

1601/103
1602/103
MATHEMATICS 1
June/July 2015
Time: 3 hours



Index No: _____
Candidate's Signature: _____
Date: _____

THE KENYA NATIONAL EXAMINATIONS COUNCIL
CRAFT CERTIFICATE IN ELECTRICAL AND ELECTRONICS
TECHNOLOGY
(POWER OPTION)
(TELECOMMUNICATION OPTION)

MODULE 1

MATHEMATICS 1

3 hours

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- You should have the following for this examination:
 - Electronic calculator/Mathematical tables;
 - Geometrical set.
- This paper consists of **EIGHT** questions.
- Answer any **FIVE** questions in the spaces provided in this question paper.
- ALL** questions carry equal marks.
- Maximum marks for each part of a question are as shown.
- Do **NOT** remove any pages from this question paper.
- Candidates should answer the questions in English.

For Examiner's Use Only

Question	1	2	3	4	5	6	7	8	TOTAL SCORE
Candidate's Score									

This paper consists of 20 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

Turn over

Pipe A can fill a tank in 2 hours. Pipes B and C can empty the tank in 5 hours and 6 hours respectively. Determine the time taken to fill the tank.

- (i) if A and B are left open and C closed,
- (ii) with all the pipes open.

(10 marks)

(b) Change:

- (i) $(101011111)_2$ to decimal,
- (ii) $(12345)_{10}$ to hexadecimal.

(10 marks)

5. (a) If 136, a, b, 459 are in geometric progression, find the values of a and b.

(6 marks)

(b) The fourth, seventh and sixteenth term of an arithmetic progression are in a geometric progression. The sum of the first six terms of the arithmetic progression is 12. Determine:

- (i) the first term and the common difference of the arithmetic progression;
- (ii) common ratio of the geometric progression;
- (iii) sum of the first six terms of the geometric progression.

(14 marks)

6. (a) Evaluate $1\frac{1}{2} - [\frac{1}{2} \times \frac{1}{4}] + [1\frac{1}{2} \div \frac{1}{3}] - \frac{1}{2}$.

(6 marks)

(b) Change $0.6\bar{7}$ into a fraction.

(6 marks)

(c) Three people, A, B and C carried out an installation job for which they were paid Ksh.2,560. A received $\frac{3}{8}$ while C received $\frac{3}{16}$ of the total amount. The balance went to B. Find the:

- (i) fraction of B's share;
- (ii) amount received by each of them.

(5 mark)

(d) A worker's monthly salary is Ksh 12,000. After the deduction of income tax he receives Ksh.9,500. Determine the income tax as a fraction of the gross income.

(3 mark)

Turn over

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7. (a) A businessman invests Ksh.20,000 and then adds Ksh.5,000 per year to the investment for 4 years. Find the total amount he has after 4 years if the rate of interest earned is 10% per annum.

(5 marks)

- (b) If Ksh.80,000 is deposited to earn 10% interest for 3 years and then 12% per annum in the subsequent years. Determine the total amount at the end of 5 years using compound interest.

(5 marks)

- (c) Solve the equation:

$$\frac{4x+2}{8} - \frac{2x-3}{6} = 5$$

(4 marks)

- (d) A brand of wheat costing Ksh.240 per kg is mixed with another brand costing Ksh.330 per kg. If the mixture sells at Ksh.360 to give a 25% profit; determine the:

- (i) cost price of the mixture;
(ii) proportion of the mixture.

(6 marks)

8. Table 2 shows the sizes of cables used by a technician in installation.

Table 2

Class	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	2	2	3	4	6	4	5	2

- (a) Draw an ogive curve and use it to determine the semi-quartile range.

(10 marks)

- (b) Calculate the:

- (i) 6th decile;
(ii) 80th percentile.

(10 marks)

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1. Table 1 below shows masses of electrical accessories found in a workshop.

Table 1

Mass	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Frequency	1	2	3	4	5	4	3	2	1

Determine the:

- mean;
- median;
- variance;
- standard deviation;
- coefficient of skewness;
- coefficient of variation.

(20 marks)

2. (a) Given that

$$A = \begin{bmatrix} 4 & 8 \\ 6 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & -3 \\ 7 & -4 \end{bmatrix}$$

Find:

(i) $A + B$;

(2 marks)

(ii) $2A - 3B$;

(4 marks)

(iii) A^2B .

(6 marks)

- (b) Use the inverse matrix method to solve the system of equations.

$$3x + 4y = 21$$

$$5x + 7y = 43$$

(8 marks)

3. (a) Solve the equations:

(i) $\text{Log}_5(3x + 4) - \text{Log}_5(8x + 2) = 2$;

(4 marks)

(ii) $\text{Log}_2 x + 3 \text{Log}_2 x = -4$.

(9 marks)

- (b) Use logarithms to evaluate

$$\sqrt{\frac{(0.6873)^7 \times 438.7}{396.8}}$$

(7 marks)