The Management University of Africa

Sponsored by the Kenya Institute of Management

CERTIFICATE UNIVERSITY EXAMINATIONS

SCHOOL OF MANAGEMENT AND LEADERSHIP

CERTIFICATE COMMON UNIT

CCU 103: BASIC CALCULATIONS AND STATISTICS

DATE: 1ST APRIL 2026

DURATION: 2 HOURS

MAXIMUM MARKS: 70

INSTRUCTIONS

1. Write your registration number on the booklet.
2. **DO NOT** write in this question paper.
3. This paper contains **SIX (6)** questions.
4. Question **ONE** is compulsory.
5. Answer any other **FOUR** questions**.**
6. Question **ONE** carries **30 MARKS** and the rest carry **10 MARKS** each.
7. **Write all your answers in the examination answer booklet provided.**

QUESTION ONE

a) Differentiate between primary data and secondary data **(4 marks)**

b) A box contains 3 red, and 5 black balls. If two balls are picked up randomly without replacement

(i) Draw a tree diagram to illustrate the above information **(4 marks)**

(ii) What would be the probability of choosing two red balls? **(3 marks)**

c) Given the cost function for producing x units is $C=500+300x-0.01x^2$. Find the derivative of the cost function **(3 marks)**

d) Solve the following quadratic equation by factorization method (**4 marks**)

$$2x^2 - 5x - 12 = 0$$

e) (i). What compound rate of interest will be required to produce Ksh. 15,000 after five

years with an initial investment of Ksh. 10,000?

(4 Marks)

ii). How long will it take for a given sum of money to double itself at 10% per annum

simple interest? **(4 Marks)**

f) Eliana buys 10 apples and 6 bananas in a shop. They cost Ksh. 210 in total.

In the same shop, Talia buys 4 apples and 5 bananas she spends Ksh. 123 in total.

Find the cost of one apple and one banana**.** **(4 Marks)**

QUESTION TWO

The marks of a certificate class of 20 students are; 11, 27, 18, 14, 28, 18, 2, 22, 11, 24, 22, 11, 8, 20, 25, 28, 30, 12, 11, 8.

a) Prepare a frequency distribution table for the class marks with a class interval of 5 grouped in inclusive form **(5 mark)**

b) Calculate the mean and mode from the frequency distribution table obtained above **(5 marks)**

QUESTION THREE

a) Define the following terms as used in basic calculations and statistics

i). Statistics (**2 marks)**

ii). Probability (**2 marks)**

iii). Mutually exclusive events **(2 marks)**

b). The county government of Nairobi is conducting research to analyze how often people use public transportation in the city. Highlight the appropriate data collection methods you would advise the county government to use to conduct the research

(4 Marks)

QUESTION FOUR

Given below is a table for commodities A, B and C with the corresponding prices and quantities over the years (2023 and 2014)

	2023		**2024**	
	Price	Quantity	Price	Quantity
A	12	10	17	10
B	14	9	16	11
C	11	12	13	10

Taking 2023 as the base year, Calculate:

a). Laspeyres's price index **(4 marks)**

b). Paasche price index **(4 marks)**

c). Fisher's Price index **(2 marks)**

QUESTION FIVE

Using the data below;

Marks	0-10	10-20	20-30	30-40	40-50
Frequency	2	7	11	6	4

Determine;

a) Quartile 1(Q_1)

(3 marks)

b) Quartile 3(Q_3)

(3 marks)

c) Semi- Interquartile Range

(1 mark)

d) Decile 4 (D4)

(3 marks)

QUESTION SIX

A car costs Sh.850, 000 on cash basis. On hire purchase terms an, initial deposit of 20% of the cash price is required plus monthly installments of Ksh. 50,000 for 2 years. Customers who purchase the car on cash basis are granted a 4% discount of the cash price.

a) Calculate the amount customers pay if they purchase the machine on cash basis

(2 marks)

b) Calculate the total amount customers pays if they purchase the car on hire- purchase basis **(4 marks)**

c) Which option is cheaper and by how much? **(2 marks)**

d) What are the advantages and disadvantages of the hire purchase option in the case above? **(2 marks)**

Formulas

Median =L + i/f (M-C)

Mean $\bar{x} = (\sum fx)/(\sum f)$

$$\text{Mode} = L + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times c$$

Formula for finding Index numbers by *Laspeyres Method (L)*

$$P_L = \frac{\sum P_1 q_0}{\sum P_0 q_0} \times 100$$

Where: P_L = Laspeyres price index number
P_0 = price of the base year
q_0 = quantity of the base year
P_1 = price of the current year
q_1 = quantity of current year

Formula for finding Index numbers by *Paasche Method (P)*

$$P_P = \frac{\sum P_1 q_1}{\sum P_0 q_1} \times 100$$

Where: P_P = Paasche price index number
P_0 = price of the base year
q_0 = quantity of the base year
P_1 = price of the current year
q_1 = quantity of current year

Formula for finding Index numbers by *Fisher's Ideal Method*

$$P_F = \sqrt{\frac{\sum P_1 q_0}{\sum P_0 q_0} \times \frac{\sum P_1 q_1}{\sum P_0 q_1}} \times 100$$

$$P_F = \sqrt{(L \times P)}$$

Formula for finding standard deviation

$$\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Simple interest formula

$S = P(1 + r\,n)$

Compound interest

$S = P(1 + r)^{n}$

The semi-interquartile range,

$$SIR = \frac{Q3 - Q1}{2}$$