UGANDA MARTYRS UNIVERSITY

NKOZI

UNIVERSITY EXAMINATIONS
END OF SEMESTER TWO FINAL ASESSMENT 2021/2022
BSC II GEN & BSC II ECON & STAT

ECONOMETRICS I

Instructions:

1. Attempt any **FOUR (04)** questions

2. All questions carry equal marks

3. Do not write anything on the questions paper.

4. Carefully read through ALL the questions before attempting.

5. No **names** should be written anywhere on the examination booklet.

6. Ensure your work is **clear** and **readable**. Untidy work shall be penalized.

7. Any type of examination Malpractice will lead to automatic disqualification.

8. Ensure that your **ID number** is indicated on all pages of the examination answer booklet.

Question One

(a) Write brief and concise notes on the following

    (i) Regression analysis (05marks)

    (ii) Disturbance or error term (05marks)

    (iii) Simultaneous-equations models (05marks)

(b) Give the functions of econometrics and aspects that make it basically different from most physical sciences. (05marks)

(c) Give at least three reasons why assumptions are necessary in regression models. (05marks)

Question Two

(a) Consumer demand theory states that the quantity demanded of a commodity D_X is a function of, or depends on, its price P_X, consumer's income Y, and the price of other (related) commodities, say, commodity Z $(i.e., P_Z)$. Assuming that consumers' tastes remain constant during the period of analysis, state the preceding theory in

    (i) Specific or explicit linear form or equation and in a stochastic form. (04marks)

    (ii) Which are the coefficients to be estimated and what are they called? (02marks)

(b) With reference to the consumer demand theory in (a) above.

(i)   Present in a schematic form the various stages of econometric research. (10marks)

(ii)   How can the estimated demand function stated in $a(i)$ above be evaluated in terms of the a priori, statistical and econometric criteria? (09marks)

Question Three

Given the linear stochastic model $Y_i = \beta_0 + \beta_1 X_i + u_i$

(a)   State each of the assumptions of the classical regression model (OLS) and give an intuitive explanation of the meaning and need for each of them. (12marks)

(b)   Derive the OLS estimates $\hat{\beta}_0$ and $\hat{\beta}_1$ of the above regression equation. (13marks)

Question Four

A researcher runs an experiment to measure the impact of a short nap on memory. There are 200 participants and they can take a short nap of either 40 minutes or 45 minutes. After waking up, each participant takes a short test for short-term recall. Each participant is randomly assigned one of the examination times, based on the flip of a coin. Let Y_i denote the number of points scored on the test by the ith participant $(0 \ldots Y_i \ldots 100)$, let X_i denote the amount of time for which the participant slept prior to taking the test $(X_i = 40 \; or \; 45)$, and consider the regression model model
. $Y_i = \beta_0 + \beta_1 X_i + u_i$

(a) Explain what the term u_i represents. Why will different participants have different values of u_i? (05marks)

(b) What concerns might the researcher have about ensuring compliance among participants? (06marks)

(c) The estimated regression is $Y_i = 35 + 0.18X_i + u_i$

1

i) Compute the estimated regression's prediction for the average score of participants who slept for 40 minutes before taking the test. Repeat for 45 minutes and 60 minutes.

(07marks)

ii) Compute the estimated gain in score for a participant who is given an additional 7 minutes to nap.

(07marks)

Question Five

MJI group of company's investments (I) depend on accumulated capital (C) and business income level (Y). Suppose you are given the following summarized data for a sample of 26 companies.

$\bar{I} = 50$, $\bar{C} = 10$, $\bar{Y} = 15$, $\sum i^2 = 1000$, $\sum c^2 = 100$ $\sum y^2 = 200$, $\sum ic = 100$, $\sum iy = 400$, $\sum cy = 0$. The lower cases denote deviations from the sample mean values.

   (a) Fit the investment model $I = \beta_0 + \beta_1 C + \beta_2 Y$ (09marks)

   (b) Interpret the coefficients in the investment model   (03marks)

   (c) Compute the standard errors of the estimate coefficients.   (07marks)

   (d) Compute, interpret and distinguish between of $\bar{R}$ and $\bar{R}^2$ (06marks)

Question Six

   (a) Define Multicollinearity and explain how it would arise in regression analysis.   (04marks)

   (b) Explain the tests conducted to detect multicollinearity in the data series.   (06marks)

   (c) Give any five (05) consequence of multicollinearity in econometric modelling.   (10marks)

   (d) Explain the procedure you would take to overcome the consequences give in (c) above.

(05marks)

END