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 SUPPORT SUBJECTS

June/July 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
GENERAL AGRICULTURE

SUPPORT SUBJECTS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Mathematical tables/Scientific calulator;

Drawing instruments.

This paper consists of **THREE** sections; A, B and C.

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 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 $\frac{12 \div (-3) \times 4 - (-20)}{-6 \times 6 \div 3 + (-6)}$

(3 marks)

2. Solve for x in the equation

$$\frac{81^{2x} \times 27^x}{9^x} = 729$$

(3 marks)

- 3. Baka bought four pencils and six pens for Kshs 66. Hellen bought two pencils and five pens for Ksh 51. Calculate the price of each item. (3 marks)
- 4. Using mathematical tables, evaluate $\frac{1}{24.6} + 4.35^2$ (3 marks)
- 5. Using mathematical tables, evaluate $\frac{4.56 \times 0.38}{0.82}$ and leave your answer in standard form. (3 marks)
- 6. Solve for x in the equation $2x^2 + x 36 = 0$. (3 marks)
- 7. Make n the subject of the formula

$$\frac{r}{p} = \frac{m}{\sqrt{n-1}}$$

(3 marks)

8. A shopkeeper made a loss of 30% by selling an electric iron box at Ksh 700. What profit would the shopkeeper have made if he sold the iron box at Ksh 1150. (3 marks)

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PART II (16 marks)

Answer any TWO questions from this part.

9. Table 1 shows the tax rates for a certain year.

Income (K£ per annum)	Tax rates (Sh. per £)
1 - 4512	2
4513 - 9024	3
9025 - 13536	4
13537 - 18048	5
18049 - 22560	6
Over 22,560	6.5

In the year, Becky earned a salary of Shs 16,510 per month. She was entitled to a monthly tax relief of Sh. 960. Calculate:

(a) Becky's gross annual salary in K£.

(7 marks)

(b) The monthly tax paid by Becky in Kshs. Take£ = Ksh 20

(6 marks)

10. Figure 1 shows a right pyramid on a square base of side 6 cm. The slant edge of the pyramid is 5 cm.

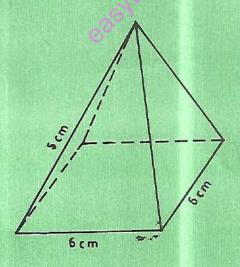


Fig. 1

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(a)	Draw	the net o	f the	pyramid
(00)	LILUTT	the net o	T LITE	pyrumu.

(2 marks)

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(b) Calculate the height of the pyramid.

(3 marks)

(c) Calculate the total surface area of the pyramid.

(3 marks)

Amos cycled from his home to a school 6 km away in 20 minutes. He stopped at the school for 5 minutes before taking a vehicle to a town 40 km away. The vehicle travelled at 75 km/hr. Draw a distance time graph to represent Amos' journey. (8 marks)

SECTION B: SCIENCE

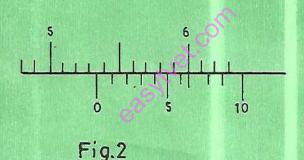
PART I (24 marks)

Answer ALL questions from this part.

12. State three methods that can be used to magnetise a steel rod.

(2 marks)

13. (a) Figure 2 shows a section of a vernier callipers scale. Determine the reading on the scale in mm. (1 mark)



(b) State two measurements that can be taken using vernier callipers.

(2 marks)

14. (a) Define friction.

(1 mark)

(b) State two factors that determine the amount of fricton between two surfaces.

(2 marks)

15. With the aid of a diagram, explain regular reflection of light.

(3 marks)

16. State **two** factors that affect the velocity of sound in air.

(2 marks)

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- 17. Define each of the following substances:
 - (a) salt;

(2 marks)

(b) base.

(2 marks)

- 18. Explain each of the following modes of heat transfer:
 - (a) conduction;

(1 mark)

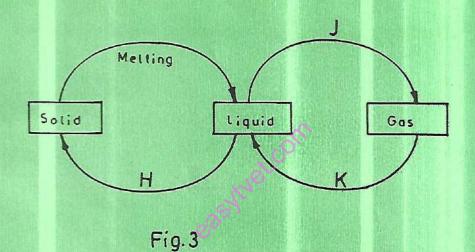
(b) convection;

(1 mark)

(c) radiation.

(1 mark)

19. Figure 3 shows the changes in physical states of matter.



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Name the processes labelled H, J and K.

(3 marks)

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PART II (16 marks)

Answer any TWO questions from this part.

20. (a) Define powe and state its SI unit.

(2 marks)

- (b) An electric motor rated at 2500 W is used to lift cartons of nails in a store. A single carton has a mass of 5 kg. If the store is 4 m above the ground, determine the number of cartons that the motor can raise in 2 minutes.

 (Take g = 10 N/kg) (6 marks)
- 21. (a) Differentiate between effort and load as used in simple machines. (2 marks)
 - (b) An effort of 125 N is used to lift a load of 500 N through a height of 2.5 m. If the distance moved by the effort is 15 m. Calculate the efficiency of the simple machine.

 (6 marks)
- 22. (a) Figure 4 shows a simple electric circuit connecting three identical bulbs: B₁, B₂ and B₃.

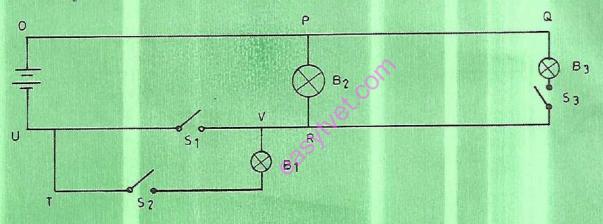


Fig. 4

Explain the effect of each of the following indicating the path of current.

- (i) S_1 is closed;
- (ii) S_2 and S_3 are closed.

(6 marks)

(b) A current of 3 mA flows through a conductor of 4K Ω . Calculate the voltage across the conductor. $\eqno(2\mbox{ marks})$

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SECTION C: GENERAL STUDIES

PART I (20 marks)

Answer BOTH questions in Part I.

23. The following letter has been written to invite a job applicant for an interview.

Ushindi Enterprises

Box 22220

NAIROBI

REF. NO. 1018/20

Dear Mr. Bakati

Thank you for your letter of application for the position of Technician dated 6 March 2020.

We hereby invite you for an interview on 25 June this year at 2 p.m. Carry along with you the original certificates. We look forward to meeting you then.

Yours faithfully MANAGER

idno

Identify five mistakes in the letter that would make it not to communicate effectively.

(10 marks)

- 24. (a) State three benefits of water conservation to a country. (3 marks)
 - (b) State two reasons for conducting stock taking in a business organisation. (2 marks)
 - (c) Name three ministries in the Government of Kenya. (3 marks)
 - (d) List **two** message-related factors considered when choosing a communication medium. (2 marks)

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		0405/215		

PART II (20 marks)

Answer any FIVE questions from this part.

25.	(a)	List two types of non-verbal communication.	(2 marks)
	(b)	Fill in the blank spaces in each of the following sentences by choosing the confrom those provided in brackets.	orrect word
		(i) the news on at five or six? (is, Are)	
		(ii) The players, as well as the Captain to win. (want, want	(2 marks)
26.	(a)	State two advantages of the nuclear family.	(2 marks)
	(b)	List two social services that are negatively affected by overpopulation.	(2 marks)
27.	(a)	State two legislative measures that have been put in place to control pollution	m in Kenya. (2 marks)
	(b)	List two roles of trade unions in Kenya.	(2 marks)
-28.	(a)	List two passive leisure activities that the youth may engage in.	(2 marks)
	(b)	State two circumstances under which songs were sang in the Traditional Afre Society.	ican (2 marks)
29.	(a)	List two external publics of a business enterprise.	(2 marks)
	(b)	State two ways in which an individual can demonstrate neatness when filling form.	g an official (2 marks)
(30)	(a)	List two indicators of an unsuitable business location.	(2 marks)
	(b)	List two types of fixed costs incurred in a business enterprise.	(2 marks)
(31)	(a)	State two advantages of saving through a savings and credit society.	(2 marks)
	(b)	List two services that commercial banks offer to business enterprises.	(2 marks)
32 .	(a)	List two details that should be contained in a valid cheque.	(2 marks)
	(b)	State two methods that can be used to promote sales in a business enterprise	es. (2 marks)
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