



**TECHNICAL UNIVERSITY OF MOMBASA**  
**SCHOOL OF BUSINESS**  
**DEPARTMENT OF MANAGEMENT SCIENCE**  
**UNIVERSITY EXAMINATION FOR:**  
**BACHELOR OF COMMERCE, BACHELOR OF BUSINESS**  
**ADMINISTRATION**  
**BMS 4201: BUSINESS STATISTICS**  
**END OF SEMESTER EXAMINATION**  
**SERIES:AUGUST2019**  
**TIME:2HOURS**  
**DATE: Aug2019**

**Instructions to Candidates**

You should have the following for this examination

-*Answer Booklet, examination pass and student ID*

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

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**Question ONE**

- a) The frequency distribution below shows the mass of some flowers produced in a farm off Limuru road in the month of October 2018.

| Mass (Kg) | Frequency (f) |
|-----------|---------------|
| 20-30     | 7             |
| 30-40     | 14            |
| 40-50     | 22            |
| 50-60     | 13            |
| 60-70     | 6             |
| 70-80     | 11            |

Required

- i. The Arithmetic Mean (4 Marks)
- ii. The Median (3 Marks)
- iii. The Mode (3 Marks)
- iv. The Variance (3 Marks)
- v. The Standard deviation (3 Marks)
- vi. The coefficient of variation. (2 Marks)
- vii. The first Quartile (2 Marks)

b) Umoja traders collected the following data on annual sales and the years of experience of members of its sales staff.

|       |     |     |     |     |     |     |    |     |     |    |
|-------|-----|-----|-----|-----|-----|-----|----|-----|-----|----|
| Sales | 200 | 191 | 135 | 236 | 305 | 183 | 50 | 192 | 184 | 73 |
| Years | 10  | 4   | 5   | 9   | 12  | 6   | 2  | 7   | 6   | 2  |

- a) Construct a scatter plot representing these data. (4 marks)
- b) Describe the kind of relationship that exists (if any) between years of experience and sales. (3 marks)
- c) Approximate the increase in sales that accrues with each additional year of experience for a member of the sales force. (3 marks)

## Question TWO

a) The following data set refers to the number of customers per day at a jewellery kiosk in Christiana Mall during a 20 day period.

8      10      18      58      58      59      63      64      69      71      75      78      80  
82      84      84      86      87      87      88

Required

- i) Determine the first, second, and third quartiles. (6 marks)
- ii) Determine the interquartile range (2 marks)
- iii) Construct a box and whisker plot for the data. (4 marks)
- b) i) Describe the difference between a statistic and a parameter. (4 marks)  
ii) Describe how systematic random sampling could be used to select a sample of 1000 customers who have a current account at a commercial bank. Assume that the bank has 25,000 customers who own a current account. (4 marks)

### **Question THREE**

The following table shows the ice creams bought from a street vendor over the course of eight days (Demand). Also shown is the temperature for each day in degrees Celsius.

| Temperature X | Demand Y |
|---------------|----------|
| 20            | 48       |
| 11            | 30       |
| 23            | 36       |
| 18            | 40       |
| 7             | 18       |
| 12            | 23       |
| 18            | 42       |
| 21            | 33       |

Required:

- (i) Calculate the product moment correlation coefficient for the data (6 Marks)
- (ii) Comment on the relationship between X and Y ( 2 Marks)
- (iii) Calculate the coefficient of determination for the data and interpret your answer. (2 marks)
- (iv) Use the method of linear least squares to find the estimated linear regression equation. ( 6 Marks)
- (v) What is the meaning of the slope of this regression line? (2 Marks)
- (vi) Predict the demand for ice creams on a day with a temperature of 15 degrees Celsius. (2 marks)

### **Question FOUR**

- a) The results of a census of 2500 employees of a mid-sized company with NSSF retirement accounts are as follows.

| Account Balance  | Male | Female |
|------------------|------|--------|
| Below 25000      | 635  | 495    |
| 25000 -49999     | 185  | 210    |
| 50000 - 99900    | 515  | 260    |
| 100000 and above | 155  | 45     |

Suppose researchers are going to sample employees from the company for further studies.

- i) What is the probability that a randomly selected employee will be a female?
- ii) What is the probability that a randomly selected employee will be a male?
- iii) What is the probability that a randomly selected employee will have an account balance of between 25000 and 49999?
- iv) What is the probability that a randomly selected employee will be a female with an account balance between 50000 and 99900?
- v) Assume that an employee is chosen and you are told that the employee is a female. What is the probability that the selected employee will have an account balance of between 25000 and 99900?

(10 marks)

- b) Explain the difference between stratified random sampling and cluster sampling.(5marks)
- c) Researchers waited outside a bar they had randomly selected from a list of establishments. They stopped every 10<sup>th</sup> person who came out of the bar and asked whether he or she thought drinking and driving was a serious problem.

Required: Identify the following items from the statistical study.

- i) The population
- ii) The population parameter of interest
- iii) The sampling frame
- iv) The sample
- v) The sampling method.

(5 marks)

### Question FIVE

a)The following data relate to a set of products sold in Uchumi supermarket for the years 2017 and 2018

| Product | 2017            |           | 2018            |           |
|---------|-----------------|-----------|-----------------|-----------|
|         | Quantity(Units) | Price(Sh) | Quantity(Units) | Price(Sh) |
| A       | 100             | 30        | 90              | 50        |
| B       | 30              | 50        | 25              | 70        |
| C       | 20              | 60        | 30              | 80        |
| D       | 750             | 20        | 200             | 25        |

Required:

- i) Laspeyre's price index (4 Marks)
- ii) Paasche's price index (4 Marks)
- iii) Fisher's ideal price index (4 Marks)

- b) Explain any four problems encountered when constructing index numbers. (8 marks)