

MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS**

**2014/2015 ACADEMIC YEAR**

**SECOND YEAR FIRST SEMESTER**

**SCHOOL OF BUSINESS AND ECONOMICS**

**BACHELOR OF SCIENCE (AGRICULTURAL ECONOMICS)**

**COURSE CODE: ARE 203**

**COURSE TITLE: MATHEMATICS FOR                                   ECONOMICS II**

**DATE: 25TH AUGUST 2015 TIME: 8:30 – 10:30AM**

**INSTRUCTIONS TO CANDIDATES**

Answer question **ONE** and any other **THREE** questions

*This paper consists of 2 printed pages. Please turn over*

**Question One**

(a) Prove that the following demand function has a unitary elasticity **(5mks)**

P = 1 , where K is a constant

KQ

(b) If the cost function of a firm is 100 + 23Q +½Q3 and the demand function is

P = 100-Q. Determine maximum profit for this function. **(5mks)**

(c) A discriminating monopolist has the following demand function corresponding to the rural and urban market for its product:

QR = 42 – 0.2PR

QU  = 100 – 0.8PU

Its total cost function is given by: C = 400 + 20Q

1. What price should the monopolist charge so as to maximise profit if it were to discriminate between the two **(10mks)**
2. What price should the producer charge if there was no discrimination **(5mks)**

**Question Two**

(a) What are the limitations of static **(6mks)**

(b) Determine the critical values of X, Y and λ in the following optimization problem:

X + 2XY + Y

Subject to:

X + Y = 4 **(9mks)**

**Question Three**

(a) Consider the following optimization **(10mks)**

Optimize Z = X21 + X22

Subject to: X1 + 4X2 = 2

Determine the stationary values of Z is a maximum or minimum

(b) Discuss the economic application of the Hessian Determinant **(5mks)**

**Question Four**

(i) a)Find the derivative of Z with respect to U

Z = x2y2 – x5y x=u3 y = u5 **(5mks)**

1. Compute the derivative of the following function

∫(w) = (13 – w3)(w5 – 5 **(5mks)**

(ii) Determine factors that affect **(5mks)**

**Question Five**

(a) Discuss the advantages of using mathematics in **(7mks)**

(b) Consider the following cost and revenue functions

TR = 400Q – 3.3Q2

TC = 1/5Q3 – 3/10Q2 + 40Q + 500

Find the profit maximising level of output (prove your answer using first and second conditions **(8mks)**

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