KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF SCIENCE IN ECONOMICS AND MATHEMATICS

COURSE CODE: **ECON 322**

COURSE TITLE: **ECONOMETRICS II**

STREAM: **Y4S2**

DAY: **TUESDAY**

TIME: **2.00 – 4.00 P.M.**

DATE: **12/8/2008**

INSTRUCTIONS:

1. Answer **QUESTION ONE** and any other **TWO** questions.
2. Question **ONE** carries **30 marks** and the rest **20 marks** each.
3. Show all your workings clearly.

PLEASE TURN OVER

QUESTION ONE

(a) Define the following terms as used in econometrics;

(i) Identification problem **(1mk)**

(ii) Simultaneous bias **(1mk)**

(iii) Structural model **(1mk)**

(iv) Recursive model. **(1mk)**

(v) Dummy variable **(1mk)**

(b) Consider the general linear regression model;

$$Y = X\beta + \varepsilon$$

Where, Y is (n x 1) matrix

B is (k x 1) matrix

X is (n x k) matrix

ε is (n x 1) matrix

(i) Derive the ordinary least squares (OLS) estimator $\hat{B}$ for the model. **(6mks)**

(ii) Explain the properties of the parameter estimate in (i) above **(3mks)**

(c) A researcher wanted to analyze the effects of economic growth (Y) and inflation ($\prod$) on investment (I) using the following data;

Y	I	$\prod$
8	6	5
11	12	2
9	10	1
6	7	3
6	3	4

(i) Specify a regression model to be estimated **(2mks)**

(ii) Estimate the model and interpret your results on a prior condition **(7mks)**

(iii) Compute coefficient of determination **(3mks)**

(iv) Conduct statistical test of the parameter estimates at 5% level of significance **(4mks)**

QUESTION TWO

Given the following macroeconomic model;

$C_t = \beta_0 + \beta_1 Y_t + \beta_2 C_{t-1} + e_1$ (Consumption function)

$I_t = \propto_0 + \propto_1 Y_{t-1} + \propto_2 Y_t + e_2$ (Investment function)

$Y_t = C_t + I_t + G_t$ (definitional equation)

(a) (i) Identify the predetermined and endogenous variables in the model. **(3mks)**

(ii) Using the order and rank condition establish the identification state of consumption and investment function. **(9mks)**

(iii) What is the appropriate estimation technique that can be used to estimate consumption and investment function? **(2mks)**

(b) Consider the following model

$D = a_0 + a_1 P_t + \varepsilon_{1t}$ (Demand function)

$S = b_0 + b_1 P_t + b_2 P_{t-1} + \varepsilon_{2t}$ (Supply function)

$D = S$ (Equilibrium condition)

Derive the reduced form of the model. **(6mks)**

QUESTION THREE

The following information was found in an economy;

Imports (M)	70	65	90	95	110	115	120	140	155	150
Income (Y)	80	100	120	140	160	180	200	220	240	260

(a) (i) Specify a model of imports on income **(2mks)**

(ii) Estimate the model specified in (i) as a log-log model and interpret your results. **(15mks)**

(b) Outline the effects of simultaneous equations bias in an econometric model.

(3mks)

QUESTION FOUR

An econometrician analyzed the effects of family income (Y) and family size (N) on family household consumption expenditure (C). Using 89 households, he came up with the following information;

$$(X'X)^{-1} = \begin{bmatrix} 0.0218 & 0.0015 \\ 0.0015 & 0.0011 \end{bmatrix}, \qquad (X'X) = \begin{bmatrix} 50.5 & -66.2 \\ -66.2 & 987.1 \end{bmatrix}$$

$$(X'Y) = \begin{bmatrix} 36.8 \\ 39.1 \end{bmatrix}, \qquad C'C = 113.6, \quad \bar{C} = 5.8$$

$$\bar{Y} = 2.9, \qquad \bar{N} = 3.9$$

(i) Specify the function to be estimated. **(2mks)**

(ii) Calculate $\hat{B}$, coefficient of determination (R^2) and variance covariance matrix. **(9mks)**

(iii) Construct 95% confidence intervals for the partial slope coefficients. **(2mks)**

(iv) Construct an ANOVA TABLE and test the hypothesis that $\beta_1 = \beta_2 = 0$ at 5% level of significance. **(7mks)**

QUESTION FIVE

The following computations in original values were obtained from data on quantity demanded (Y), its own price (X_1) and the price of some other good (½);

$n = 10$ $\sum x_2 = 5$ $\sum Y = 330$

$\sum X_1Y = 26210$ $\sum X_2Y = 190$ $\sum X_1X_2 = 456$

$\sum X_1^2 = 64527$ $\sum X_2^2 = 5$ $\sum Y^2 = 11700$

(a) (i) Specify a regression model based on the data set above. **(1mk)**

(ii) Estimate the model and interpret your result. **(5mks)**

(b) Explain economic problems that one would encounter if he runs a regression using a non-stationary series. **(6mks)**

(c) Explain in detail how Geometric lag structure can be used to reduce the number of Parameters in an econometric model so as to estimate fewer parameters. **(8mks)**