

NATIONAL UNIVERSITY OF LESOTHO
FACULTY OF AGRICULTURE
DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION
M.Sc AGRIBUSINESS MANAGEMENT
FINAL EXAMINATION
AEC 640: QUANTITATIVE AND ECONOMETRIC TECHNIQUES

JUNE 2023

MARKS: 100

TIME: 3HRS

INSTRUCTIONS:

Answer **Questions 1 and 2** any other **two** questions.
Each question carries **twenty five** marks.

QUESTION 1

1. The data below show the consumption and income of 10 rural households.

Household	Y consumption	X income
1	4	5
2	5	6
3	6	7
4	8	9
5	10	15
6	13	21
7	16	27
8	19	32
9	24	35
10	31	48

- (a) With the use of deviation method, determine the correlation coefficient between Y and X.
(b) Give an interpretation of the correlation coefficient you obtained in question 1(a).

HINT: $r = \frac{\sum xy}{\sqrt{(\sum x^2)(\sum y^2)}}$

(Total marks is 25)

QUESTION 2.

Given that the import demand function is $Y = \beta_0 + \beta_1 X$ and the estimated import demand function is $y = 0.096 + 0.34x$ and $R^2 = 0.76$ (0.905) (0.13)

- (i) Test the hypothesis on the independent variable using the standard error test.
(ii) Test the hypothesis on the independent variable using the t-test if the level of significance is 5% and t-tabulated is 2.306
(iii) Give an explanation of what R^2 of 0.76 means. (Total marks is 25)

QUESTION 3.

The government of your country has invited you to give advice on how to conduct a national research on consumption habit of civil servants on roasted maize in your country. As an applied econometrician, provide a step by step explanations on how the research should be conducted and analyzed econometrically.

(Total marks is 25)

QUESTION 4.

With relevant economic examples, explain how econometrics is an integration of economic theory, mathematical analysis and statistical analysis. (Total marks is 25)

QUESTION 5.

Explain the following problems in linear regression in terms of definition, causes, effects on OLS and remedies:

- (a) Heteroscedasticity
- (b) Errors in variables
- (c) Autocorrelation
- (d) Multicollinearity

(Total marks is 25)