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# KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY UNIVERSITY EXAMINATION, 2024/2025ACADEMIC YEAR SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (BUSINESS ADMINISTRATION)

Date: 13<sup>th</sup> August, 2024 Time: 2.30m –4.30pm

## KBA 2203 STATISTICS FOR MANAGEMENT

## **INSTRUCTIONS TO CANDIDATES**

## ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS\_

#### **QUESTION ONE (30 MARKS)**

a) Consider the following data 12, 14, 17, 11, 9, 15, 22, 18, 13, 9 Compute;

i)	Median.	(2 marks)
ii)	Harmonic mean.	(2 marks)
iii)	Mean.	(2 marks)
iv)	Standard deviation.	(2 marks)

- b) Paired observations on random variables X and Y have the given summary statistics. n = 7,  $\sum X = 75$ ,  $\sum Y = 189$ ,  $\sum XY = 2427$ ,  $\sum X^2 = 955$  and  $\sum Y^2 = 6203$ .
  - i) Determine the simple linear regression model of Y on X. (5 marks)ii) Predict Y when X is 17. (1 mark)
- c) The prices per kilogram of sugar over a five-year period in Kenya is given in the preceding table.

Year	2019	2020	2021	2022	2023
Price (KES)	100	120	140	200	160

Use chain-based method to compute the price indices for the product. (3 marks)

d) A box contains 7 white and 9 black identical balls. Two balls are picked randomly, one at a time and without replacement. Represent this information in a probability tree, hence find the probability that the two balls picked are of different colors. (3 marks)

e) The probability distribution function of a random variable X is given by

x	0	1	2	3
P(X = x)	0.1	0.3	0.4	0.2

Determine;

i)	Mean of X.	(2 marks)
ii)	Variance of X.	(3 marks)

- f) A new production system is adopted if it produces more than 80 units of items per hour an average. In the last 7 hours, 60, 75, 68, 78, 70, 80 and 75 units were produced using the new system. Test the appropriate hypothesis to determine whether the new system should be adopted? Take  $\alpha = 0.05$
- The time series data on unit sales of a products is as shown. g)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul
Sales	40	55	60	80	90	98	100

Determine a 3- point moving averages for the data.

**QUESTION TWO (20 MARKS)** 

A study is conducted for 10 days to investigate the association between price per unit and units supplied for a certain commodity at a specific market.

Day	1	2	3	4	5	6	7	8	9	10
Price (KES)	20	23	8	29	14	12	11	20	17	18
Supply (units)	30	35	11	34	23	16	13	32	25	26

a) Fit a simple linear regression equation for supply on price per unit. (7 marks)

b) Predict the supply if the price per unit in a particular day is KES 25. (2 marks)

c) Determine and interpret the Pearson's product-moment correlation coefficient.

(4 marks)

- d) What percentage of variation in supply is explained by the price? (2 marks)
- Compute the sum of squares and construct the analysis of variance (ANOVA) table. e)

(5 marks)

2

(5 marks)

(3 marks)

## **QUESTION THREE (20 MARKS)**

a)	The follow	ving are	e the ma	rks sco	re (out o	of 100)	by 50 st	tudents	in a cer	tain exam	ination.
	55	54	76	70	77	80	84	66	80	61	
	62	64	80	85	78	42	72	63	85	50	
	72	53	54	76	90	66	85	82	79	83	
	78	55	69	80	72	74	74	54	54	54	
	81	86	58	72	90	78	38	69	69	82	
	Formulate	a grou	ped free	luency of	listribu	tion tabl	le.			(4 n	narks)
b)	Use the fre	equency	y distrib	ution in	a) to e	stimate;					
	i) Mode.									(3 n	narks)
	ii) Media	n.								(3 m	arks)
	iii) Inter-Q	Quartile	Range.							(4 n	narks)
	iv) Mean.									(3 n	narks)
	v) Standa	ard devi	ation.							(3 n	narks)

#### **QUESTION FOUR (20 MARKS)**

a) The following table gives the price and quantity of products A, B, C and D for the year 2012 and 2016.

Commodity		2012	2016			
Commonly	Price Quantity		Price	Quantity		
Α	4	20	6	10		
В	3	15	5	23		
С	2	25	3	15		
D	5	10	4	15		

Calculate price index number for 2016 of the following data by weighted aggregative method using;

- i) Laspeyre's method.(3 marks)ii) Paasche's method.(3 marks)
- iii) Fisher's method.
- iv) Marshall-Edgewood method.
- b) The exports (in 10 billion KES) for country XYZ for the years 2013 to 2019 are;

Year	2013	2014	2015	2016	2017	2018	2019
Export	60	75	80	100	110	118	120

- i) Fit a linear trend to the data.
- ii) Predict the exports for the year 2022.

3

(3 marks)

(3 marks)

(6 marks)

(2 marks)

### **QUESTION FIVE( 20 MARKS)**

- a) A company would like to introduce a new product product to the market. To check on the potentiality of the market to the product, the company conducts a survey among 500 potential customers, and you ask them if they would buy the new product or not (stick to old products they are used to). Out of these, 100 answered gave a positive response. Find the probability that out of 10 customers who go for such product,
  - i) Less than 3 will purchase the new product. (3 marks)
  - Between 4 and 6 (inclusive) will purchase the new product. ii) (3 marks)
- b) A company selling personalized T-shirts owns a website where customers can purchase T-shirts online within Kenya. It is believed that on average 2 orders arrive per minute. Determine the probability that;
  - i) More than 3 orders are received in a minute. (3 marks)
  - ii) Exactly 30 orders are received in an hour. (3 marks)
- c) The owner of ABC, a chain of popular bakery stores in the Nairobi, supplies all of her employees with a uniform. She is ordering a bundle of uniforms for new employees hired within the next year and needs to decide what sizes and how many uniforms of each size to buy. The only difference between uniforms is their height and the owner assume that peoples' heights follow a normal distribution with  $\mu = 170$  cm and  $\sigma^2 = 49$  cm.
  - i) Calculate the probability that a randomly selected (future) employee is:
  - ii) Smaller than 160cm. (2 marks) (3 marks)
  - iii) Between 165cm and 175cm.
  - If 20% of employees have a height not greater that H cm, what is the maximum value of iv) H? (3 marks)