

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF BACHELOR DEGREE IN  
ECON 131: INTRODUCTION TO MATHEMATICS FOR ECONOMISTS

STREAMS: ECONSTAT, ECONSOCI, ECONMATH, ECOHHIST, ECONGEOG, BA  
GENERAL

TIME: 2 HOURS

DAY/DATE: MONDAY 14/12/2020

8.30 A.M -10.30 A.M.

INSTRUCTIONS TO CANDIDATES:

- Answer All questions in section A and choose two questions in section B
- Do not write anything on the question paper

QUESTION ONE

- a) A study was done to establish the popularity of viewing of three stations i.e citizen, KTN and Nation TV. 50% of residents watch citizen TV, 23% watch Nation TV and 27% watch KTN TV. 15% watch both Nation and KTN, 32% watch KTN and Citizen and 17% watch Nation and Citizen.

Required:

- i. Present the above information on a Venn diagram [5 Marks]
- ii. If the total number of villages sampled were 100. Calculate the number of people who watch Nation and Citizen together. [2 Marks]
- b) Expand the following function  $(x + y)^7$  [4 Marks]
- c) Given the following information of a two commodity market model

$$Q = 4 - P_1 + 0.5P_2$$

$$Q = 10 + \dots$$

## ECON 131

$$Q = -3 + 4$$

$$Q = -18 + 4$$

Use the crammers rule to determine the equilibrium price and quantity of each market in the economy. [8 Marks]

d) Evaluate the following:

i.  $(4 \times 2 + 16) \times 2 - 2 + 3 \times 4 + 18 \times 6 - (5 - 2)$  [2 Marks]

ii. [2 Marks]

iii.  $+ 16$  [2 Marks]

iv. Solve for in the following function [2 Marks]

### QUESTION TWO

a) Mathematical economics use mathematical symbols in stating economic problems and making use of the mathematical theorems for policy formulation on economic conditions. Discuss the significance of mathematical economics. [10 Marks]

b) Find the critical values of the following function and determine whether or not these values give rise to local maxima. if so, what is the maximum value of y. [5

Marks]

$$y = +$$

c) Find the following definite Integrals.

a. [3 Marks]

b. [2 Marks]

### QUESTION THREE

a) Distinguish between the following terms giving examples

i. Endogenous and Exogenous variables [2

Marks]

ii. Behavioral and Technical Functions [2 Marks]

iii. Rational and irrational numbers [2

Marks]

iv. Integer and real number [2

Marks]

v. Descriptive and enumerative methods of set representation [2 Marks]

b) You are given the following functions.

## ECON 131

You are required to:

- i. Giving reason, identify the demand and the supply function. [2 Marks]
- c) The government decides to impose a per unit tax  $t$  on output supplied by the firm. Determine the tax rate that will maximize government tax revenue. [3 Marks]
- ii. Determine the maximum tax revenue. [3 Marks]
- e) Expand the following function
  - a. [2 Marks]

### QUESTION FOUR

- a) Given the following function Matrices,

$$P= \quad Q =$$

Prove that

[6 Marks]

- b) The total cost of producing Unga, manufactured by Unga company is given by;

$$TC = 0.067 - 0.45 + 1.89Q + 15$$

Required: Find;

- a.) AC
- b.) AVC
- c.) AFC
- d.) TVC
- e.) TFC

[5 Marks]

- c) An economy is defined as where

You are required to:

- i) Name the endogenous and exogenous Variables in the model. [3 Marks]
- ii) What is the balance of trade position in the economy when;
  - a)  $x$  [1 Mark]
  - b)  $x$  [1 Mark]
  - c)  $x =$  [1 Mark]
- iii) Find the Equilibrium income for the economy. [3 Marks]

