



MACHAKOS UNIVERSITY

University Examinations for 2016/2017 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

THIRD YEAR SPECIAL EXAMINATION FOR BACHELOR OF SCIENCE IN
STATISTICS

SST 300: ECONOMETRICS I

DATE:

TIME:

INSTRUCTIONS TO CANDIDATES

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

QUESTION ONE (COMPULSORY 30MARKS)

- (a) Discuss clearly the assumptions underlying multiple linear regression models (10 marks)
- (b) The following data was obtained from the manager of a city water department for predicting the consumption of water (in gallons) from the size of a household

Household size(X)	Water Used(Y)
2	650
7	1200
9	1300
4	430
12	1400
6	900
9	1800
3	640
3	793
2	925

- i) Fit the regression line and interpret your results (6 marks)
- ii) Predict the level of water use for each household (3 marks)
- iii) Calculate the residual water use values for each household. (3 marks)
- iv) Test whether the coefficient of household size is different from zero assuming a 5% level of significance (8 marks)

QUESTION TWO (20 MARKS)

- (a) Differentiate between deterministic and stochastic functions (6 marks)
- (b) Briefly discuss the methodology of econometrics. (8 marks)
- (c) Why is OLS the most preferred estimator? (6 marks)

QUESTION THREE (20 MARKS)

A researcher sought to investigate the effect of exchange rate, foreign income, domestic income and money supply on Kenya's trade balance. Using Stata (Econometric Software), the following regression results were obtained.

Table 1: ANOVA TABLE

Source	Sum of Squares	Degrees of freedom	Mean sum of squares	Number of observation	= 53
Model	336607972	4	a	F(4, 48)	= 535.31
Residual	7545709.92	b	157202.29	Prob > F	= 0.000
Total	344153682	52	c	R-squared	= 0.9781

Table 2: Coefficients and other statistics

Trade balance	Coefficient.	Standard Error	t value	P value
Exchange rate	1.44	4.18	0.34	0.732
Domestic income	-0.03	0.054	-0.60	0.553
Foreign income	0.00012	0.000027	4.61	0.000
Money supply	-0.39	0.12	-3.20	0.002
Constant	153.16	104.49	1.47	0.149

From the above regression results:

- i) Determine a, b and c (6 marks)
- ii) Interpret the coefficients of exchange rate, domestic income, foreign income and money supply showing whether they are individually significant in determining trade balance or not (8 marks)
- iii) Interpret the coefficient of determination (R-squared) (3 marks)
- iv) Interpret the Prob > F = 0.000 (3 marks)

QUESTION FOUR (20 MARKS)

- (a) Distinguish clearly between Multicollinearity, Heteroscedasticity and Autocorrelation (6 marks)
- (b) What are the consequences of heteroscedasticity in a regression model? (4 marks)
- (c) Derive the Durbin-Watson statistic and explain how one can use it to test for no correlation, perfect positive and negative correlation (10 marks)

QUESTION FIVE (20 MARKS)

- (a) Discuss the nature of data used in econometric analysis (6 marks)
- (b) The following data relates to prices of oranges in hundreds of Kenya Shillings per kilogram from 10 different markets

Price 1	6	5	8	8	7	6	10	4	9	7
Price 2	8	7	7	10	5	8	10	6	8	6

- i. Compute the simple linear correlation coefficient between the two sets of prices and interpret your results. (6 marks)
- ii. Compute the Spearman's rank correlation coefficient between the two sets of prices and interpret your results. (6 marks)
- iii. Compute the coefficient of determination for the two sets of prices and interpret your results. (2 marks)