



KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS

2022/2023 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER

SUPPLIMENTARY EXAMINATION

FOR THE DEGREE OF BACHELLOR OF EDUCATION

COURSE CODE: ECO 103

COURSE TITLE: MATHEMATICS FOR ECONOMISTS

DATE: 17TH AUGUST, 2023

TIME: 11.00AM -1.00PM

INSTRUCTIONS TO CANDIDATES

Answer Question One in Section A and Any other TWO (2) Questions in Section B

KIBU observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

QUESTION ONE

a) Find the equilibrium price and quantity for each of the following markets;

i) $Q_s = -20 + 3P$ (6marks)
 $Q_d = 220 - 5P$

ii) Given the universal set U and its subsets C and D

$$U = \{7,9,11,13,15,17,19,21\}$$

$$C = \{9,11,15,19\}$$

$$D = \{11,13,15,17,21\}$$

$$E = \{\phi\}$$

Determine:

- i) intersection of C and D (2marks)
ii) intersection of D and E (1mark)
iii) union of C and E. (1mark)
iv) $D \cap E \cup C$ (1mark)

b) Given the following model,

$$Y = C + I + G$$

$$C = a + bY^d$$

$$Y^d = Y - T$$

$$T = d + tY$$

Find the equilibrium \bar{Y} , \bar{C} , \bar{T} . (10marks)

d) Use the Gaussian elimination method to solve the following system of equations

$$3X_1 + 8X_2 = 53$$

$$6X_1 + 2X_2 = 50 \quad (10 \text{ marks})$$

QUESTION TWO

a) Given the following data on a hypothetical economy;

$$C = 100 + 0.8Y^d \text{ (Consumption function)}$$

$$I = 10 - 10r \text{ (Investment function)}$$

$$G = 10 \text{ (government spending)}$$

$$T = 0.25Y \text{ (tax function)}$$

$$L = Y - 100r \text{ (Real money demand)}$$

$$M = 295 \text{ (Real money supply)}$$

Required;

Compute the general equilibrium income and interest rate that clears both the goods and money markets. (8marks)

b) Using a well labelled diagram, analyse the effect of a contractionary monetary policy on the IS-LM curve. (12marks)

QUESTION THREE

a) Given the following set of simultaneous equations for two related markets, beef (B) and pork

(P), find the equilibrium conditions for each market, using the substitution method.

$$1) Q_{dB} = 82 - 3P_B + P_P$$

$$2) Q_{dP} = 92 + 2P_B - 4P_P$$

$$Q_{sB} = -5 + 15P_B$$

$$Q_{sP} = -5 + 32P_P$$

(10 marks)

b) Analyze the role of mathematics in economics.

(10marks)

QUESTION FOUR

a) Discuss the four main characteristics of the Consumption function and MPC. (8marks)

b) Calculate the MPC using the consumption function $C = 150 + 0.68Y^d$ (2marks)

c) Solve the following system of linear equations using Cramer's rule. (10marks)

$$3y_1 + 7y_2 = 41$$

$$8y_1 + 9y_2 = 61$$

QUESTION FIVE

a) Given: $Q_s = -5 + 3P$, $Q_d = 10 - 2P$

Solving for P and Q for the economy to be in equilibrium.

(6marks)

b) Income determination models generally express the equilibrium level of income in a four-sector economy as $Y = C + I + G + (X - Z)$ here Y _ income, C _ consumption, I _ investment, G _ government expenditures, X _ exports, and Z _ imports. By substituting the information supplied in the problem, solve for the equilibrium level of income. (6marks)

c) Assume a simple two-sector economy where $Y = C + I$, $C = C_0 - bY$, and $I = I_0$. Assume further that $C_0 = 85$, $b = 0.9$, and $I_0 = 55$. Calculate the equilibrium level of income in terms of (1) the general parameters and (2) the specific values assigned to these parameters.

(8marks)