

The
Management
University
of Africa



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CERTIFICATE UNIVERSITY EXAMINATION

SCHOOL OF MANAGEMENT AND LEADERSHIP

CERTIFICATE IN COMMON UNIT

CCU 103: BASIC CALCULATIONS AND STATISTICS

DATE: 7TH DECEMBER 2022

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) State 4 limitations of statistics **(4 marks)**
- b) Differentiate between primary data and secondary data **(4 marks)**
- c) State 2 limitations of index numbers **(2 marks)**
- d) Solve the following quadratic equation by factorization method **(4marks)**

$$2x^2 + 3x + 1 = 0$$

- e) Given the following data values, group the data in exclusive form taking class intervals of 5
2,4,3,1,5,7,9,21,13,15,18,17,14,10,12,17,7,6,19,22,11,23,22,24,2,5,3,4,3,2 **(5 marks)**

- f) Given the following data:

Marks	0-10	10-20	20-30	30-40	40-50
Frequency	8	12	18	12	10

Calculate

- i) Quartile 1 (Q1) **(2 Marks)**
- ii) Quartile 3 (Q3) **(2 Marks)**
- iii) Decile 6 (D6) **(2 Marks)**
- iv) Percentile 60 (P60) **(2 Marks)**
- g) Edga Ouko sells goods on commission basis for a Nairobi firm. Commission is paid on sales as follows in addition to his monthly salary of Sh. 2,000. On the first Sh. 50,000 of sales: Nothing. On the next Sh. 100,000 of sales, 4% and the balance of sales, 5%. He sold goods worth Sh.350,000 during November 2021. Calculate Tom Omino's total income for November 2021 **(3 Marks)**

QUESTION TWO

Given below is a table of four commodities with the corresponding prices and quantities over the years (2012 and 2013). Taking 2012 as the base year.

PRODUCT	TIME			
	2012		2013	
	Quantity (Kg)	Price (shs)	Quantity (Kg)	Price (shs)
Bread	5	5	7	6.5
Eggs	6	7.75	10	8.8
Soap	4	9.63	6	10.75
Sugar	9	12.5	9	12.75

Calculate:

- Laspeyre's price index
- Paasche price index

(5 marks)

(5 marks)

QUESTION THREE

Using the data below

IQ (class interval)	No of residence (F)
0 – 20	6
20 – 40	18
40 – 60	32
60 – 80	48
80 – 100	27
100 – 120	13
120 – 140	2
	$\sum F = 146$

Determine

- Mean
- Median
- Mode

(4marks)

(3 marks)

(3 marks)

QUESTION FOUR

- a) Solve the following simultaneous equation by elimination method (4 marks)

$$2x - 3y = 8$$

$$3x + 4y = 5$$

- b) Solve the following quadratic equation using quadratic formula

$$2x^2 + 8x - 24 = 0$$

(4marks)

- c) Solve for the value of x

(2marks)

$$\frac{3x}{8} = -3$$

QUESTION FIVE

- a) Define the following terms as used in statistics

i. Probability

(1 Mark)

ii. Statistics

(1 Mark)

iii. Sample Space

(1 Mark)

iv. Set

(1 Mark)

v. Discount

(1 Mark)

- b) There are 6 balls in a bag, 3 are red, 2 are yellow and 1 is blue.

i. Calculate the probability of picking a yellow?

(2 Marks)

ii. Calculate the probability of picking a red or blue?

(3 Marks)

QUESTION SIX

A research study of 200 households in a certain country yielded the following information about travels plans of the households for next year celebrations.

70 households plan to travel to Mombasa

76 households plan to travel to Nakuru

68 households plan to travel to Kisumu

26 households plan to travel to both Mombasa and Nakuru

22 households plan to travel to both Mombasa and Kisumu

32 households plan to travel to both Nakuru and Kisumu

10 households plan to travel to both Nakuru, Kisumu and Kisumu

Required;

- i. A Venn diagram for the above information (5 Marks)
- ii. The number of households who will travel to exactly one destination (2Marks)
- iii. The number of households who will travel to more than one destination (3 Marks)

Formulas

$$\text{Median} = L + i/f (M-C)$$

Formula for finding Index numbers by Laspeyres Method (L)

$$P_{01} = \frac{\sum P_1 q_0}{\sum P_0 q_0} \times 100$$

Where: P_{01} = 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)

$$P_{01} = \frac{\sum P_1 q_1}{\sum P_0 q_1} \times 100$$

Where: P_{01} = 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

$$P_{01} = \frac{\sum P_1 q_0}{\sum P_0 q_0} \times \frac{\sum P_1 q_1}{\sum P_0 q_1} \times 100$$

$$P_{01} = \sqrt{(L \times P)}$$

Formula for finding Index numbers by Marshall-Edge Worth method

$$P_{01} = \frac{\sum (q_0 + q_1) P_1}{\sum (q_0 + q_1) P_0} \times 100$$

On opening the brackets;

$$P_{01} = \frac{\sum P_1 q_0 + P_1 q_1}{\sum P_0 q_0 + P_0 q_1} \times 100$$

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

$$A = S = P(1 + rn)$$

Compound interest

$$A = S = P(1 + r)^n$$

$$\text{Mean } \bar{x} = \frac{\sum fx}{\sum f}$$

Computation method

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

The semi-interquartile range,

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

