NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF MANAGEMENT SCIENCES

DEPARTMENT OF ACCOUNTING ECONOMICS AND FINANCE

QUALIFICATION: BACHELOR OF ECONOMICS HONOURS DEGREE	
QUALIFICATION CODE: 08HECO	**LEVEL:** 8
COURSE CODE: AEM810S	**COURSE NAME:** APPLIED ECONOMETRICS
SESSION: JUNE 2019	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION MEMORANDUM	
EXAMINER(S)	Prof. Tafirenyika Sunde
MODERATOR:	Dr Reinold Kamati

INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. Ruler
2. Calculator

THIS QUESTION PAPER CONSISTS OF 3 PAGES INCLUDING THE FIRST PAGE

QUESTION 1 [25 MARKS]

The estimation output below relates to the determinants of house prices in the city of Windhoek.

Dependent Variable: House Price (HP)
Method: Least
Sample: 120

Table 1: Eviews Output for Multiple Regression Model Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOTSIZE	5.429174	0.369250	14.70325	0.0000
BEDROOMS	2824.614	1214.808	2.325153	0.0204
BATHRMS	17105.17	1734.434	9.862107	0.0000
STORIES	7634.897	1007.974	7.574494	0.0000
C	-4009.550	3603.109	-1.112803	0.2663

R-squared	0.535547	Mean dependent var	68121.60
Adjusted R-squared	0.532113	S.D. dependent var	26702.67
S.E. of regression	18265.23	Akaike info criterion	22.47250
Sum squared residual	1.80E+11	Schwarz criterion	22.51190
Log-likelihood	-6129.993	Hannan-Quinn criteria.	22.48790
F-statistic	155.9529	Durbin-Watson stat	1.482942
Prob (F-statistic)	0.000000		

a) State the multiple regression equation that relates to the output in Table 1.

b) Interpret the results of this equation. Hint: use the following:

(i) Signs on the coefficients

(ii) Effect of each independent variable on the dependent variable

(iii) The significance level of each independent variable

(iv) Adjusted R-squared

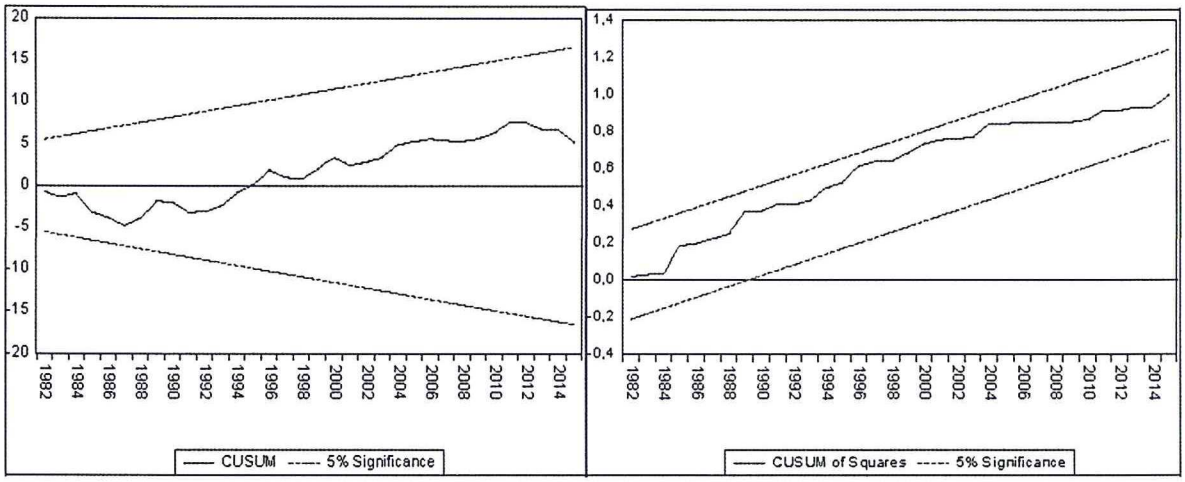
(v) F-Statistic

QUESTION 2 [25 MARKS]

(a) Assume these tests were done on the house price equation in Question 1. For each of these diagnostic tests, write the hypothesis tested and then interpret the result relating to the test.

Diagnostic test	F-Statistic	P-value
χ^2 SERIAL LM TEST	0.149671	0.9279
χ^2 JARQUE BERA	1.148180	0.5632
χ^2 ARCH	0.504221	0.4777
χ^2RESET	17.95336	0.4456

(b) State the hypothesis used to test for parameter stability and interpret the results of the CUSUM and the CUSUM of squares represented by the figure below:



(c) Justify why we should accept these results.

QUESTION 3 [25 MARKS]

Dependent Variable: GPCE
Method: OLS-ARDL (1,1,1)
Date: 04/06/19 Time: 16:35
Sample (adjusted): 1970Q3 1991Q4
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.390305	0.085787	4.549680	0.0000
PCE(-1)	0.179441	0.122010	1.470709	0.1453
GDP	0.505818	0.077755	6.505297	0.0000
GDP(-1)	0.029991	0.087407	0.343114	0.7324
PDI	0.106604	0.069365	1.536848	0.1283
PDI(-1)	0.034530	0.068090	0.507123	0.6135
R-squared	0.498359	Mean dependent var		0.689746
Adjusted R-squared	0.467007	S.D. dependent var		0.749982
S.E. of regression	0.547535	Akaike info criterion		1.700433
Sum squared residual	23.98355	Schwarz criterion		1.871666
Log-likelihood	-67.11861	Hannan-Quinn criteria.		1.769346
F-statistic	15.89533	Durbin-Watson stat		2.008461
Prob(F-statistic)	0.000000			

a) Given the following equation:

$$PCE_t = m + a_1 PCE_{t-1} + b_0 GPD_t + b_1 GDP_{t-1} + c_0 PDI_t + c_1 PDI_{t-1} + e_t$$

(i) Which parameters are short-run multipliers?

(ii) Which parameters are instant multipliers?

(iii) State the long run equation.

(iv) State the formula used to calculate the long run multiplier with respect to GDP

(v) State the formula used to calculate the long run multiplier with respect to PDI

b) Use the output in the Table to answer the following questions:

(i) Write the linear regression equation for ARDL (1, 1, 1).

(ii) What is the instantaneous multiplier of GDP?

(iii) What is the instantaneous multiplier of PDI?

(iv) What is the cumulative short-run multiplier of GDP after one (1) period?

(v) What is the cumulative short-run multiplier of PDI after one (1) period?

(vi) What is the long run multiplier of PCE with respect to GDP?

(vii) What is the long run multiplier of PCE with respect to PDI?

QUESTION 4 [25 MARKS]

Suppose you want to test for the Dynamic Granger causality between GDP (Y) and money supply (M) whose model is given as follows:

$$\Delta Y_t = \lambda_0 + \sum_{i=1}^{n} \lambda_{1i} \Delta Y_{t-i} + \sum_{i=1}^{n} \lambda_{2i} \Delta M_{t-1} + \lambda_3 \epsilon_{1t-1} + \mu_{1t} \qquad (1)$$

$$\Delta \mathrm{M}_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta Y_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta M_{t-1} + \varphi_3 \epsilon_{2t-1} + \mu_{2t} \qquad (2)$$

(i) State the condition that should be met if there is short-run unidirectional causality running from M to GDP.

(ii) State the condition that should be met if there is short-run unidirectional causality running from GDP to M.

(iii) State the condition that should be met if there is short-run bidirectional causality between M to GDP.

(iv) State the condition that should be met if there is independence between M to GDP.

(v) State the hypothesis used in (i).

(vi) State the hypothesis used in (ii).

(vii) State the joint short run and long run Granger causality hypotheses for both equations (1) and (2).