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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
FIRST YEAR, SECOND SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF
BUSINESS INFORMATION TECHNOLOGY
KMA 2115- BUSINESS STATISTICS

Date: 10th August, 2023
Time: 8.30am – 10.30am

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Distinguish between;
- Discrete and continuous random variables. (2 Marks)
 - Mutually exclusive and mutually exhaustive events. (2 Marks)
- b) The weight of a new pack of an item is known to have a mean of 40 grams. A sample of 7 packages yielded the following weights: 37, 38, 39, 40, 38, 41 and 42 grams. Obtain point estimate of population mean μ and population variance σ^2 (5 Marks)
- c) Under what circumstances do a researcher prefer sampling to complete enumeration. (3 Marks)
- d) In a consignment of 20 volumetric analysis devices, just 4 are defective. If a random sample of 5 devices is taken from this consignment, find the probability that it will contain.
- No defective device (3 Marks)
 - 3 or more defective devices (4 Marks)
- e) Given that X is a normal random variable describing the distribution patterns of a mental condition with mean 20 and variance 16, find $P(|X - 20| < 3.2)$ (5 Marks)
- f) A company produces jars of English Honey. The weight of the glass jars used are normally distributed with a mean 122.3g and standard deviation of 2.6g. calculate the probability that a randomly chosen jar will weigh;
- Less than 127g (3 Marks)
 - Less than 129.2g but more than 124.5g (3 Marks)

QUESTION TWO (20 MARKS)

- a) A manufacturer of optical lenses has the following data on the cost per unit (in USD) of a certain custom-made lenses and the number of units made in each order

Number of Units (X)	1	3	5	7	10	12
Cost per Unit (Y)	58	52	46	40	37	22

- i) Obtain the simple linear regression model (5 Marks)
ii) Sketch the regression line obtained in part (a) above (3 Marks)
iii) Predict the unit cost in an order of 8 of these glasses (2 Marks)
- b) Explain the four components of time series (4 Marks)
- c) Fit a linear trend line equation for the following data and obtain the trend values using the fitted trend line. Use $t = \text{year} - 1983$ (6 Marks)

Year	1980	1981	1982	1983	1984	1985	1986
No. of production units, X_t	125	128	133	135	140	141	143

QUESTION THREE (20 MARKS)

- a) The House of Suzanne Delicacies holds four annual chef seminars. Records show that the probability that a chef will attend from zero to four of these function is as shown in the table

Number of seminars attended	0	1	2	3	4
Probability	0.08	0.44	0.31	0.12	0.05

- i) What is the probability that a chef will attend at least one of the seminars? (3 Marks)
Find the:
ii) Mean of this distribution (3 Marks)
iii) Standard deviation of this distribution (4 Marks)
- b) Sixty-eight percent of all the holders of Erie City Bonds sell their bonds before maturity. A random survey of 120 bondholders is taken. Find the probability that
i) Exactly 75 bondholders will sell before maturity (4 Marks)
ii) Less than 70 bondholders will sell before maturity (3 Marks)
iii) More than 90 will sell before maturity (3 Marks)

QUESTION FOUR (20 MARKS)

- a) The following data shows sales of some commodities in a certain retail shop for seven consecutive days

Commodity	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Rice	197.7	205.7	205.3	204.5	203.5	203.8	204.0
Wheat	158.8	159.1	158.9	158.2	160.0	160.5	160.8
Sugar	269.8	269.9	270.4	256.1	256.0	256.5	256.8

Calculate mean, standard deviation and coefficient of variation for each commodity and interpret the results. (10 Marks)

b) The following data shows sales and quantities of some commodities

Commodity	1983		1984	
	Quantity (Kg.)	Total Value (Sh.)	Quantity (Kg.)	Total Value (Sh.)
Food	250	750	400	1600
Housing	300	1200	500	1500
Education	100	800	250	1000
Clothing	200	1200	150	1200
Miscellaneous	270	1100	290	1200

Calculate weighted aggregative indices using Laspeyre's formula, Paasche formula, Dorbish and Bowley's method and Fishers Ideal formula. In each case, interpret your answer. (10 Marks)

QUESTION FIVE (20 MARKS)

a) In a certain estate, monthly salaries earned by the inhabitants were summarized in a table shown below

Salary (*000)	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
frequency	6	5	8	10	12	17	20	12	7	3

Calculate:

- i) Mean (2 Marks)
 - ii) Interquartile range (3 Marks)
 - iii) Coefficient of variation (5 Marks)
- b) Given the following frequency distribution, which represents purchases by 25 customers who visited a food manufacturing store in one day;

<i>Sales (in USD)</i>	<i>Number of sales</i>
35-44	4
45-54	6
55-64	8
65-74	4
75-84	3

Compute:

- i) Standard deviation of the daily sales. (4 Marks)
- ii) Karl Pearson's coefficient of skewness for this data and comment on the value obtained. (6 Marks)