



**DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY**  
**UNIVERSITY EXAMINATION ACADEMIC YEAR 2014/2015**  
**FIRST YEAR EXAMINATION FOR THE DEGREE OF MASTERS OF SCIENCE IN ECONOMICS**

**BEC 4106: ECONOMETRICS II**

**APRIL 2015**

**TIME: 3 HOURS**

**Instructions:**

**Answer question ONE and any other TWO questions**

**QUESTION ONE**

- a) Examine the suitability of OLS estimator in linear regression in terms of Gauss-Markov Theorem.
- b) Theoretical considerations determine the choice of the functional form to use. In this respect, discuss the use of double log models vis-à-vis the linear model in the analysis of economic data. In addition, explain the derivation of elasticities after estimation.
- c) You are provided with a production function of the form  $Q = AM^{\beta_1}N^{\beta_2}$  where Q is output of a production process/ week, M is capital used per week and N is labour usage per week. You are required to log-linearize the function and explain why this process is necessary.
- d) Examine hypotheses formulation, testing procedure and relevant tests in regression analysis of economic data.
- e) Examine autocorrelation in terms of formal definition, detection and possible remedial measures.

**QUESTION TWO**

A researcher estimated a regression model of the form  $S = 103.32 + 6.39 (SE= 2.52)D$ , that related company sales/ month/salesperson to distance covered in thousands of kilometers. The total number of observations were twenty five but only ten observations are provided in Table 1.

Table1: Data for sales of product 1 and distance covered

Observation	1	2	3	4	5	6	7	8	9	10
Sales (S)	130	140	180	200	190	185	210	195	210	190
Distance (D)	5	7	11	15	12	10	13	14	15	16

$$R^2 = 0.69$$

You are required to:

- i) Formulate the relevant hypotheses for this problem (2mrks)
  - ii) Interpret the model parameters (2mks)
  - iii) Compute the t value to compare with the tabular (critical t) in the testing of hypotheses. (1 mrk)
  - iv) Compute the residuals (10 mks)
- [15 mrks]

**QUESTION THREE**

You are given the following Keynesian macroeconomic model:

$$Y_t = CO_t + I_t + G_t + NX_t \dots\dots\dots(1)$$

$$CO_t = \beta_0 + \beta_1 YD_t + \beta_2 CO_{t-1} + \epsilon_{1t} \dots\dots\dots(2)$$

$$YD_t = Y_t - T_t \dots\dots\dots(3)$$

$$I_t = \beta_3 + \beta_4 Y_t + \beta_5 r_{t-1} + \epsilon_{2t} \dots\dots\dots(4)$$

Where:

$Y_t$  = GDP in year t

$CO_t$  = total personal consumption in year t

$I_t$  = total gross investment in year t

$G_t$  = government purchases of goods and services in year t

$T_t$  = taxes in year t

$NX_t$  = exports minus imports in year t

$R_t$  = the interest rate in year t

$YD_t$  = disposable income in year t

- a) Which equations are stochastic? Why? (2mrks)
- b) Explain identification problem in simultaneous equation systems (3 mrks)
- c) Using the order rule of identification, which equations are identified? (4 mks)
- d) Explain the appropriate procedure for econometric estimation of this model. ( 6mks)

**QUESTION FOUR**

In terms of definition, concepts, formulation and procedures, examine the following econometric techniques:

- a) Maximum Likelihood Estimation(MLE) (5mrks)
  - b) Durbin Watson test (5mrks)
  - c) Koyck distributed lag modeling (5mrks)
- [15mrks]