MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (STATISTICS AND PROGRAMMING)

SST 300: ECONOMETRICS I

DATE: **TIME:**

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 (30 MARKS)

a)   Define the term econometrics and give three reasons why it should be studies in a unique way

(5 marks)

b)   The following data relates to the sales and profit of ABC Company limited over 10 years.

TIME	1	2	3	4	5	6	7	8	9	10
X	10	20	30	40	50	60	70	80	90	100
Y	2	3	5	7	9	11	12	13	14	19

i.   Calculate the sample correlation coefficient between sales and profit   (8 marks)

ii.   Interpret the above results in (i)   (2 marks)

c)   The following table provides the information on observations for X and Y variables. Use the information to answer the question in this section:

Time	X	Y
1	42	54
2	72	65
3	79	66
4	58	50
5	67	55
6	71	62
7	66	61
8	53	57
9	60	54
10	74	63

    i.   Assuming $Y = B_0 + B_1 X + \varepsilon$, obtain the OLS estimators of B_0 and B_1 (8 marks)

    ii.   Discuss the importance of the model specification with reference to achievement of goals that you have identified in (a) ii in above   (3 marks)

d)   Write brief notes on the following topics as applied in econometrics

    i.   GAUSS-MARKOV Theorem   (2 marks)

    ii.   Model Specification   (2 marks)

QUESTION TWO (20 MARKS)

a)   The ordinary squares (OLS) estimators are the main techniques used to estimate regression Models. The name OLS is derived from the fact that OLS aims at minimizing the sum of squared residuals. In so doing, OLS finds the values of the model parameters (B0 and B1) that fits the line of best fit .Derive 8 steps in the for which the two estimators are derived clearly explaining each step   (16 marks)

b)   Highlight four reasons for the inclusion of the error term in a regression model.   (4 marks)

QUESTION THREE (20 MARKS)

a) Explain the differences between the regression analysis and correlation coefficients

(6 marks)

b) Explain the properties of an econometric model   (5 marks)

c) There were finalists in a beauty pageant contest. Two judges A and B separately ranked the contestants as follows:

Contestants	V	W	X	Y	Z
Ranked by Judge A	2	1	5	1	4
Ranked by Judge B	4	2	5	3	3

Calculate the Spearman's rank correlation coefficient for the judgment   (9 marks)

QUESTION FOUR (20 MARKS)

a) Skyda Consultancy is deals with the Second Hand Cars and they put an advertisement for used cars for prices of their cars. The age X is measured in years and prices by Y in thousands for the leading brands of the cars.

Car	1	2	3	4	5	6	7	8	9	10
X	1	2	3	4	5	6	7	8	9	10
Y	49.5	42.5	40.0	34.0	30.0	24.0	22.5	15.0	12.0	10.0

   i.   Estimate the regression equation relating Y and X and interpret the results (7 marks)

   ii.   Forecast the value of Y when X is 20.2   (3 marks)

   iii. Construct a 95% confidence level interval for the slope of the regression line

(2 marks)

b) Discuss the consequences of multicollinearity   (8 marks)

QUESTION FIVE (20 MARKS)

Consider the following data:

Y	13	12	14	6	4
X	1	2	3	4	5

a) Compute the simple correlation coefficient and interpret the results   (12 marks)

b) Compute the coefficient of determination for the relationship between X and Y and interpret the results   (8 marks)