150

(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN

UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR

SECOND YEAR, FIRST SEMESTER EXAMINATIONS

FOR
BES AND BEC

COURSE CODE: ECO 202

COURSE TITLE: ECONOMIC STATISTICS I

DATE: MONDAY -11-12-2023 **TIME:** 3:00 -5:00

INSTRUCTIONS TO CANDIDATES

ATTEMPT QUESTION **ONE** AND ANY OTHER **TWO**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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QUESTION ONE: COMPULSORY

(a). A market research firm is interested in surveying certain attitudes in a small community. There are 125 households broken down according to income, ownership of a telephone or ownership of a TV.

	Household with monthly income of shs.8,000		Household with monthly income above shs.8000		
	Telephone subscribers	No telephone	Telephone subscribers	No telephone	
Own TV set	27	20	18	10	
No Tv set	18	10	12	10	

(i). What is the probability of obtaining of a TV owner in drawing at random?   (1 mark)

(ii). If a household has monthly income over shs.8000 and is a telephone subscriber, what is the probability that it has TV?   (2 marks)

(iii). What is the conditional probability of drawing a household that owns a TV. given that the household is a telephone subscriber?   (2 marks)

(b). Examine some of the practical situations where the Poisson distribution can be used.

(4marks)

(c). Explain the following as used in regression and correlation analysis:

(i). Standard error of estimate for multiple regression   (3 marks)

(ii). Coefficient of multiple correlation   (2 marks)

(d). Calculate Karl Pearson's coefficient of correlation between expenditure on advertising and sales from the data given below:

Advertising expenses ("000")	39	65	62	90	82	75	25	98	36	78
Sales (Kshs)	47	53	58	86	62	68	60	91	51	84

(5 marks)

(e). Calculate the seasonal indices by the ratio to moving average method from the following data of the sales(y) of a firm in kshs.

Year	I Quarter	II Quarter	III Quarter	IV Quarter
2001	68	62	61	63
2002	65	58	66	61
2003	68	63	63	67

(4 marks)

(f). Goals scored by two teams A and B in a football season were as shown in adjoining table.

by calculating the coefficient of variation in each case, find which team may be considered more consistent.

Number of goals scored in a match	Number of matches	
	A team	B team
0	27	17
1	9	9
2	8	6
3	5	5
4	4	3

(7 marks)

QUESTION TWO

(a). The prices of a commodity during 2001- 2006 are given below. Fit a parabola

$Y = \alpha + bX + cX^2$ to these data. Estimate the price for the year 2007:

Year(X)	2001	2002	2003	2004	2005	2006
Prices(shs) (Y)	100	107	128	140	181	192

(8 marks)

(b). From the following data calculate the rank correlation coefficient after making adjustment for tied ranks.

x	48	33	40	9	16	16	65	24	16	57
y	13	13	24	6	15	4	20	9	6	19

(6 marks)

(c). Examine the merits and limitations of simple random sampling (6 marks)

QUESTION THREE

(a). From the data given below find:

(i). The two regression coefficients (1 mark)

(ii). The two regression equations (3 marks)

(iii). The coefficients of correlation between the marks in economics and statistics (2 marks)

(iv). The most likely marks in statistics when marks in economics are 30 (1 mark)

Marks in economics	25	28	35	32	31	36	29	38	34	32
Marks in statistics	43	46	49	41	36	32	31	30	33	39

(b). You are given the following information:

Class	F	Class	F	Class	F
40-41	1	45-46	20	50-51	19
41-42	2	46-47	38	51-52	14
42-43	4	47-48	52	52-53	6
43-44	7	48-49	40	53-54	4
44-45	12	49-50	29	54-55	2

(i). Calculate the first four moments about 47.5 (4 marks)

(ii). Convert these into moments about the mean and calculate β_1 and β_2 (3 marks)

(iii). Also apply Sheppard's corrections into moments. (2 marks)

(c). Describe the guidelines that may be useful for deciding about the unit in any statistical enquiry in the data collection process

(4 marks)

QUESTION FOUR

(a). The table given below shows the data obtained during outbreak of smallpox:

	Attacked	Not attacked	Total
Vaccinated	31	469	500
Not vaccinated	185	1315	1500
Total	216	1784	2000

(i). Test the effectiveness of vaccination in preventing the attack from smallpox   (4 marks)

(ii). Test your result with the help of χ^2 at 5% level of significance   (3 marks)

(b). The mean produce of wheat of a sample of 100 fields is 200 lbs per acre with a standard deviation of 10 lbs. Another sample of 150 fields gives the mean of 220 lbs with a standard deviation of 12 lbs. Assuming the standard deviation of the mean yield at 11 lbs for the universe, find if the results are consistent.

(4 marks)

(c). Memory capacity of 9 students was tested before and after training.

State whether the training was effective or not from the following scores:

Student	1	2	3	4	5	6	7	8	9
Before $(X_{\beta i})$	10	15	9	3	7	12	16	17	4
After $(X_{\beta i})$	12	17	8	5	6	11	18	20	3

(6 marks)

(d). Examine the limitations of statistics   (3 marks)

QUESTION FIVE

(a). Describe the demerits of mean deviation as the measures of dispersion in descriptive
statistics   (4 marks)

(b). The mean and standard deviation of the frequency distribution of a continuous random
variable X are 40.604 lbs and 7.92 lbs respectively. The distribution after change of origin and
scale is as follows:

d	-3	-2	-1	0	1	2	3	4	Total
f	3	15	45	57	50	36	25	9	240

Where $d = \frac{(X-A)}{h}$ and f is the frequency of X. Determine the actual class intervals.

                                                                                               (8 marks)

(c).In a normal distribution,31% of the items are under 45 and 8% are over 64.

(i). Find the mean and standard deviation of the distribution   (6 marks)

(ii). What % of the items differ from the mean by a number not more than 5?   (2 marks)