KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
SECOND YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(BUSINESS ADMINISTRATION)

Date: 18th April, 2023
Time: 2.30pm –4.30pm

KBA 203 - STATISTICS FOR MANAGEMENT

INSTRUCTIONS TO CANDIDATES

ANSWER **QUESTION ONE (COMPULSORY)** AND **ANY OTHER TWO** QUESTIONS

QUESTION ONE (30 MARKS)

a)   Consider the data given below
     32, 20, 44, 33, 35, 32, 31, 27, 28, 26, 33, 37, 41, 43, 38, 32, 40, 32
     Find;
     i)   Mode.   (1 mark)
     ii) Median.   (2 marks)

b)   Suppose that the summary of a sample survey is given by the table below

Class	5-9	10-14	15-19	20-24	25-29	30-34	35-39
Frequency	5	12	32	40	16	9	6

     Estimate the;
     i)   Mean.   (2 marks)
     ii) Standard deviation.   (3 marks)

c)   A bag contains 8 black and 5 white balls. 2 balls are drawn at random one at a time and without
     replacement. Find the probability that both balls are white.   (3 marks)

d)   Find the chain base index numbers from the following data regarding the price of an item

YEAR	2009	2010	2011	2012	2013	2014
PRICE	40	45	48	55	60	70

                                                                                                    (5 marks)

e) Determine the Spearman's rank correlation coefficient from the following table and interpret it.

Age(x)	43	21	25	42	57	59
Glucose level (y)	99	65	79	75	87	81

(5 marks)

f) Briefly explain the four components of time series.

(4 marks)

g) Suppose that a population income has unknown mean and known variance 62500. From a sample of 100 individuals, the mean income of 4500 was obtained. Test whether the population mean income of this population is less than 4000. Take $\alpha = 0.05$. (5 marks)

QUESTION TWO (20 MARKS)

Listed are the hourly income of 50 casual employees of a certain company.

240, 210, 220, 260, 250, 195, 230, 270, 320, 225, 175, 295, 205, 230, 250, 210, 220, 210, 230,

202, 250, 265, 230, 210, 240, 245, 225, 180, 175, 215, 215, 235, 245, 250, 215, 210, 195, 240,

240, 225, 260, 210, 190, 260, 230, 190, 210, 230, 185, 260

a) Construct a grouped frequency distribution. (6 marks)

b) From the frequency distribution constructed in a) determine the;
   i) Mode. (3 marks)
   ii) Median. (3 marks)
   iii) Mean. (2 marks)
   iv) Mean Absolute deviation. (3 marks)
   v) Standard deviation. (3 marks)

QUESTION THREE (20 MARKS)

Sales of a business are believed to be affected by the location (distance) of the business premises from a densely populated area. Ten same-size retail shops offering the same products on different location from the area under consideration made the following sales in the previous month.

Distance (km)	0.1	0.2	1.0	0.8	0.5	0.3	0.2	0.6	0.3	1.5
Sales ('0000 KES)	40	30	20	15	10	28	35	18	25	12

Required;
a) Develop a simple regression model relating sales to the distance. (8 marks)
b) Predict the sales of a shop located 0.9km from the said locality. (2 marks)
c) Obtain the Pearson product-moment correlation coefficient and interpret it. (6 marks)
d) What percentage of variation in sales is explained by the distance. (3 marks)

QUESTION FOUR (20 MARKS)

a) Highlight four levels of measurements. (4 marks)

b) A welfare department of ABC county has estimated that the monthly income of the residents in that county can be approximated by a normal distribution with mean KES 62,000 and standard deviation of KES 24, 800. Out of 1000 sampled residents, how many of them would you expect to be earning;

  i) less than KES 12, 400 per month. (2 marks)

  ii) between KES 37, 200 and KES 74, 400 per month. (3 marks)

  iii) if the 10% of residents are living in an abject poverty level, what is the maximum monthly income of an individual for him/her to be considered in this category? (3 marks)

c) Due to various challenges faced by new enterprises, it has been estimated by 30% of newly opened businesses fail to make through their first year. Let X be the number of businesses that do not make through the first year out of f 20 businesses opened at the beginning of the year.

  i) What is the probability distribution of X? (2 marks)

  ii) What is the probability that;

   I. Between 2 and 5 inclusive businesses will be closed within the first year. (3 marks)

   II. At most two businesses did not make through year one. (3 marks)

QUESTION FIVE (20 MARKS)

a) Differentiate between;

  i) Null hypothesis and alternative hypothesis. (2 marks)

  ii) Type I and type II error. (2 marks)

b) It has been claimed that there is disparity between wages of female and male managers in the sense that women managers earn less than their male counterparts. To investigate this claim, gender activist sampled 9 and 6 organizations managed by men and women and asked them of their wages respectively. The summary statistics are as below

Managed by	Number sampled	Mean income	Income Std Dev
Male	$n_1 = 9$	$\overline{X}_1 = KES124,000$	$S_1 = KES\ 62,000$
Female	$n_2 = 6$	$\overline{X}_2 = KES\ 105,400$	$S_2 = KES\ 37,200$

Determine whether the claim is actually true at 5% level of significance. (7 marks)

c) The data below show the price and quantities for four commodities in the year 2011 and 2016.

COMMODITY	2011 PRICE	QUANTITY	2016 PRICE	QUANTITY
A	20	8	40	6
B	50	10	60	5
C	40	15	50	15
D	20	20	20	25

Calculate price index numbers for 2016 with 2011 as base by:

  (i) Laspeyre's Method. (3 marks)

  (ii) Paasche's Method. (3 marks)

  (iii) Fisher's Method. (3 marks)

3