



**REGULAR UNIVERSITY EXAMINATIONS
2022/ 2023 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER**

**SCHOOL OF ARTS, HUMANITIES, SOCIAL
SCIENCES AND CREATIVE INDUSTRIES
CERTIFICATE IN SOCIAL WORK AND
COMMUNITY DEVELOPMENT/CRIMINOLOGY**

COURSE CODE: CRM 101

COURSE TITLE: QUANTITATIVE SKILLS I

DATE: 5TH DECEMBER, 2022

TIME: 0830-1030

INSTRUCTIONS:

This question paper contains two sections, section A and B

Answer question one and any other two questions in section B

SECTION A

Question one

a) Solve the following simultaneous equations:(6marks)

1.
$$\begin{aligned} 2x + 5y &= 12 \\ 3x + 3y &= 9 \end{aligned}$$

2.
$$\begin{aligned} 10x - 18y &= -1 \\ 8x + 9y &= 7 \end{aligned}$$

b) A variable x is such that it take values which satisfy the equation below

$x^2 + 3x - 10 = 0$. Determine the values for the variable x (3marks)

c) Find the value of p that will make the following a perfect square (2marks)

$$2x^2 + px + 200$$

d) State the meaning of the following terms as used in set theory, giving an example in each case (8marks)

- i. A set
- ii. Empty set
- iii. Subset
- iv. Infinite set

e) Define cardinality of a set and find the cardinality of the sets below (7marks)

- i. $A = \{a, b, c, f, g\}$
- ii. $C = \{a, d, e, g, k, l\}$
- iii. $M = \{10, 20, 30, 40, \dots\}$

f) A set B is a set of prime numbers less than 15. Find the complement of the set B given that the universal set is the set formed by a set of whole numbers from 1 to 20. (2marks)

g) Differentiate between a discrete variable and a continuous variable (2marks)

SECTION B

Question two

Students in a university did a test and the following data was recorded.

Class	35 - 44	45 - 54	55 - 64	65 - 74	75 - 84	85 - 94
Frequency	5	15	10	7	2	1

Use the table above to calculate

- Mean (4marks)
- Median(4marks)
- Mode(4marks)
- Variance and standard deviation (8marks)

Question three

a) Use substitution method to solve simultaneous equation below (4mks)

- $$\begin{aligned} 3x + 4y &= 18 \\ 5x + 2y &= 16 \end{aligned}$$

b) In school team of 32 students, the number of students who play volleyball are 8 less than those who play soccer. If a student is allowed to play either soccer or volleyball, find the number of students who play soccer (4marks)

c) Factorise and solve the following equations (6mks)

- $x^2 - 5x - 6 = 0$
- $x^2 - 2x - 35 = 0$

d) Solve by completing the square method (4mks)

$$x^2 - 4x - 12 = 0$$

e) A student had an average of 60 in an exam of 5 units, his brother wanted to know what he scored in one of the units which was recorded as y in the data below

75, 56, y, 60,40 . Determine the value of y (2marks)

Question four

a) Natasha invests Sh. 20,000 in a building society account that pays a simple interest of 8% p.a. calculate; (12marks)

- i. The interest accumulated after 4 years
- ii. The interest accumulated after 8 years
- iii. The total amount after 10 years
- iv. How long it will take to accumulate a total of Sh. 50,000.

b) A company invested Sh. 500,000 in a bank that pays a compound interest of 12% p.a. Calculate; (8marks)

- i. The amount after 3 years.
- ii. The amount after 4 years

Question five

A Company manufactures products alpha, beta and gamma. Alpha takes 10 hours, 20 hours and 9 hours in Departments A, B and C respectively. Beta takes 12 hours, 21 hours and 10 hours in Departments A, B and C respectively. Gamma takes 16 hours, 26 hours and 10 hours in Departments A, B and C respectively. The total hours available for Departments A, B and C are 122, 220 and 95 respectively. Determine the number of each products that must be produced in order to exhaust all the time. (20 marks)

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