

KAPSABET HIGH SCHOOL



232/2 - PHYSICS - Paper 2



2 HRS

NAME: ADM NO.:

CLASS

CANDIDATE'S SIGNATURE.....DATE:

INTERNAL TRIAL 1 2023

Kenya Certificate of Secondary Education (K.C.S.E.)

232/2

PHYSICS

Paper 2

2 hours

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided.
- Mathematical tables and non-programmable calculators may be used.
- This paper consists of section A and section B.
- Attempt all the questions in the spaces provided.
- ALL working MUST be clearly shown.

For Examiners Use

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 12	25	
B	13	13	
	14	15	
	15	15	
	16	12	

	TOTAL	80	

This paper consists of 15 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

Section A (25 marks)

1. An object pin is placed in front of a plane mirror. The image of the pin is viewed from position A. Draw array diagram to show this image. (2 marks)

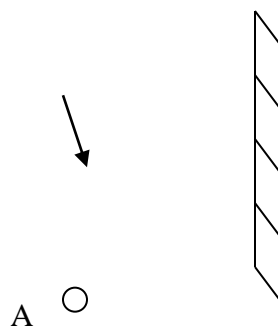


Figure 1

2. You are provided with two rods, a conductor and an insulator. Describe how you would use a charged gold-leaf electroscope to distinguish between the insulator and a conductor. (2 marks)

3. A pin-hole camera of length 10 cm is placed 0.5 m away from a goalpost. A sharp image of the goalpost 15 cm high is formed on the screen. Determine the height of the goalpost. (2 marks)

4. The figure 2 below shows a displacement- time graph of a particular progressive wave.

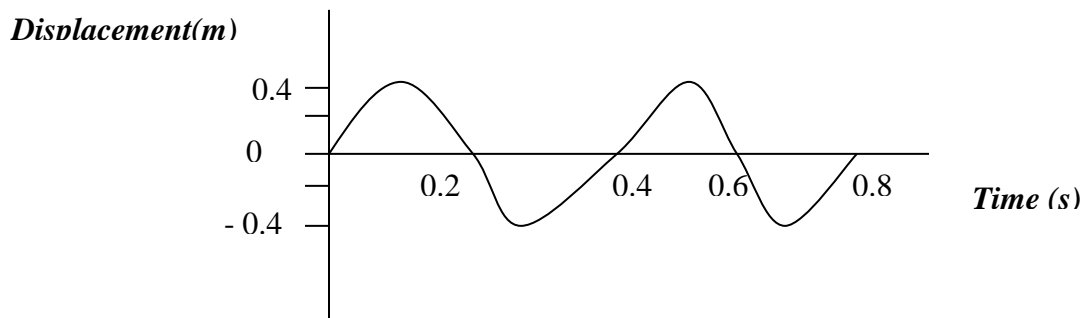


Figure 2

Draw on the same diagram, a wave which passes through the points with double frequency and half amplitude of the first wave. (2 marks)

5. Explain how temperature affects the speed of sound in gases (1 mark)

6. A polythene charged strip is brought near two spheres A and B that are in contact as shown in figure 3

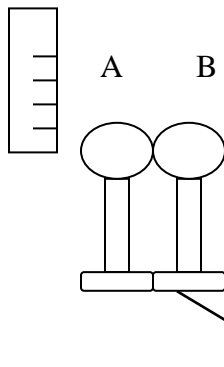


Figure 3(a)

Insulating handle

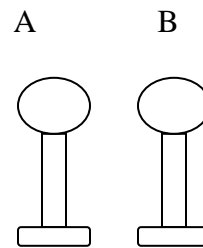


Figure 3(b)

- (i) indicate the charge distribution on the spheres when a negatively charged polythene strip is brought near A. (1 mark)
- (ii) draw the charge distribution on A and B shown in (b) when the spheres are separated and immediately the polythene strip is withdrawn. (2 marks)

7. Three identical lamps X, Y, Z are connected as in figure 4. The E.m.f applied in the circuit is 3.0 volts

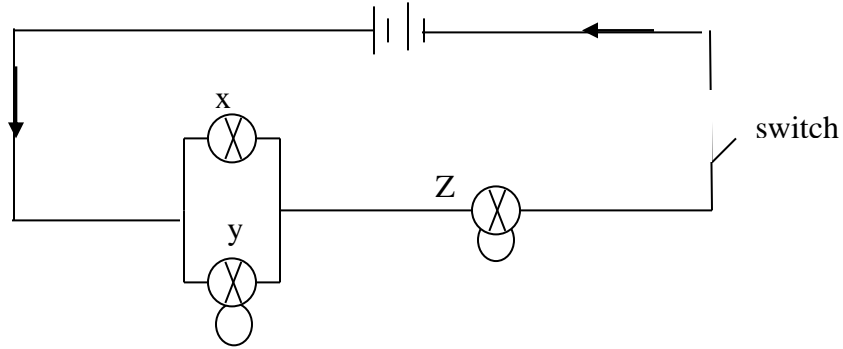


Figure 4.

- (i) State which lamp is brightest when circuit is closed? (1 mark)
- (ii) Explain your answer in part (i) above. (2marks)

8. Figure 5 shows an iron rod on which a wire is to be wound to make an electromagnet.

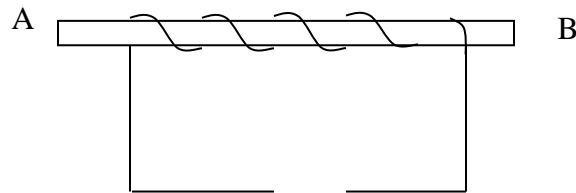


Figure 5

By drawing, show how two cells are connected so that end A becomes North pole and end B south pole. (2marks)

9. The force on a conductor carrying current in a magnetic field can be varied by changing, among others, the magnitude of the current and magnetic field strength. State two other factors that can be changed to vary the force. (2marks)

10. Using domain theory explain the differences between a magnetic material and a magnet (2marks)

11. Figure 6 shows water waves traveling from deep into shallow water.

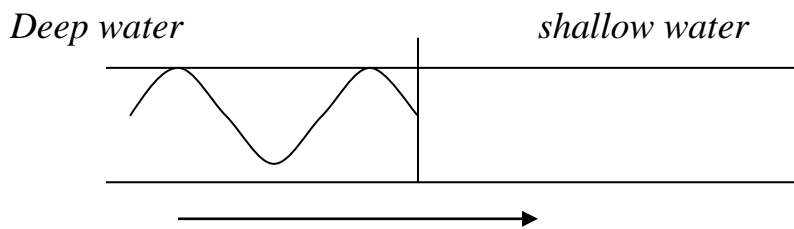


Figure 6

Complete the wave front to show how it travels in shallow water (1 mark)

12. Figure 7. Shows two rays incident on a converging lens

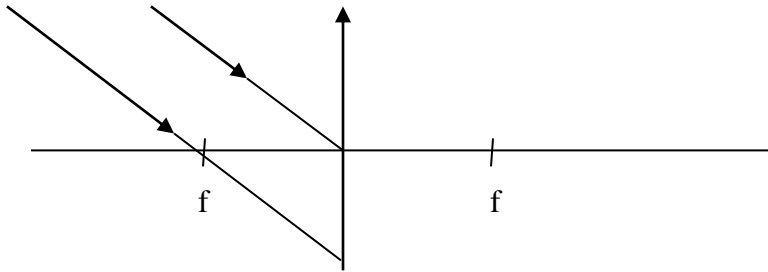


Figure 7.

- (i) Draw the ray after refraction to show positions of the image. (2marks/)
- (ii) State the application of this arrangement in (i) above (1 mk).

Section B(55 marks)

13. (a) Define refractive index of a material in terms of velocity of light. (1mark/)

(b) state the conditions necessary for a total internal refraction to occur (2marks)

(c)Figure 8 shows light ray traveling from air to glass and from glass to air. Ray of Light AO is incident normally on the semicircular glass,

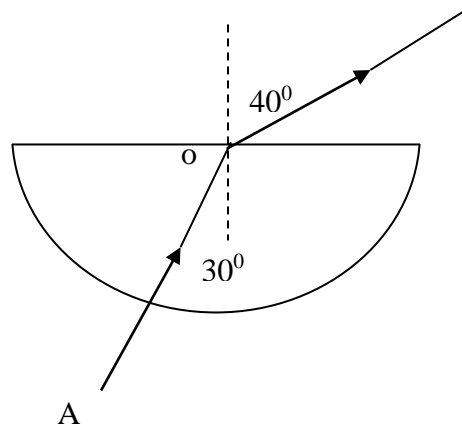


Figure 8

- (i) Determine the refractive index of glass with respect to air. (3 marks)
- (ii) In addition to the circular glass, you are provided with; a ray box (source of light ray), four office pins, soft board, white paper and a protractor, describe how this apparatus may be used to determine the critical angle of the glass. (4marks)

(iii) Determine the critical angle of this semicircular glass. (3 marks)

14.(a) you are provided with three resistors $1\ \Omega$, $3\ \Omega$ and $6\ \Omega$.

(i) Draw a circuit diagram to show $6\ \Omega$ and $3\ \Omega$ resistors in parallel and this combination in series with $2\ \Omega$ resistor and the $6\ \text{V}$ battery.
(2marks).

(ii) Determine the total effective resistance in the circuit drawn in (i) above (2 marks)

(iii) Calculate the p.d across a $2\ \Omega$ resistor (2 marks)

- (iv) Determine the value of current through the $6\ \Omega$ resistor (3marks)

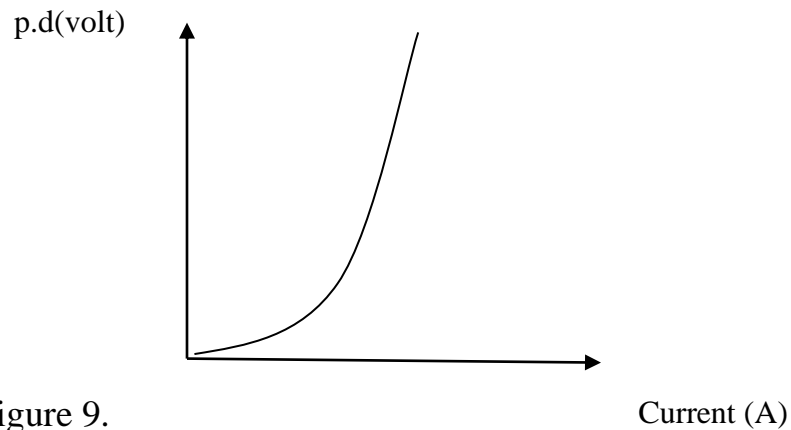


Figure 9.

- (b) Figure 9, shows a graph of potential difference (V) against current (I A) through a filament lamp (bulb)
- (i) Draw a well labeled working circuit diagram showing the apparatus that can be used to obtain a set of readings used to draw the graph in (figure9). (2marks)

- (ii) explain why the filament lamp does not obey ohm's law (2 marks)

- (iii) Explain how resistance of the filament lamp varies as current increases. (1 mark).

- (iv) State the characteristics of material wire used in the filament lamp. (1 mark).

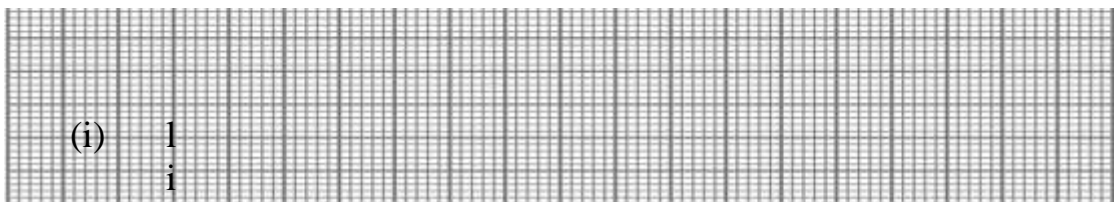
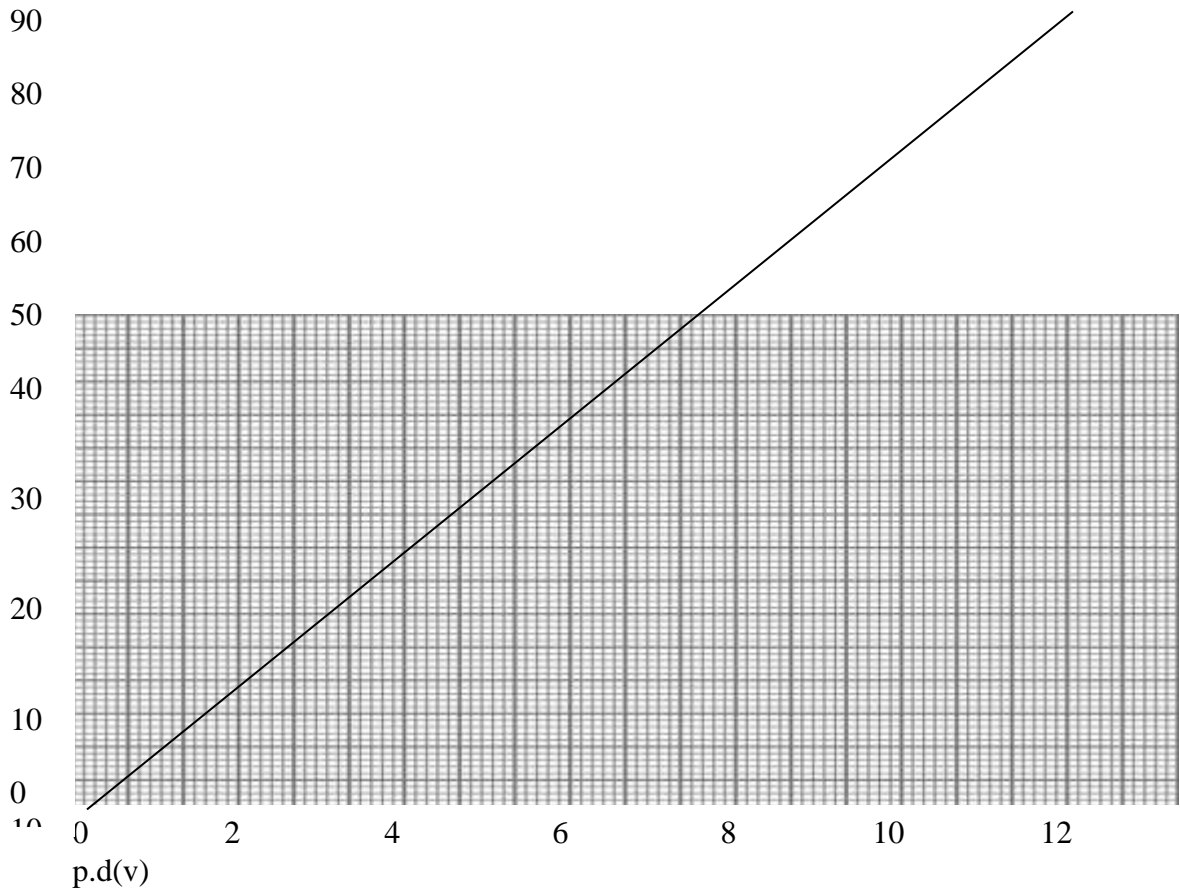
15. (a) define capacitance of a capacitor. (1 mark)

(b)(i) Describe the essential features in the construction of a parallel plate capacitor. (3 marks)

(iii) Explain how charge is distributed in such parallel capacitor in b(i) above. (2marks)

(c) In an experiment to charge a capacitor, the charge stored was measured for different values of charging potential difference. A

graph of charge stored Q (μC) (y-axis) against potential difference p.d (v) was plotted as shown graph 1.



(i)

1
i
s

Draw a diagram of the apparatus used to perform this experiment (1 mark)

- (ii) draw a circuit diagram showing all connections of the listed apparatus in (i) above to perform the experiment of charging a capacitor. (2 marks)

From the graph

- (ii) determine the capacitance of the capacitor used in this experiment. (3 marks)

- (iii) Calculate the energy stored in this capacitor. (2 marks)

(d) Three capacitors are connected as shown in figure 10.

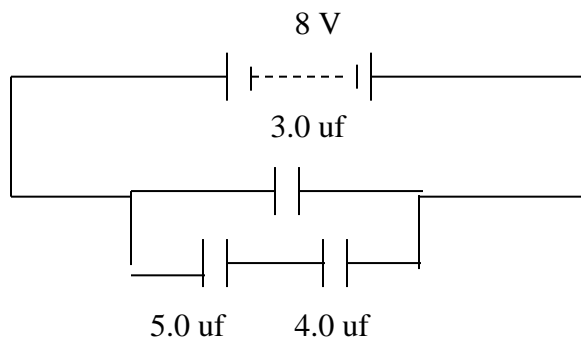


Figure 10

Calculate:

(i) total effective capacitance in the circuit. (2 marks)

(ii) The charge on a $4.0 \mu\text{F}$ capacitor. (2 marks)

16. (a) Complete figure 11 by drawing two rays to show the final image formed by convex lens of the object O, shown (2 marks)

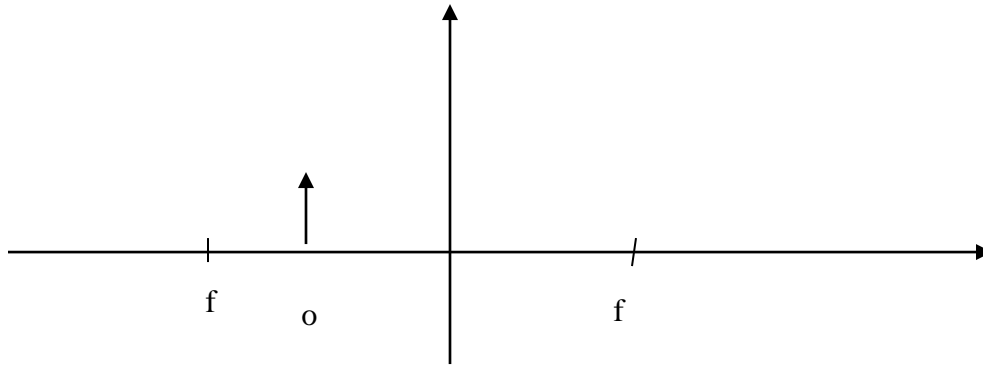


Figure 11

(b) Describe the characteristics of the image formed in 16 (a) above (3 marks)

(c) State the optical device that uses the arrangement in (a) above. (1 mark)

(d) A person viewing a near object switches attention to look at an aero-plane far away.

(i) State the change that occurs in his eye in order to see the aero-plane clearly. (2 marks)

(ii) If this person fails to see the aero-plane clearly, what defect is he suffering from? (1 mark)

(iii) Explain with a diagram how the defect can be corrected. (3 marks)

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