TEVETA
Technical Education, Vocational and
Entrepreneurship Training Authority

CERTIFICATE IN COMPUTER STUDIES

TQF 4 LEVEL EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATION

SITTING: NOVEMBER/DECEMBER 2013

SUBJECT: MATHEMATICS AND STATISTICS

TIME ALLOWED: 3 HOURS

TOTAL MARKS: 100%

PASS MARK: 50

INSTRUCTIONS TO CANDIDATES

1. Write your examination number and National Registration Card number on the answer booklet

2. There are seven (7) questions in this paper

3. Answer any five (5) questions of your choice

4. All questions carry **equal** marks

5. **Cell phones** and **programmable calculators** are **NOT** allowed in the examination room.

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

Question 1

(a)   Solve the following equations:

(i) $3p + 4q = 27$
       $p - 5q = -10$ by elimination method.   (6 marks)

(ii) $7r + 4 = (r + 10)$ (4 marks)

(b)   Calculate the mean deviation of the following distribution of five (5) toy cars weights:

50g, 45g, 30g, 60g and 40g.   (10 marks)

(Total: 20 marks)

Question 2

(a)   The following ratios are distributed to three (3) investors 3:4:5. If the largest share is K2800, Calculate:

(i)   The total sum that is shared   (4 marks)

(ii)   Shares of the other two (2) investors   (6 marks)

(b)   The prices and quantities of three (3) commodities sugar, tea and butter are shown below:

	2010		2011	
Commodity	Price (K)	Quantity	Price (K)	Quantity
Sugar	11	500	13	550
Tea	13	300	16	350
Butter	20	100	21	150

Calculate:

(i)   Simple price index number of tea taking 2010 as the base year.   (3 marks)

(ii)   Paasche price index number taking 2010 as the base year   (7 marks)

(Total: 20 marks)

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Question 3

(a)   Differentiate: $y = 7x^2 - 4x + 5$ (1 mark)

(b)   JS Ltd has estimated that the demand curve for its product is $P(x) = 10 - 0.003x$, where P is the unit price in Kwacha and x is the quantity of sales. The total cost function (in kwacha) is $C(x) = 1000 + 3x + 0.004x^2$.

    (i)   Calculate the quantity and the unit price at which profit will be maximised.

        (12 marks)

    (ii)   Calculate the amount of profit at this level of output.   (7 marks)

(Total: 20 marks)

Question 4

(a)   A project is expected to earn the following net cash flows in three (3) years: K4000 in year 1, K3000 in year 2 and K2000 in year 3. If the initial investment is K8000 and the cost of this capital is at 8%

    (i)   Compute the NPV   (7 marks)

    (ii)   Comment on the viability of the project.   (2 marks)

(b)   The following data shows the life span of white board markers used at a training institute:

No. of words written	Number of white board markers
0 – 6000	30
6000 – 12000	85
12000 – 18000	120
18000 – 24000	45

    (i)   Draw the cumulative frequency curve.   (7 marks)

    (ii)   From the curve in (i) above, estimate the median.   (4 marks)

(Total: 20 marks)

Question 5

(a) Mandipa deposited K70 in a student account of bank AY at 8% interest compounded quarterly for 5 years.

Calculate the accrued amount at the end of five (5) years. (6 marks)

(b) The following data relates to the quarterly sales made in two (2) years, 1990 and 1991

Year	Quarter	Sales
1990	1	52
	2	54
	3	56
	4	55
1991	1	57
	2	60
	3	59
	4	62

(i) Calculate the four (4) quarter moving average trend values. (10 marks)

(ii) Find the seasonal variation by additive model. (4 marks)

(Total: 20 marks)

Question 6

(a) Given the following equations and inequalities:

$$Z = 4000x + 2000y$$

s.t:

$$3x + 6y \geq 120$$
$$5x + 2y \geq 100$$
$$x \geq 0, y \geq 0$$

Identify:

(i) The objective function

(iii)   Constraint functions and non-negativity functions.   (4 marks)

(b)   (i)   Draw the graph of constraint functions   (8 marks)

       (ii)   Find the minimum cost   (5 marks)

(Total: 20 marks)

Question 7

(a)   The arithmetic progression is given as follows:

-54, -73, -92, -111…

Calculate:

(i)   The thirteenth (13th) term of the A.P.   (3 marks)

(ii)   The sum of the first eight (8) terms of the progression.   (3 marks)

(b)   A company purchased a machine at a cost of K50. The machine is expected to depreciate to a scrap value of K15 in five (5) years.

       (i)   Calculate the annual percentage rate of depreciation using reducing balance · method.   (4 marks)

       (ii)   Find the book value of the machine at the end of the third (3rd) year. (4 marks)

(c)   The mean number of calls made at a call centre per hour is 1.6. Calculate the Probability that:

       (i)   Exactly two (2) calls will be made in an hour.   (2 marks)

       (ii)   More than two (2) calls will be made in an hour.   (4 marks)

(Total: 20 marks)