****

MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS**

**2015/2016 ACADEMIC YEAR**

***FIRST* YEAR *SECOND* SEMESTER**

**SCHOOL OF BUSINESS & ECONOMICS**

**BACHELOR OF ECONOMICS**

**COURSE CODE: ECO 113**

**COURSE TITLE:** **INTRODUCTION TO MATHS I**

**DATE: 11TH MAY 2016 TIME: 11-1 PM**

**INSTRUCTIONS TO CANDIDATES**

1. Answer Question **ONE** and any other **THREE** questions

*This paper consists of* ***3*** *printed pages. Please turn over.*

**QUESTION ONE( 25 MARKS)**

1. An economy has three industries, government (G), Agriculture (A) and manufacturing (M). The input output table for three industries is given as:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Input to** |  |  |
| **G** | **A** | **M** | **Final demand** | **Total output** |
| **Output From** | **G** | 400 | 200 | 200 | 200 | 1000 |
| **A** | 200 | 400 | 100 | 300 | 1000 |
| **M** | 200 | 100 | 300 | 400 | 1000 |
|  | **Primary** **inputs** | 200 | 300 | 400 |  |  |

Calculate the total output required for each industry when the final demand changes to 300,350 and 450 for government, agriculture and manufacturing respectively **( 15 marks)**

1. Evaluate by means of integration by substitution: 

** (5 marks)**

1. Given the following equation

$Q\_{x}=50-3P\_{x}-0.2P\_{y}+0.6Y$, where $ P\_{x}=5, P\_{y}=7 and Y=500$

Calculate

1. The cross price elasticity of demand. What is the relationship between good x and good y. Explain. **(3 marks)**
2. The income elasticity of demand **(2 marks)**

**QUESTION TWO ( 15 MARKS)**

1. The demand function of a product is given as:

$$\left(p+10\right)\left(q+20\right)=1000$$

The supply function is given as:

$$q-4p+10=0$$

1. Determine the equilibrium price and quantity **(6 marks)**
2. Determine the producer surplus under market equilibrium **(6 marks)**
3. State and explain the types of returns to scale  **(3 marks)**

**QUESTION THREE ( 15 MARKS)**

1. Given the utility function$\left(x+2\right)\left(y+1\right)$ and $P\_{x}=4, P\_{y}=6 $ and income of the consumer=130
2. Write the consumer’s optimization problem **(2 marks)**
3. Find the optimal level of x and y. **(7 marks)**
4. Prove Euler’s theorem using the following function

$Q=96K^{0.3}L^{0.7}$ **(6 marks)**

**QUESTION FOUR ( 15 MARKS)**

1. Let the national income model be given as

$$Y=C+I\_{0}+G$$

$C=a-b\left(Y-T\_{0}\right) \left(a>0, 0<b<1\right)$

$G=gY \left(0<g<1\right)$

1. Identify the endogenous variables **(1 mark)**
2. Find the equilibrium national income **(4 mark)**
3. The demand and supply functions of 2 commodities are given as

$$ Q\_{d1}=18-3P\_{1}- P\_{2} Q\_{s1} = -2+4P\_{1}$$

$ Q\_{d2}=12-P\_{1}-2P\_{2} Q\_{s2}= -2+ 3P\_{2}$

Determine the equilibrium prices and quantities for the 2 goods using cramer’s rule **(6 marks)**

1. Prove young theorem using the following function

$q=x^{2}+5xy-y^{3}$ **(4 marks)**

**QUESTION FIVE ( 15 MARKS)**

1. Find the rank of the matrix

$ \left(\begin{matrix}4&0&1\\19&1&-3\\7&1&0\end{matrix}\right)$ **(5 Marks)**

1. A manufacturers marginal revenue function is

$\frac{dr}{dq}=100+50q-3q^{2}$

Find the change in the manufacturers total revenue if production increases from 5 to 10 units **(4 marks)**

1. Given the total revenue and total cost functions below, find the profit maximizing level of output

TR(Q)=1200Q-2Q2

TC(Q)=Q3-61.25Q2+1528.5Q+2000 **(6 marks)**

**....................END....................**