LAIKIPIA UNIVERSITY

UNIVERSITY EXAMINATIONS

1ST SEMESTER 2023/2024 ACADEMIC YEAR

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF COMMERCE

BCOM 216: BUSINESS STATISTICS

STREAM: ***TIME: 2 HRS***

DAY: THURSDAY [11.30-13.30 P.M] ***DATE: 14/12/2023***

THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

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INSTRUCTIONS: *Answer **QUESTION ONE** and any **OTHER TWO**Questions*

QUESTION ONE (30 MARKS)

a) Briefly explain the following sampling techniques; -.

i) Systematic random sampling **(2 Marks)**

ii) Stratified Random Sampling **(2 Marks)**

iii) Multi-stage Sampling **(2 Marks)**

(b) From the following data, compute the required measures of central tendency.

Values	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	5	4	15	17	7	5	9	7	8

i) Arithmetic mean **(3marks)**

ii) Geometric mean **(3marks)**

iii) Harmonic mean **(3marks)**

b) The data below is for the student's marks scored in a test.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of Students	5	10	15	8	6	4	18	6	6	10

i) Present the information in a histogram **(6marks)**

ii) Use the histogram in (i) above to determine the mode **(3 marks)**

iii) Superimpose a frequency polygon on the histogram in (i) above **(1 mark)**

iv) Calculate the median mark **(3 marks)**

c) With the aid of a normal distribution curve, explain the three levels of Kurtosis **(3 marks)**

QUESTION TWO (20 MARKS)

(a) A manufacturer assures his customers that the probability of having a defective item is 0.005. A sample of 1000 items was inspected. Find the probability of having the following outcomes assuming a Poisson probability distribution.

i) Only one item is defective **(3marks).**

ii) Exactly two items are defective **(3marks)**

iii) At most two items are defective **(3marks)**

iv) At least two items are defective **(3marks)**

(b) The probability of a rare disease striking a given population is 0.003. A sample of 10000 persons was examined. Calculate;

i) The expected number suffering from the disease **(3 marks)**

ii) The variance **(3 marks)**

iii) The standard deviation **(2 marks)**

QUESTION THREE (20 MARKS)

A medical survey was conducted in order to establish the proportion of the population which was infected with cancer. The results indicated that 40% of the population were suffering from the disease.

A sample of 6 people was later taken and examined for the disease. Find the probability that the following outcomes were observed

i) Only one person had the disease **(2 marks)**

ii) Exactly two people had the disease **(2 marks)**

iii) At most two people had the disease **(2 marks)**

iv) At least two people had the disease **(2 marks)**

v) Three or four people had the disease **(1 marks)**

b) Ten marketing companies marketing a particular product are ranked by two judges in the following order.

Company	A	B	C	D	E	F	G	H	I	J
Judge 1	1	6	5	10	3	2	4	9	7	8
Judge 2	3	5	8	4	7	10	2	1	6	9

i) Establish the rank correlation coefficient between the two judges **(9 marks)**

ii) Interpret your answer in (i) above **(2 marks).**

QUESTION FOUR (20 MARKS)

a) A financial manager speculates about the relationship between family income and their allocation of investment. The table below shows the results of a survey of 8 randomly selected families.

Monthly income Kshs (000)	Investment (%)
8	36
12	25
9	33
24	15
13	28
37	19
10	20
16	22

i) Develop a regression equation for the data **(12 marks)**

ii) Determine the investment at an income level of Kshs 20000. **(3 marks)**

iii) Determine the covariance from the information given in (a) above **(3 marks)**

b) Distinguish between correlation and regression **(2 marks)**

QUESTION FIVE (20 MARKS)

The following table gives the weekly expenditure of 100 families.

Weekly expenditure ($)	Number of families
0 – 100	14
100– 200	23

200 – 300	27
300 – 400	21
400- 500	15

i) Arithmetic mean (3 marks)

ii) Calculate the median **(3 marks)**

iii) Calculate the standard deviation **(6 marks)**

iv) Compute the Karl Pearson's coefficient of Skewness **(6 marks)**

v) Interpret the nature of Skewness computed in iii above **(2 Marks)**

QUESTION SIX (20 MARKS)

a) Using the data below with 1982 as the base year, calculate the indices as required

	1982		**1983**	
ITEM	**Prices**	**Quantity**	**Prices**	**Quantity**
A	10	3.12	12	3.17
B	6	11.49	7	11.58
C	5	1.40	8	1.35
D	9	2.15	9	2.14
E	50	0.32	53	0.32

i) Laspeyres Index **(2 Marks)**

ii) Paasche's Index **(2 Marks)**

iii) Fishers "ideal" Index **(2 Marks)**

b) The table below shows the company quarterly sales for a period of four years

	Quarters			
Year	Q1	Q2	Q3	Q4
1	20	30	45	29
2	21	42	40	34
3	23	31	42	54
4	27	33	46	47

Required

i) The trend line equation of the form $Y = a + bX$ **(6 Marks)**

ii) Using the trend line in i above, compute the forecast sales for each quarter **(4 marks)**

iii) Calculate the seasonal variation given that $S = \frac{Actual\ Sales}{Forecast\ sales} x100\%$ **(4 marks)**