MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (STATISTICS AND PROGRAMMING)

SST 405: ECONOMETRICS III

DATE: 22/10/2020 **TIME: 2:00 – 4:00 PM**

INSTRUCTIONS:

i) **Answer question ONE and any other TWO questions. Question one carries 30 marks and the other questions carry 20 marks each.**
ii) **Do not write on the question paper**

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Distinguish between deterministic and stochastic functions using equations. (6 marks)

b) You are given the following Stata output (Table 1) of probit model on the determinants of technology adoption in agriculture in Kenya.

Table 1: Determinants of technology adoption (adoption of hybrid (1) verses traditional seeds (0))

Variable	Coef	P-value
Gender of household head	0.0383	0.047
Age of household head	-0.291	0.079
Farm size	0.00367	0.0000
Access to credit	-0.000410	0.0000
Access to off-farm activities	-0.139	0.0000
Distance to the market	0.349	0.031
Contact with extension officers	0.0386	0.2659
Farm equipment	0.993	0.0860
Family size	2.020	0.0000
Practice of soil conservation	0.914	0.858
Constant	-0.0444	0.000
Observations	812	
Prob > F	0.000	
R^2	0.733	

Required:

a) Comment on the fitness of the model (2 marks)

b) Explain R^2 (2 marks)

c) Interpret these findings with reference to p-values and the sign of coefficients.

QUESTION TWO (20 MARKS)

You are given the following 10 values of Y and X depicting the relationship between Y a dependent variable and X an independent variable.

Y	40	80	90	85	70	60	95	100	50	70
X	80	100	150	110	90	40	120	150	30	70

Required:

a) Estimate: $\hat{a}_0$ and $\hat{a}_1$ (12 marks)

b) Express the relationship between $\hat{y}$ and x, and interpret the results. (4 marks)

c) Compute the r^2 and interpret the results. (4 marks)

QUESTION THREE (20 MARKS)

Using hypothesis, interpret the results of the following diagnostic test outputs:

a) Multicollinearity test (Variable Inflation Factors)

Variable	VIF	1/VIF
X_1	5.83	0.171490
X_2	5.83	0.171648
X_3	1.47	0.679920
X_4	1.10	0.908289
Mean VIF	3.85	

(2 marks)

b) **Shapiro-Wilk Normality Test**

Variable	Obs	W	V	Z	Prob>z
r	320	0.85641	32.395	8.189	0.00000

(2 marks)

c) State and describe the four main steps involved in empirical econometric analysis (8 marks)

d) Compute t statistics for X_1 -X_4 from the following OLS output. (8 marks)

Y	Coef.	Std. Err.	t	P>t
X_1	.0167962	.0058687	?	0.006
X_2	.8668781	1.316693	?	0.514
X_3	1.325903	.823754	?	0.114
X_4	.5452621	.2854932	?	0.063
_cons	-3.500225	.9709277	?	0.001

QUESTION FOUR (20 MARKS)

Suppose the value of Y in period t is determined by its own lagged value and by lagged values of other variables X and Z;

a) Express Y_t as a function of its lagged value, and lagged values of X and Z (4 marks)

b) Use the Y_t equation (in a) to form an expectation of Y taking into consideration time t. (hint: use lagged values at $t-1$). (10 marks)

c) Differentiate between stationary and non-stationary time series, normal and non-normal distributions. (6 marks)

QUESTION FIVE (20 MARKS)

a) Write short notes on the following:

i. Cross-sectional study (4 marks)

ii. Panel study (4 marks)

iii. Endogeneity (4 marks)

b) Explain the role on an error term in econometric models (4 marks)

c) Identify any four sources of Multicollinearity (4 marks)