The Management University of Africa

Sponsored by the Kenya Institute of Management

CERTIFICATE UNIVERSITY EXAMINATION

SCHOOL OF MANAGEMENT AND LEADERSHIP

CERTIFICATE COMMON UNIT

CCU 103: BASIC CALCULATIONS AND STATISTICS

DATE: 1ST 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
	$\sum F = 146$

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

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*

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

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

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 + r n)

Compound interest

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

Mean $\bar{x} = \frac{\Sigma fx}{\Sigma f}$

Computation method

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

The semi-interquartile range,

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