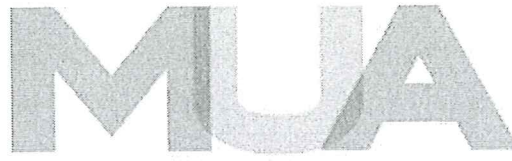


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CERTIFICATE UNIVERSITY EXAMINATION

SCHOOL OF MANAGEMENT AND LEADERSHIP

CERTIFICATE COMMON UNIT

**CCU 103: BASIC CALCULATIONS AND STATISTICS**

**DATE: 1<sup>ST</sup> AUGUST 2023**

**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) i) State and explain any 2 application of statistics **(4 marks)**
- ii) State 2 limitations of index numbers **(2 marks)**
- iii) Differentiate between primary data and secondary data **(4 marks)**
- b) Solve the following quadratic equation by factorization method **(4 marks)**

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

- c) There are 9 balls in a bag, 4 are red, 3 are yellow and 2 is blue.
- (i) What is the probability of picking a red? **(2 Marks)**
- ii) What is the probability of picking a yellow or blue? **(2 Marks)**

- d) Using the data below

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
	$\Sigma F = 146$

Determine

- i) Mean **(3marks)**
- ii) Median **(3 marks)**
- iii) Mode **(3 marks)**
- e) How long will it take for a sum of money to double itself at 10% per annum simple interest. **(3 Marks)**

**QUESTION TWO**

Using the data below,

Marks	0-10	10-20	20-30	30-40	40-50
Frequency	5	10	15	8	7

Calculate

- i) Quartile 1 (Q1) (2 Marks)
- ii) Quartile 3 (Q3) (2 Marks)
- iii) Semi-Interquartile Deviation (2 Marks)
- iv) Decile 4 (D4) (2 Marks)
- v) Percentile 60 (P60) (2 Marks)

**QUESTION THREE**

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

$$2x - 3y = 8$$

$$3x + 4y = -5$$

- b) Solve the following quadratic equation using complete square method

$$5x^2 + 2x - 3 = 0$$

**(4marks)**

- c) Solve for the value of x

**(2marks)**

$$3x + 4 = -8$$

**QUESTION FOUR**

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

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:

a) Laspeyre's price index (5 marks)

b) Paasche price index (5 marks)

**QUESTION FIVE**

a) Define the term Statistics (2 marks)

b) Describe any 4 methods of data collection (8 marks)

**QUESTION SIX**

a). Define the following terms as used in statistics

i. Discount (2 marks)

ii. Commission (2 marks)

b). A man purchased a mini-combo set with a cash price of sh20,000 by paying a 10% down payment followed by 18 monthly payments of sh. 1500 each. Calculate

i. The amount financed (4 Marks)

ii. The interest (2 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**

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

**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,**

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