UNIVERSITY EXAMINATION

REGULAR EXAMINATION

(MAIN EXAMINATION)

COURSE CODE: 105

COURSE TITLE: MATHEMATICS FOR ECONOMISTS

DATE:

TIME:

INSTRUCTIONS

- **Answer question one and any other THREE questions**

QUESTION ONE

Given the demand function: Qd = 12-P

a) Find the demand and marginal revenue schedules
b) Plot these schedules
c) Find marginal revenue when
   P = 10
   P = 6
   P = 2
d) Estimate the elasticity coefficient of the demand curve, when the total revenue is at maximum

QUESTION TWO

Given the sets below

A = { 8,9,10}

B = {1,2,5,9,11}

a) Draw a Venn diagram for their intersection
b) Give the set that represents their union
   Where
   Qd = Quantity demanded
   Qs = Quantity supplied
   P = Selling price per unit

QUESTION THREE

a) Differentiate between
   i)   Price elasticity of demand and cross elasticity of demand
   ii)   A demand schedule and a demand curve
   iii)   Perfect market structure and monopolistic market structure
b) Calculate the derivatives of the following function
   i) $Y = (2x^2 + 3x)^2$
   ii) $Y = (4x + 8) (3x^2 + 5x)$
   iii) $Y = \dfrac{2x + 4}{3x^2 + 1}$

QUESTION FOUR (15 MARKS)

a) Using the model given below, calculate the equilibrium prices and quantities for each product

    i) Qd_1 $= 10-2p_1 + p_2$

    ii) Qs_1 $= -2 + 0.3 p_1$

    iii) Qd_2 $= 15 + p_1 - p_2$

    iv) Qs_2 $= -1 + 2p_2$

Qd_1 and Qs_1 = Quantities of product one demanded and supplied

Qd_2 and Qs_2 = Quantities of product two demanded and supplied

P_1 and P_1 = the prices of products one and two respectively

b) Using Cramer's Rule determine the values of the variables X_1 and X_2 in the matrix below:

$3X_1 + 2X_2 = 10$

$4X_1 + 3X_2 = 13$

QUESTION FIVE

    i)   Define a technological matrix

    ii)   Give the following Leontief inverse matrix:

$$(I-A)^{-1} = \begin{matrix} 1.15 & 0.01 & 0.05 & 0.25 \\ 0.05 & 1.00 & 0.05 & 0.00 \\ 0.15 & 0.20 & 1.10 & 0.10 \end{matrix}$$

        If the required final demand is

Find the level of X that satisfy the quantity of demand