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**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: 11<sup>th</sup> December, 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) The miles that 20 randomly selected runners ran during a given week are the following table

<b>Class</b>	16 -20	21-25	26 - 30	31-35	36 -40
<b>Freq</b>	3	5	7	3	2

Estimate;

- i) Median (2 marks)  
ii) Mean. (2 marks)  
iii) Standard deviation. (3 marks)
- b) Find the fixed base index numbers from the following data regarding the price of an item using 2015 as the base year.

<b>YEAR</b>	2015	2016	2017	2018	2019	2020
<b>PRICE</b>	40	45	48	55	60	70

(4 marks)

- c) Determine and interpret the Spearman's rank correlation coefficient for the data in the table below.

Price(x)	43	21	25	42	57	59
Supply (y)	99	65	79	75	87	81

(4 marks)

- d) Two balls are drawn randomly one at a time and without replacement from a box containing 6 white and 4 black identical balls. What is the probability that both balls picked are of the same colour?  
(3 marks)

- e) Consider the data on monthly sales of a given business

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Sales (100,000)	50	70	65	55	70	85	70	110	120	100

- Determine 5-point moving average for the data. (4 marks)
- f) The scores of KBA 203 students in statistics exam marked out of 30 are known to be normally distributed with mean 15 and standard deviation 10. Find the probability that a student scores between 12 and 18. (3 marks)
- g) A construction firm has placed an order that they require a consignment of wires which have a mean length of 10.5 meters with a standard deviation of 1.7 m. The company which produces the wires delivered 90 wires, which had a mean length of 9.2 m. The construction company rejected the consignment on the grounds that they were different from the order placed. Conduct a statistical test to indicate whether you support or not support the action taken by the construction company at 5% level of significance. (5 marks)

### **QUESTION TWO (20 MARKS)**

The following data relate to advertisement expenditure (in thousands of shillings) and their corresponding sales (in a hundred thousand shillings)

Advertisement Expenditure	40	50	38	60	65	50	35
Sales	38	60	55	70	60	48	30

- a) Fit a linear regression equation for sales on advertisement expenditure. (6 marks)
- a) Estimate the sales corresponding to advertising expenditure of KES 30,000. (2 marks)
- b) Determine the Pearson's correlation coefficient. (5 marks)
- c) Compute the coefficient of determination. (2 marks)
- d) Obtain the Analysis of Variance (ANOVA) table. (6 marks)

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

The ages of the top 50 wealthiest people in the world as listed in *Forbes Magazine* are as follows.

49, 57, 38, 73, 81, 74, 59, 76, 65, 69, 54, 56, 69, 68, 78, 65, 85,  
 49, 69, 61, 48, 81, 68, 37, 43, 78, 82, 43, 64, 67, 52, 56, 81, 74,  
 77, 79, 85, 40, 85, 59, 80, 60, 71, 57, 61, 69, 61, 83, 90, 87

- a) Construct a grouped frequency distribution table. (4 marks)
- b) From the frequency distribution table obtained above, estimate;
- Mode. (2 marks)
  - Mean. (2 marks)
  - Median. (3 marks)
  - Inter Quartile Range. (3 marks)
  - Variance. (3 marks)
- c) Construct a histogram and a frequency polygon on the same graph. (3 marks)

**QUESTION FOUR (20 MARKS)**

- a) The table below shows the prices and quantities demanded for four products A, B, C and D for 2014 and 2021

Commodity	2014		2021	
	Price (KES)	Quantity	Price (KES)	Quantity (KES)
A	40	16	80	12
B	100	20	120	10
C	80	30	100	30
D	40	40	40	50

Taking 2014 as the base year, compute the price index numbers using the following methods.

- i) Laspeyre's Method. (3 marks)
  - ii) Paasche's Method. (3 marks)
  - iii) Fisher's Method. (2 marks)
  - iv) Marshall-Edgeworth method. (2 marks)
- b) The quarterly sales record for particular enterprise is as shown in the table below.

Year	Sales (Millions)			
	Quarter I	Quarter II	Quarter III	Quarter IV
2018	20	32	62	29
2019	21	42	75	31
2020	23	39	77	48

- i) Fitting a linear trend to the data. (5 marks)
- ii) Obtain the seasonal indices using the trend line in i) comment on the results. (5 marks)

**QUESTION FIVE( 20 MARKS)**

- a) Suppose you play a game that you can only either win or lose. The probability that you win any game is 55%, and the probability that you lose is 45%, what is the probability that you win;
  - i) 15 times if you play the game 20 times? (3 marks)
  - ii) between 16 and 18 of all 20 games? (3 marks)
- b) Suppose a given website receives an average of 20 visitors per hour. What is the probability that the number of visitors received by the website is;
  - i) At least 4 in an hour? (2 marks)
  - ii) Exactly 15 in three hours? (3 marks)
- c) The final exam scores in a statistics class were normally distributed with a mean of 63 and a standard deviation of 5.
  - i) Find the probability that a randomly selected student scored more than 65 on the exam. (3 marks)
  - ii) Find the probability that a randomly selected student score between 60 and 70. (3 marks)
  - iii) If 90% of students scored below grade k, what is the maximum value of k? (3 marks)