B 3 2 3

C 2 0 1

And the maximum capacities of X, Y and Z are 130 85 and 60 respectively. Calculate the number of units to be produced of A , B and C [13 marks]

1. Determine the integral using the substitution method

 [7 marks]

**QUESTION FIVE**

1. Give the demand D=10.4 – 1.3x ( where X is in hundreds) , find the level of production which maximizes total revenue [6 marks]
2. For a certain type of credit card, the collection percentage of credit issued can be approximated using the following function P=0.95(1-e-0.7t)

Find

1. Percentage of debts recovered in 6 months [4 marks]
2. The value that should be provided for bad debts [4 marks]
3. Use the inverse method to solve for the unknown in the function.



 [6 marks]