KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN BIOMETRY AND INFORMATICS
FIRST SEMESTER 2022/2023
[SEPTEMBER-DECEMBER, 2022]

STAT 212: ECONOMETRICS

STREAM: Y2S1 **TIME: 2 HOURS**

DAY: WEDNESDAY, 3:00 – 5:00 PM **DATE: 08/12/2022**

INSTRUCTIONS

1. ***Do not write anything on this question paper.***
2. ***Answer question ONE and any other TWO questions.***

QUESTION ONE (Compulsory) (30 MARKS)

a. Define the following terms as used in econometrics (6marks)
   i. Econometrics
   ii. Time series
   iii. Correlation

b. Consider $C = household\ food\ Consumption\ \ and$ $i = is\ household\ weekly\ income$. Given the above economic variables follows a simple linear regression model for a given function f_t. Formulate an economic model for the expected level of food consumption and explain under what conditions it can be achieved (4marks)

c. Although plenty of data are available for economic research, the quality of the data is often not that good. Explain five reasons for that. (5marks)

d. State three assumptions of simple Keynesian model in econometrics (3marks)

e. The result $Eb_2 = \beta_2$ means that the distribution of b_2 is centered β_2. Since the distribution of b_2 is centered at β_2, we say that $b_2$is unbiased estimator of β_2. Explain how a good estimator can be unbiased. (3marks)

f. Differentiate between micro and macro data as used in economic modeling (2marks)

g. State three purposes of regression analysis in terms of econometrics (3marks)

h. Given that $Z = a + cX$. Show that $var(z)\ is\ given\ by\ c^2 var(x)$ (4marks)

QUESTION TWO

a. Calculate the variance for a discrete random variable x given the following data (6marks)

x	2	3	4	5	6
$f(x)$	0.1	0.3	0.11	0.2	0.3

b. Economic models can be postulated in terms of linear regression model. State three assumptions that satisfy a simple regression models. (3marks)

c. Given that $var(x) = E[(X - EX)^2]$ Proof that $var(x) is\ given\ by\ (EX^2) - (EX)^2$ (5marks)

d. Discuss the factors that determine variance and covariance of a sample size (6marks)

QUESTION THREE

a. Let (x, y) be discrete economic random variables with joint probability mass function (JPMF) of $f(x, y)$ then,

$$E(x)=\sum_x x\, f(x)$$

$$E(y)=\sum_y y\, f(y)$$

$$f(x)=\sum_y f(x,y)dx$$

$$f(y)=\sum_x f(x,y)\ \text{dy}$$

$$f(x,y) = \begin{bmatrix} a(x+y) & x = 0,2,4\ y = 1,3 \\ & \square \\ 0 & otherwise \end{bmatrix}$$

Find: (12marks)

i. The value of a
ii. Marginal function of $x\ and\ y$
iii. $E(x) and E(y)$
iv. $E(x^2)\ and\ E(y^2)$
v. $var(x)\ and\ var(y)$

b. Explain three properties of a good estimator in determination of a suitable economic model. (6marks)

QUESTION FOUR

i. Discuss Gauss-Markov Theorem and its implications in relation to economic setup (12marks)
ii. Differentiate between endogenous and exogenous variables (4marks)
iii. State assumptions of an error term if an economic model is expressed in terms of $y = \beta_1 + \beta_2 x + e$ (4marks)