*(Knowledge for Development)*

# KIBABII UNIVERSITY
## UNIVERSITY EXAMINATIONS
## 2019/2020 ACADEMIC YEAR
## FOURTH YEAR 2ND SEMESTER
## SUPPLEMENTARY/SPECIAL EXAMINATION

## FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS & RESOURCE MANAGEMENT

**COURSE CODE:**     **IAE 485**

**COURSE TITLE:**     **ECONOMETRICS**

**DATE:** 09/02/2021.                    **TIME:** 11 - 1PM.

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**INSTRUCTIONS TO CANDIDATES**

Answer **Question 1** and any other two (2) Questions.

# QUESTION ONE

a) Distinguish the following as used in econometrics:

    i.    Multicollinearity and autocorrelation (2mks)

    ii.    Time series and cross section data (4mks)

    iii.    Simple and multiple regressions equations. (4mks)

    iv.    Goodness of fit vs test significance (2mks)

b) Explain the role of disturbance term in an econometric model. (4mks)

c) Explain the properties of a good instrumental variable (5mks)

d) The following data relates to income levels and expenses of food in thousands of shillings.

| Income | 35 | 49 | 21 | 39 | 15 | 28 | 25 |
|---|---|---|---|---|---|---|---|
| Food expenditure | 9 | 15 | 7 | 11 | 5 | 8 | 9 |

Calculate the Pearson correlation for the relationship between income and food expenditure as well as the goodness of fit. Interpret your results (9mks)

# QUESTION TWO

The following data relates to the sales and profits of ABC Company over 10 years.

| Time in years | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sales in Kshs 000 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Profit in Kshs 000 | 2 | 3 | 5 | 7 | 8 | 9 | 11 | 12 | 14 | 19 |

    i.    Obtain values of OLS $\beta_0$ hat and $\beta_1$ hat and hence write the OLS regression equation. (15mks)

    ii.    Interpret the OLS regression equation results (3mks)

    iii.    Predict profit when sales are 100 units (2mks)

# QUESTION THREE

A regression function is given as: $Y_i = \beta_0 + \beta_1 X_i + e_i$

a) Show that $\beta_1$ is linear and unbiased (5mks)

b) Compute the variance of $\beta_1$ and show it is minimum compared to coefficients obtained using other econometric methods (15mks)

## QUESTION FOUR

Study the following information on X and Y:

| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Y | 2 | 4 | 7 | 6 | 5 | 6 | 5 |

a) Regress Y on X, and find the standard error of error term, OLS parameters, t statistics, the adjusted R squared and complete regression model (16mks).

b) Obtain the Pearson correlation coefficient between X and Y (4mks)

## QUESTION FIVE

Consider the following ANOVA table for the regression equation $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + u$, for a sample of 30 observations.

| Source | Sum of squares | Degrees of freedom | Mean sum of squares | F-ratio |
|---|---|---|---|---|
| Regression | 20029.3 | b | e | g |
| Residual | 12691.5396 | c | f | |
| Total | a | d | | |

i) Find the values of a to g (10mks)

ii) Stating the null hypothesis, test whether there is statistically significant relationship between the independent variables and dependent variables at 5% level of significance (7mks)

iii) Calculate the standard deviation of the regression model (3mks)