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SUPPORT SUBJECTS
Oct./Nov. 2017
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

ARTISAN CERTIFICATE

GENERAL FITTER	MASONRY
MOTOR VEHICLE MECHANICS	PLUMBING
AGRICULTURAL MECHANICS	GARMENT MAKING
WELDING AND FABRICATION	FOOD AND BEVERAGE
ELECTRICAL INSTALLATION	PRODUCTION AND SERVICE
CARPENTRY AND JOINERY	LEATHER WORK TECHNOLOGY
PAINTING AND DECORATING	GENERAL AGRICULTURE

SUPPORT SUBJECTS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Three answer booklets;
Mathematical tables;
Drawing instruments.

*This paper consists of **THREE** sections; **A**, **B** and **C**.*
*Each section **MUST** be answered in a separate answer booklet.*
*Answer **ALL** the questions in **part I** of each section, any **TWO** questions in **part II** of sections **A** and **B** and any **FIVE** questions in **part II** of section **C**.*
Maximum marks for each part of a question are shown.
Candidates should answer the questions in English.

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

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SECTION A: MATHEMATICS

PART I (24 marks)

*Answer **ALL** the questions in this part.*

1. Convert the recurring decimal 0.3333 into a fraction. (3 marks)

2. Using mathematical tables, evaluate $\frac{415.2 \times 0.0761}{135}$ and give your answer in standard form. (3 marks)

3. A shopkeeper bought a pair of shoes at Ksh 480. He wished to make a profit of 30% after selling. What was his marked price? (3 marks)

4. A tuk tuk travels 15 km at 30 km/hr and a further 15 km in 20 minutes. Determine the average speed of the journey. (3 marks)

5. A rectangular room is 4 m longer than its width. If the area of the room is $12\ m^2$, calculate the dimensions of the room. (3 marks)

6. At a point 20 m from the base of a building, the angle of elevation to the top of the building is 25°. Determine the height of the building. (3 marks)

7. The length of an arc of a circle is 4.4 cm and the angle subtended at the centre is 28°. Calculate the radius of the circle. (3 marks)

8. Make a the subject of the formula: $S = Ut + \frac{1}{2}at^2$. (3 marks)

PART II (16 marks)

*Answer any **TWO** questions from this part.*

9. (a) The sum of the ages of two boys is 32 years and the difference in their ages is 4 years. Determine the age of each boy. (4 marks)

   (b) Figure 1 shows a trapezium in which <SPQ = <PQR = 90°. Calculate the length PS. (4 marks)

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SECTION A: MATHEMATICS

PART I (24 marks)

Answer ALL the questions in this part.

1. Solve the equation $\frac{3x}{5} - \frac{x}{2} = \frac{1}{2}$. (3 marks)

2. Figure 1 shows a quadrant of radius 14 cm. Determine the area of the shaded part. (3 marks)

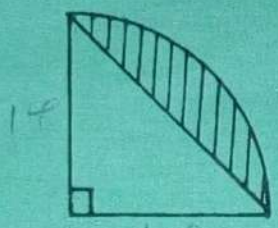

Fig. 1

3. 6 kg of tea of a certain grade is mixed with 3 kg of tea costing Sh. 27 more per kg. The value of the mixture is Sh. 100 per kg. Calculate the cost of the cheaper tea. (3 marks)

4. Solve the equation $b^2 - 3b - 4 = 0$. (3 marks)

5. A dress is sold at Sh. 1,800. The profit made is Sh. 300. Calculate the percentage profit. (3 marks)

6. A certain sum of money is sufficient to pay the wages of 18 people for 20 days. If each person is given the same daily wage, determine the number of days the same amount will be sufficient to pay 24 people. (3 marks)

7. Make U the subject of the formula

$$S = \frac{1}{2}(U + V)t$$

(3 marks)

8. Without using a calculator, evaluate $\frac{8(5^3 - 3^3)}{2^3 - 8 \div 2}$ (3 marks)

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*Answer at least **TWO** questions from this section.*

1. (a) Define each of the following:

(i) atom;

(ii) matter.

(2 marks)

(b) Explain Bohr's Theory with respect to atomic structure. (6 marks)

(c) Table 1 shows sub-atomic particles. Compete the table. (6 marks)

Table 1

S.No.	Sub-atomic particle	Location in an atom	Relative mass
1.	Proton		
2.	Neutron		
3.	Electron		

(d) (i) Distinguish between organic and inorganic compounds citing an example in each case.

(ii) Draw the structural formula for octane hydrocarbon.

(6 marks)

2. (a) Define each of the following with respect to lenses:

(i) focal length;

(ii) principle focus.

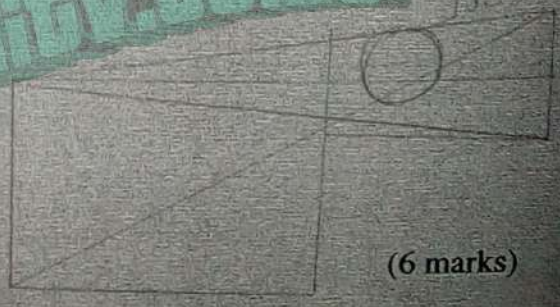
(2 marks)

(b) An object, 5 cm high, is held 25 cm from a converging lens of focal length 10 cm. Determine the:

(i) radius of curvature of the mirror;

(ii) position of the image;

(iii) height of the image.



(6 marks)

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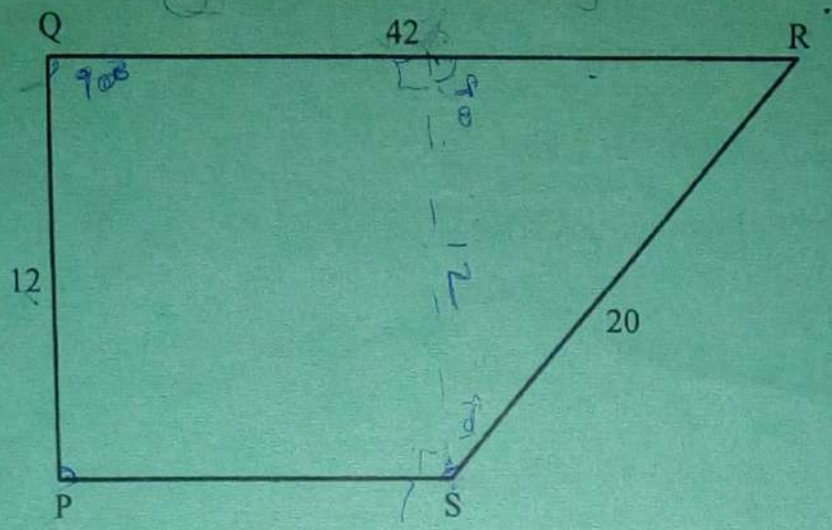

Fig. 1

10. (a) Evaluate $3^4 \times 3^5 \div 9^3$. (3 marks)

(b) 1050 block boards are shared by 3 contractors such that the 2nd contractor gets twice as much as the 1st contractor which is a half of what the 3rd contractor gets. Determine the number of block boards the 1st one gets. (5 marks)

11. (a) How long does Ksh 60,000 take to earn an interest of Ksh 36,000 at an interest rate of 12% p.a?

(2 marks)

(b) The following data shows the marks scored by 20 students in a Maths test.
9, 5, 5, 4, 5, 3, 5, 11, 6, 3, 6, 8, 9, 6, 13, 8, 8, 13, 5, 10.
Determine:

(i) the mean score;

(ii) the median;

(iii) the mode. (6 marks)

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SECTION B: SCIENCE

PART I (24 marks)

Answer ALL questions in this part.

12. (a) Define each of the following terms:

(i) energy; – ability to do work

(ii) power. – Rate of doing work

(2 marks)

(b) A force of 30 N acts on a body which moves through 3 m in the direction of the force. Determine the work done. workdone = Force × Distance (2 marks)

= 30 × 3

= 90 Nm

13. (a) List **two** disadvantages of friction. (2 marks)

(b) A matatu of mass 2.24×10^3 kg was moving at a speed of 30 m/s on a horizontal ground. The driver applied instant brakes with a frictional force of 3×10^4 N. Determine the:

M = 2.24×10^3 kg

s = 30 m/s

F = 3×10^4

(i) deceleration of the matatu;

(ii) distance moved before stopping. (6 marks)

14. State **two** laws of refraction of light. – incident (3 marks)

15. (a) What is sound? – Highness or lowness

(b) State **two** sources of sound. (3 marks)

16. Differentiate between solids and liquids. (3 marks)

17. Distinguish speed from velocity. (3 marks)

Distance moved by the effort to the distance moved by the load,

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