

0101/215 0304/215
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SUPPORT SUBJECTS

Oct./Nov. 2016

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

ARTISAN CERTIFICATE

**GENERAL FITTER
MOTOR VEHICLE MECHANICS
AGRICULTURAL MECHANICS
WELDING AND FABRICATION
ELECTRICAL INSTALLATION
CARPENTRY AND JOINERY
PAINTING AND DECORATING**

**MASONRY
PLUMBING
GARMENT MAKING
FOOD AND BEVERAGE
PRODUCTION AND SERVICE
LEATHER WORK TECHNOLOGY
GENERAL AGRICULTURE**

SUPPORT SUBJECTS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Mathematical tables;

Drawing instruments; and

Answer booklet.

*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.

This paper consists of 8 printed pages.

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

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)

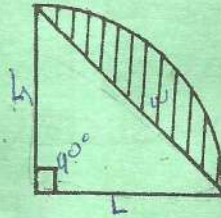


Fig. 1

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)

PART II (16 marks)

Answer any TWO questions from this part.

9. Companies A, B, and C invest Sh. 800,000, Sh. 400,000 and Sh. 200,000 respectively in a business. A and B receive 20% and 10% respectively of the annual profits as salaries and the remainder is shared among the three in proportions of the capitals they invested. If the annual profit is Sh. 320,000, determine the amount each receives at the end of the year. (8 marks)
10. A square carpet is laid in one corner of a room, leaving uncovered floor 2 m wide along one side and 1 m wide along the other side. If the area of the room is 56 m², determine the dimensions of the carpet. (8 marks)
11. The heights in centimetres of 30 boys in a class were:

141 145 163 149 152 166 156 159 139 145
 147 150 158 150 149 143 159 154 167 146
 171 152 162 144 169 162 150 173 162 167

Starting with 135 cm and using class intervals of 11 cm:

- (a) use tally and hence make a frequency table;
 (b) calculate the average height of the boys from grouped data.

(8 marks)

Class Interval	Tally	Mid point \bar{x}	freq	Cum
135-146	4	137	1	1
140-151	111	143	3	4
145-156	11111	147	6	9
150-161	1111	152	2	14
155-166	111	157	2	16
160-171	111	162	4	19
165-176	111	167	4	22
170-181	11	172	2	24

SECTION B: SCIENCE

PART I (24 marks)

Answer ALL questions in this part.

12. List any **three** characteristics of images formed by plane mirrors. (3 marks)
*the image formed is virtual since has the object
the image virtual erect and laterally inverted.*
13. Figure 2 shows the processes involved when substances change from one state of matter to another. Identify the processes named Q, R and S. (3 marks)

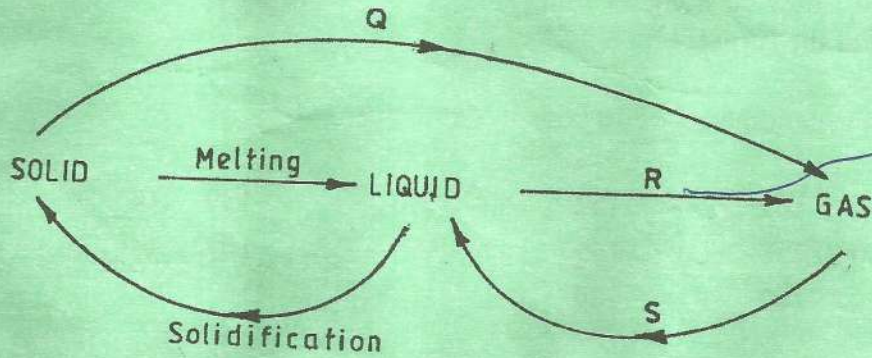


Fig. 2

14. (a) State the composition of the following alloys:

- (i) bronze;
- (ii) brass.

(2 marks)

- (b) Complete the reaction shown below:



15. Figure 3 shows a pair of magnets placed close to each other. Re-draw the magnets and sketch the magnetic field pattern. (3 marks)

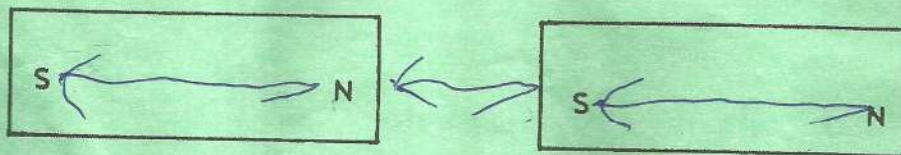


Fig. 3

16. Two resistors of $6\ \Omega$ and $2\ \Omega$ are connected in series across a $12\ \text{V}$ battery of negligible resistance. Calculate the current in the circuit. $6\ \Omega + 2\ \Omega + 12\ \text{V}$
 $= 8\ \Omega + 12\ \text{V}$ (3 marks)
17. State any **three** ways of reducing friction. (3 marks)
18. A gun is fired near a wall and the echo from the wall is heard 10 seconds later. Calculate the distance between the gun and the wall given that the speed of sound is $360\ \text{ms}^{-1}$. (3 marks)
19. State **three** properties of dilute sulphuric acid. (3 marks)

PART II (16 marks)

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

20. Figure 4 shows the extraction of iron in the blast furnace.

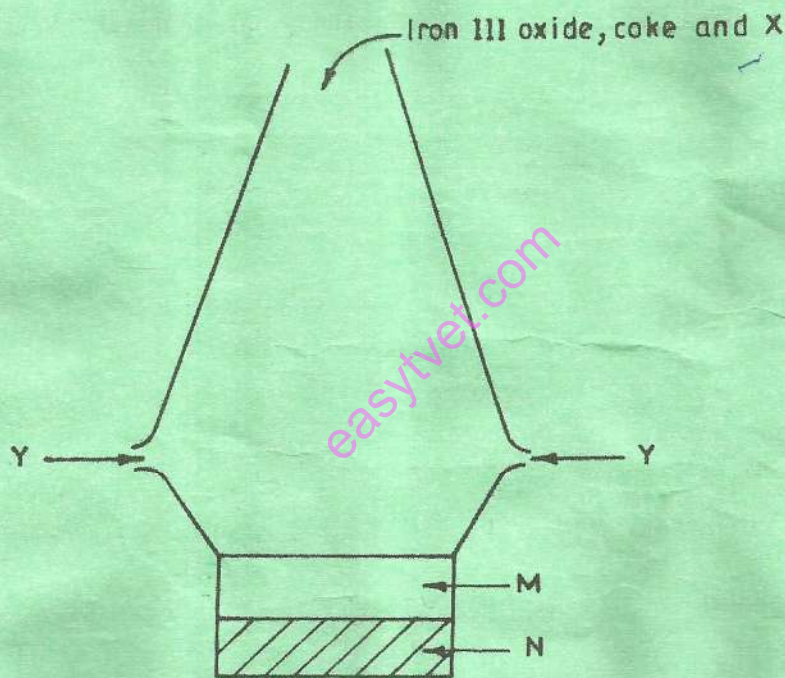


Fig. 4

- (a) Write the name and purpose of the substance marked:

- (i) X;
 (ii) Y.

(4 marks)

(b) Name the substance:

(i) M;

(ii) N.

(2 marks)

(c) State **two** alloys of iron.

(2 marks)

21. An inclined plane was used to move a 50 kg bag of cement to the top of an 8 m tall building using an average force of 200 N. If the plane was 25 metres long, determine:

(a) the work done;

(b) the potential energy gained;

(c) the efficiency of the simple machine.

(8 marks)

22. (a) Figure 5 shows the carbon cycle. Name the processes labelled P, Q and R.

(3 marks)

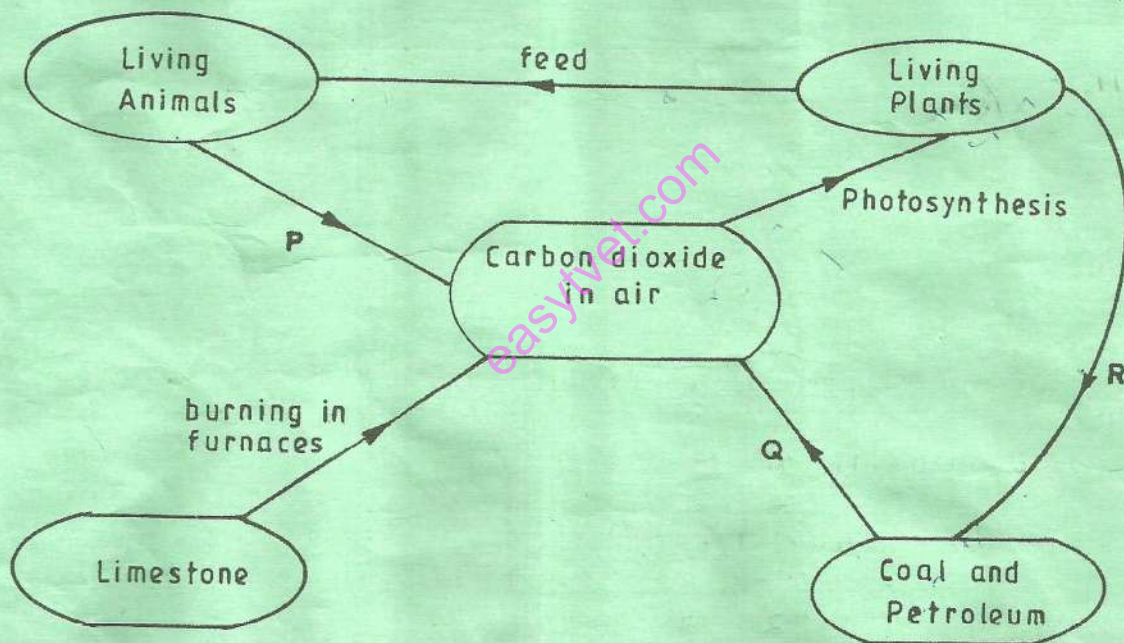


Fig. 5

(b) With the aid of a labelled diagram, show the laboratory preparation of hydrogen gas.

(5 marks)

SECTION C: GENERAL STUDIES

PART 1 (20 marks)

Both questions in this part are **COMPULSORY**.

23. You are the Dean of Students at Naitari Institute. You have invited a well known person to come and give the students a lecture on "Youth and AIDS". Write a memorandum to all the students informing them about the lecture. (10 marks)
24. (a) State **four** occasions when the National Anthem is sung. (4 marks)
- (b) Outline **two** types of pollution that are found in a market environment. (2 marks)
- (c) Give **four** examples of oral communication. (4 marks)

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PART II (20 marks)

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

25. Choose the correct word in the brackets to complete the following sentences: (4 marks)
- (i) If it rains, the bus (would not arrive, will not arrive) in time.
- (ii) He is not only sick (but also, and also) depressed.
- (iii) You have only one brother, (haven't you, don't you)?
- (iv) The young man (begged, beged) for food in the street.
- (v) The meat of a (ship, sheep) is called mutton.
- (vi) "You must (proof, prove) your innocence", the judge said.
- (vii) My mother bought me a sweater which was as white as (snow, ash).
- (viii) Divide this fruit (between, among) your two brothers.
26. Outline **four** reasons why polygamy is practised in some African communities. (4 marks)
27. State **four** effects that floods have on a country. (4 marks)
28. Highlight **four** roles of producer co-operatives in Kenya. (4 marks)

29. State **four** types of sports or games that the youth of this country can engage themselves in. (4 marks)
30. State **four** roles that dances play in the promotion of leisure in the country. (4 marks)
31. Highlight **four** conditions of employment that an employer and employee would have to agree on before an employee starts work. (4 marks)
32. Outline **four** services that local governments should provide to the residents of an area. (4 marks)

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