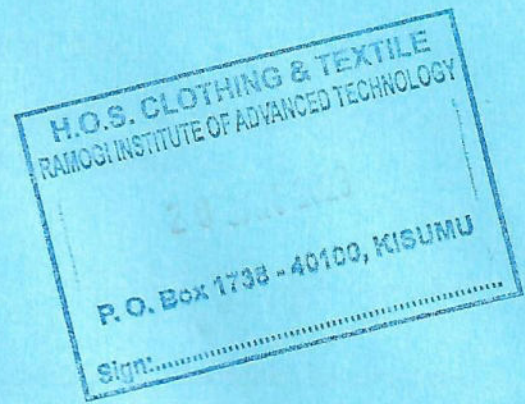


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SUPPORT SUBJECTS

Oct./Nov. 2022

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:

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.*

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. Evaluate $\frac{-8 + -5 \times -8 - -6}{-3 + -8 \div 2 \times 4}$. (3 marks)
2. Use tables of reciprocals to calculate $\frac{3}{0.674} + \frac{13}{0.156}$ (3 marks)
3. A shopkeeper sold a digital watch for Ksh 1,600 and made a loss of 20%. Determine the profit he would have made if he sold it at Ksh 2,200. (3 marks)
4. Without using mathematical tables, evaluate $\frac{1.9 \times 0.032}{20 \times 0.0038}$. (3 marks)
5. Figure 1 shows a net of a solid.

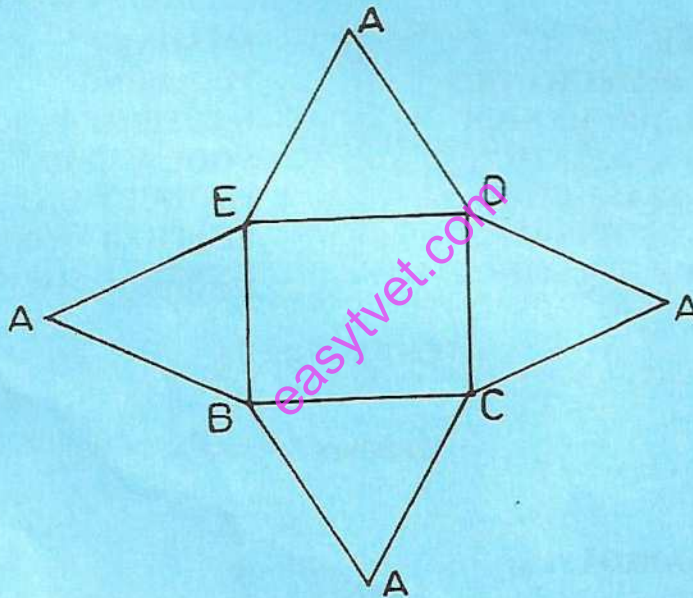


Fig.1

- Draw the solid. (3 marks)
6. Make x the subject of the formula $s = w\sqrt{a^2 - x^2}$. (3 marks)

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7. **Figure 2** shows an electric pole supported to stand vertically on a level ground by a tight wire. The wire is pegged at a distance of 6 m from the foot of the pole.

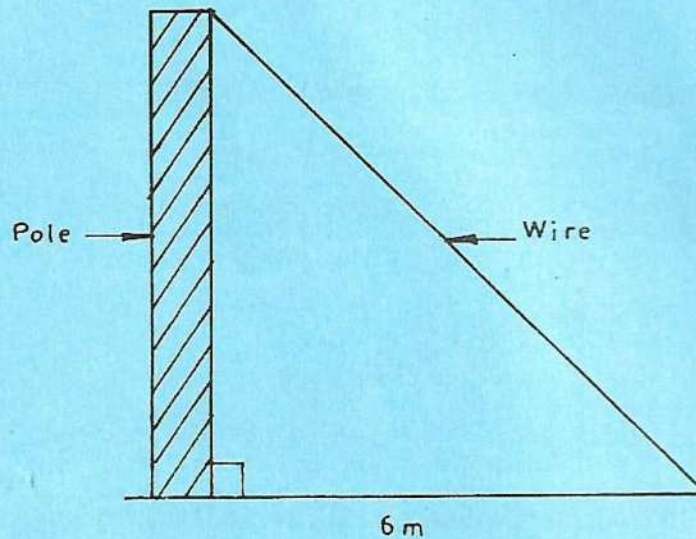


Fig.2

- The angle the wire makes with the ground is twice the angle it makes with the pole. Calculate the length of the wire. (3 marks)
8. Peter cycled for one hour at 60 km/h. He then travelled for 2 hours by car at 80 km/h and later by bus for 1 hour at 60 km/h. Calculate his average speed for the whole journey. (3 marks)

PART II (16 marks)

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

9. (a) Two pairs of socks and three hats cost a total of Ksh 390. Five such pairs of socks and two hats cost a total of Ksh 810. Determine the price of a:
- (i) pair of socks;
- (ii) hat. (4 marks)

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- (b) **Figure 3** shows a sector of a circle. If the area of the sector is 30.8 cm^2 , calculate the length of the arc AB. (Take $\pi = \frac{22}{7}$). (4 marks)

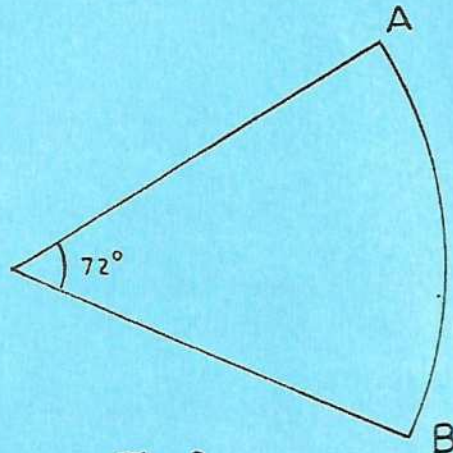


Fig.3

10. (a) The ages of 15 students in a class are: 20, 24, 16, 18, 17, 15, 16, 21, 17, 18, 19, 23, 19, 23, 19. Determine the:
- mean age;
 - median age;
 - mode of the ages. (5 marks)
- (b) Jack deposited Ksh 24,800 in a bank that offers interest at the rate of 7% p.a. for three months. Calculate the simple interest earned. (3 marks)
11. (a) Determine the value of x which satisfies the equation: $16^{x^2} = 8^{4x-3}$. (4 marks)
- (b) Three business partners; Beth, Mark and Ann are to share a profit of Ksh 12,000 in the ratio 5:6: x respectively. If Beth received Ksh 4,000, determine the value of x . (4 marks)

SECTION B: SCIENCE

PART I (24 marks)

Answer ALL questions in this part.

12. A ream of papers weighs 2.5 kg. Calculate the mass of a single sheet of paper in grams, if one ream has 500 sheets. (3 marks)
13. (a) Determine the reading of the micrometer screw gauge scale shown in figure 4. (2 marks)

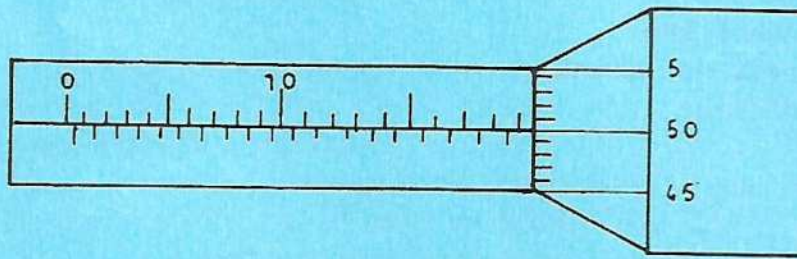


Fig. 4

- (b) State **one** measurement that can be taken using the device in 13 (a). (1 mark)
14. (a) State **one** law of refraction. (1 mark)
- (b) Distinguish between a virtual image and a real image. (2 marks)
15. Define each of the following terms as used in linear motion:
- (a) speed; (1 mark)
- (b) velocity; (1 mark)
- (c) acceleration. (1 mark)
16. Illustrate how three forces 2 N, 3 N and 4 N can be combined to give a resultant force of 3 N. (3 marks)
17. (a) Define the term base as used in the classification of chemicals. (1 mark)
- (b) State **two** properties of acids. (2 marks)
18. Two resistors of $2\ \Omega$ and $4\ \Omega$ are connected in series to 1.5 V dry cell. Calculate the current flowing through the circuit. (3 marks)

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19. State **three** factors that affect the strength of an electromagnet. (3 marks)

PART II (16 marks)

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

20. (a) A man uses an inclined plane to lift a load of 432 N through a vertical height of 4 m. The inclined plane makes an angle of 30° with the horizontal. If the man applied an effort of 300 N, determine the:
- (i) velocity ratio;
 - (ii) mechanical advantage;
 - (iii) efficiency. (6 marks)
- (b) State **two** areas of application of wheel and axle. (2 marks)
21. (a) (i) State the Pascal's principle of pressure in fluids . (3 marks)
(ii) State **two** areas where the principle identified in a (i) is applied.
- (b) **Figure 5** shows a hydraulic machine used to compress a bale.

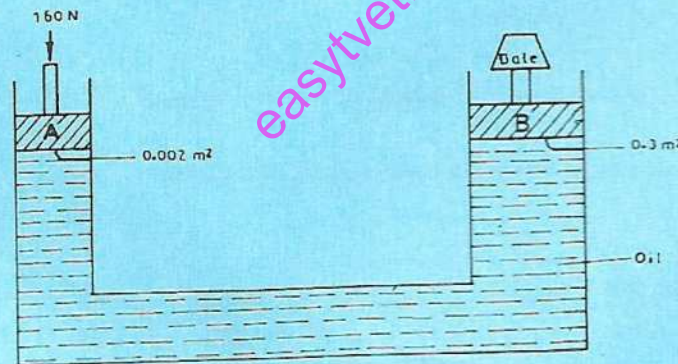


Fig.5

Determine the:

- (i) pressure exerted on the oil by the force applied in A;
 - (ii) force produced at B. (5 marks)
22. (a) Define the term echo as applied to sound. (1 mark)

- (b) A speaker is placed between two walls; A and B and is nearer to wall A than wall B. It is sending out constant sound pulses. If the speaker is 200 m from wall A and the time between the two echoes received is 0.176 s, determine the distance between the speaker and the wall B. (Take speed of sound in air as 340 m/s). (7 marks)

SECTION C: GENERAL STUDIES

PART 1 (20 marks)

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

23. (a) The organization you work for has recorded increased cases of workshop theft. You have been asked to conduct an investigation and write a report. Identify **four** sections that you will include in this report. (4 marks)
- (b) Outline **three** features of a perfectly competitive market. (3 marks)
- (c) State **three** psychological barriers to effective oral communication. (3 marks)
24. (a) Highlight **three** advantages of trade credit financing. (3 marks)
- (b) **Table 1** shows information related to Kela Traders for the year ended 30th June 2020.

Table 1

| S/No. | Details |
|-------|---------------------|
| 1. | Capital |
| 2. | Gross profit |
| 3. | Commission received |
| 4. | Cash at bank |
| 5. | Power and lighting |
| 6. | Debtors |
| 7. | Discounts |

Identify the entries that will be made in the profit and loss account for the business. (4 marks)

- (c) State **three** ways in which the government of Kenya is managing the population growth in the country. (3 marks)

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PART II (20 marks)

Answer any FIVE questions from this part.

25. (a) List **two** pillars of the Nyayo philosophy of Kenya. (2 marks)
- (b) Outline **two** roles of the Kenya Scouts Association in the national development of the country. (2 marks)
26. (a) Highlight **two** limitations of biogas technology. (2 marks)
- (b) State **two** sources of revenue for Kenya's county governments. (2 marks)
27. Complete each of the following sentences by choosing the correct conjunction from the ones given in brackets:
- (a) _____ you win the first position, you will receive a price. (Unless, If, Wherever) (2 marks)
- (b) He is honest _____ everyone trusts him. (when, if, so). (2 marks)
28. (a) Highlight **two** positive effects of religion on family relationships. (2 marks)
- (b) List **two** short-term sources of debt financing to a business. (2 marks)
29. Outline **four** reasons that make drama important in educational institutions. (4 marks)
30. Explain each of the following terms as used in budgeting:
- (a) capital expenditure; (2 marks)
- (b) revenue expenditure. (2 marks)
31. State **two** effects of each of the following types of pollution:
- (a) soil pollution. (2 marks)
- (b) noise pollution. (2 marks)
32. (a) State **two** advantages of using newspapers as a means of sales promotion. (2 marks)
- (b) Outline **two** psychological signs of a person engaging in drug and substance abuse. (2 marks)

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