25.4.8.23

TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

CERTIFICATE COMPUTER STUDIES

LEVELS 4 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY/AUGUST 2023

SUBJECT: MATHEMATICS AND STATISTICS

TIME ALLOWED: 3 HOURS

TOTAL MARKS: 100
PASS MARK: 50

INSTRUCTIONS

1. Write your examination number and National Registration Card number on the answer booklet provided. Ensure to append your signature in the answer space provided on the answer booklet.
2. Write your answer **SCRIPT SERIAL NUMBER** on the examination register and on the entry slip provided.
3. There are seven (7) questions in this paper.
4. Attempt any five (5) questions of your choice.
5. Each question carries twenty (20) marks.
6. Programmable calculators and cellular phones are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

QUESTION 1

a) Given that Y depends on X, calculate the product moment correlation coefficient of X and Y in the table below: (10 marks)

X	Y
1	20
2	15
3	35
4	32
5	12

b) Using the spearman's Rank Correlation calculate the coefficient of X and Y in the table above

(10 marks)

Total (20 marks)

QUESTION 2

a) The marks obtained by students in a computer mathematics and statistics paper were as shown in the following frequency distribution;

Percentage (%)	No. of Students
25 – 29	10
30 – 34	15
35 – 39	12
40 – 44	20
45 - 49	3

i) Construct the histogram.

(10 marks)

ii) From the histogram constructed in (i) above, estimate the modal number of marks.

(5 marks)

b) Solve, using matrix algebra, the following simultaneous equation.

$$3x + 2y = 22$$
$$x + 3y = 19$$

(5 marks)

Total (20 marks)

QUESTION 3

a) K25 000 000 is invested for five years at 12.5%. Calculate the total value of the investment when compounded

i) Monthly (4 marks)

ii) Daily (4 marks)

b) A shopkeeper finds out that the ratio of his income to his expenditure is 7:4.

If his income in a certain week was K77, what was the ratio of;

i) Profit to income?

ii) Profit to expenditure? (6 marks)

c) Given the following function:

For the function, $y = x^3 - 27x + 12$, find the maximum and minimum points.

(Find the first and second derivatives) (6 marks)

Total (20 marks)

QUESTION 4

a) Price index in Pick and Pay is made up of five items. The price for each item and the average quantities purchased from manufactures and other companies each week were as follows in 2021and 2022.

ITEMS	2021 QTY("000)	2021 PRICE	2022 QTY("000)	2022 PRICE
A	50	3	80	4
B	30	6	40	5
C	40	5	20	8
D	105	2	150	2
E	20	7	10	10

Required:

Calculate the Paasche Price index number taking 2021 as the base year (10 marks)

b) The mean of the heights of a random sample of 100 students is 168.75 cm and the standard deviation is 7.5. Calculate the 99% and 95% confidence limits and intervals of all the students.

Required:

Construct a 95% and 99% confidence interval and comment on how you would interpret the result.

(10 marks)

Total (20 marks)

QUESTION 5

a) The quantities of chickens sold by Chimutengo chicken farms for twelve days is shown below:

DAYS	1	2	3	4	5	6	7	8	9	10	11	12
NUMBER OF CHICKENS	50	100	150	80	70	30	90	40	50	120	90	80

Calculate four (4) point trend values. (10 marks)

b) A population is Normal with $\mu = 40$ and $\sigma^2 = 64$

If one item is taken randomly from this population find the probability that it is,

i) greater than 55 (3 marks)

ii) less than 32 (3 marks)

iii) between 35 and 50 (4 marks)

Total (20 marks)

QUESTION 6

a) The cash flow of three projects X,Y and Z of three years are shown below:

YEAR	PROJECT X	PROJECT Y	PROJECT Z
1	K70,000	K94,000	K80,000
2	K55,000	K60,000	K40,000
3	K88,000	K70,000	K75,000

The cost of the capital is 3%. The initial cost of each project is K190 000.

Required:

Which project is the optimum by the discounting method? (14 marks)

b) A finance company advertises money at 25% nominal interest, but compounded quarterly.

Find the effective interest rate (APR) (6 marks)

Total (20 marks)

QUESTION 7

a) The first term of an arithmetic progression is 7 and the fourth term is 16. Find;

i) the sum of the first four terms

ii) the sum of the first ten terms. (5 marks)

b) Solve the following equations; $\frac{x+1}{x-1} = x - 2$ (5 marks)

c) A greengrocer owns 10 shops in various parts of a certain town. The distances from the wholesale fruit and vegetables market are 8, 13, 15, 20, 27, 33, 46, 59, 65 and 72 kilometers.

i) Find the mean deviation of kilometers from the mean (5 marks)

ii) Find the mean deviation from the median (5 marks)

Total (20 marks)