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PHYSICS PAPER 2

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STAREHE GIRLS
STAREHE BOYS
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These exams have been compiled from recently done national schools' trials and joint series

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Kenya Certificate of Secondary Education

KCSE TOP NATIONAL SCHOOLS TRIAL SERIES 2025

Name …… **Admission number** ……

Candidate's Signature……**Date**……

KABARAK HIGH SCHOOL

Kenya Certificate of Education
Physics Paper 2

Instructions to candidates

- *This paper consists of two sections A and B.*
- *Answer all the questions in the two sections in the spaces provided after each question*
- *All working must be clearly shown.*
- *Electronic calculators, mathematical tables may be used.*
- *All numerical answers should be expressed in the decimal notations.*

SECTION	QUESTION	MAXIMUM MARKS	CANDIDATE'S SCORE
A	**1 – 9**	**25**	
B	**10**	**08**	
	11	**08**	
	12	**08**	
	13	**10**	
	14	**11**	
	15	**10**	
TOTAL		**80**	

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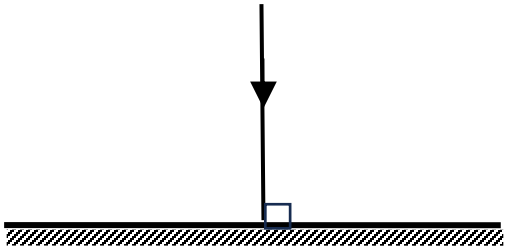
Section A (25 Marks)

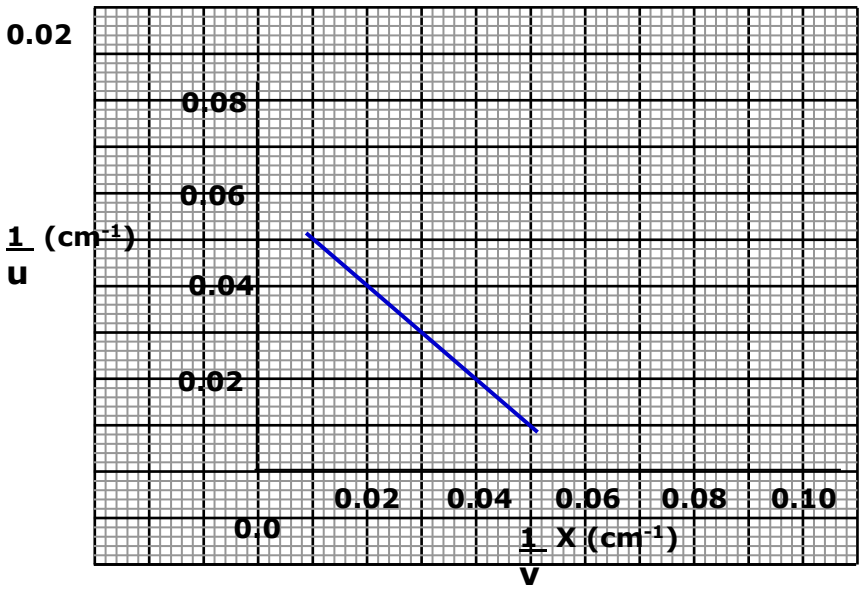
1. Figure below shows a ray of light being incident on a mirror.



(a) Complete the diagram by showing the reflected ray ***(1mark)***

(b) What is the angle of reflection? ***(1mark)***

2. The graph below shows variation of $\left(\frac{1}{u}\right)$ (cm-1) with $\frac{1}{v}$ (cm-1) for an object placed in front of concave mirror.



From the graph, determine the focal length of the mirror. ***(3marks)***

3. (a) State the basic law of electrostatic charges ***(1 mark)***

(b) A positively charged rod is brought near the cap of a lightly charged electroscope. The leaf divergence first reduces and as the rod comes nearer, it diverges more.

(i) State the charge on the electroscope. ***(1mark)***

(ii) Explain the observation above ***(2 marks)***

4. (a) The diagram below shows electromagnetic waves detection and uses. Fill in the blanks below appropriately ***(2 marks)***

Types of radiation	**Detector**	**Uses**
X- rays		X-ray photography
	Phototransistor of blackened thermometer	Warmth sensor

(b) Radio wave signals can be detected behind hills and in lower valleys; but TV waves cannot. Explain. ***(2 marks)***

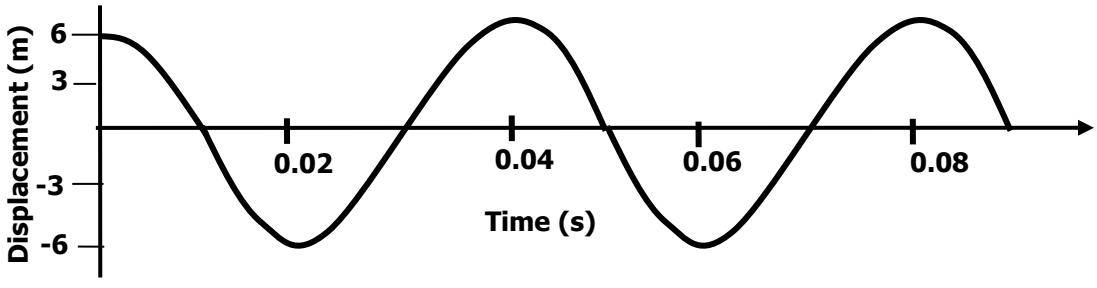
5. An iron rod is positioned facing the north- south direction and is hit several times. It was later observed that it attracted other smaller iron pieces. Using domain theory, explain this observation.

(2 marks)

6. The figure shows a current – carrying conductor placed in a magnetic field.

State and explain the observation made. ***(2 marks)***

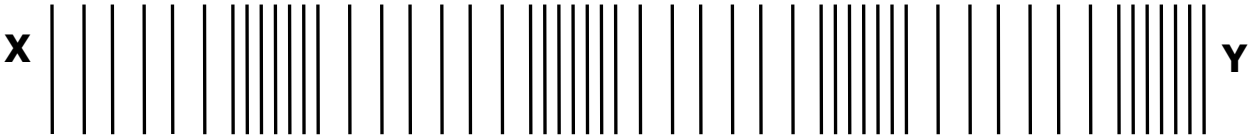
7. The Figure below shows a wave profile of moving at a velocity of **200m/s.**



Determine its wavelength. ***(2 marks)***

8. Distinguish between a transverse and a longitudinal wave *(2 marks)*

The figure below shows a longitudinal wave.

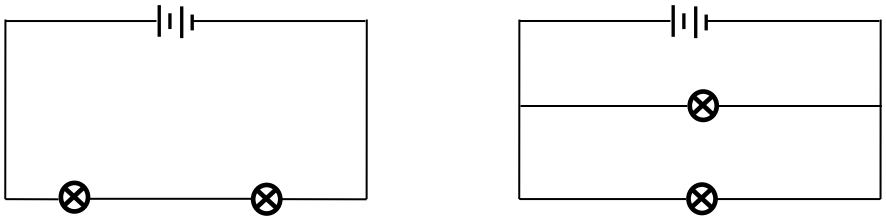


(a) Indicate on the diagram, the wave region of;

(i) Low pressure *(1mark)*

(ii) High pressure *(1mark)*

9. A student was investigating the brightness of bulbs when setup in electric circuits. She used identical bulbs and cells. The circuits shown in figure 3(a) and (b) were what she setup.

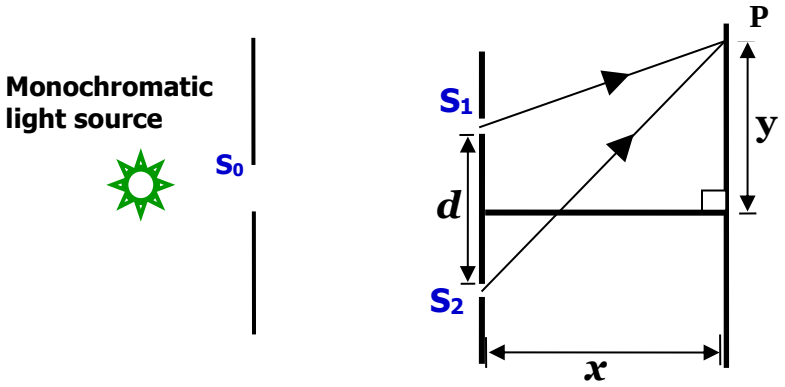


Which setup was the bulb brightest? Give a reason for your answer. *(2marks)*

Section B (55 Marks)

10. (a) Define interference of waves *(1 mark)*

The figure below shows the rays of monochromatic light incident on two adjacent slits S_1 and S_2



(b) What is the purpose of having slits S_1 and S_2 *(1 mark)*

a) State and explain the observation made ***(2 marks)***

b) State what is observed on the screen when the

(i) Slit separation, **d**, is reduced. ***(1mark)***

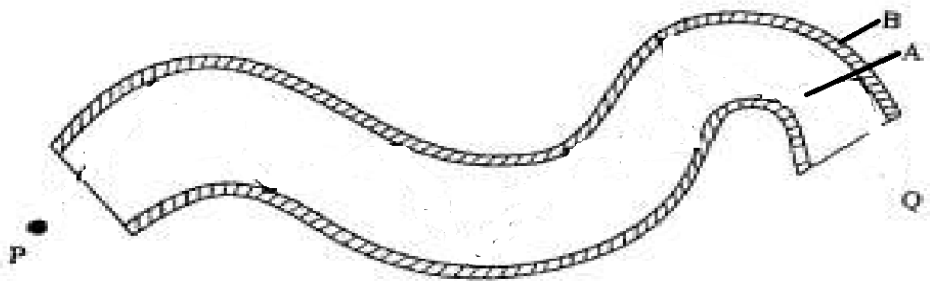
(ii) Distance, **x**, is increased. ***(1mark)***

(iii) White light is used. ***(1mark)***

(iv) Give an expression for the wavelength λ of light. ***(1mark)***

11. (a) Define critical angle ***(1mark)***

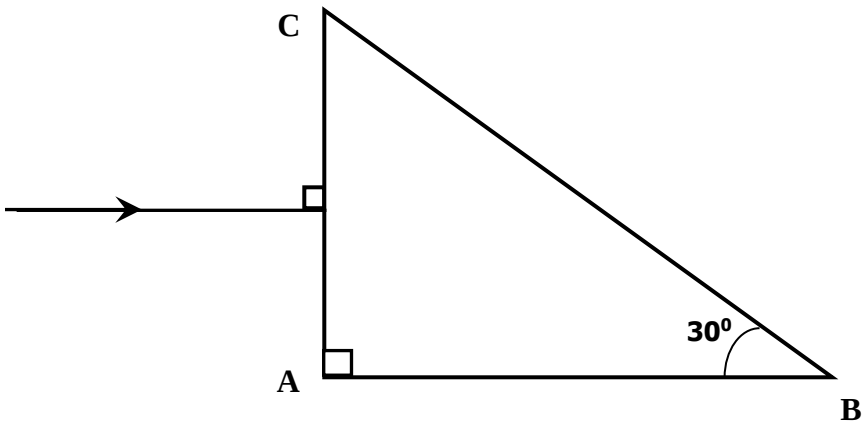
(b) A student had a research project of making a fiber optic cable as shown.



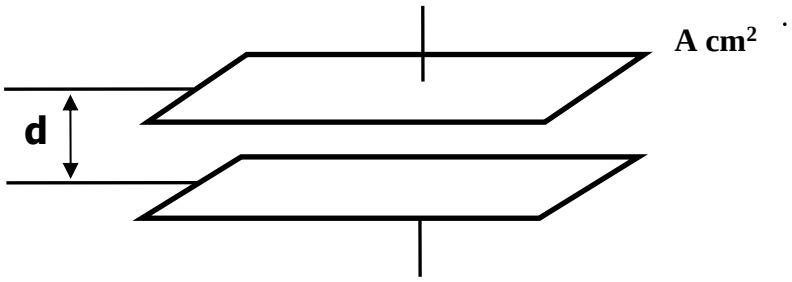
(i) Compare; with reason the optical densities of the materials A and B ***(2 marks)***

(ii) On the diagram above, draw the path of a ray of light incident on the cable at point P till it emerges at side Q ***(2 marks)***

(c) The figure below shows a ray of light passing into a glass prism ABC. Sketch the path of the ray as it travels from the face **AC**. (*critical angle for glass is 42^0)* ***(3 marks)***

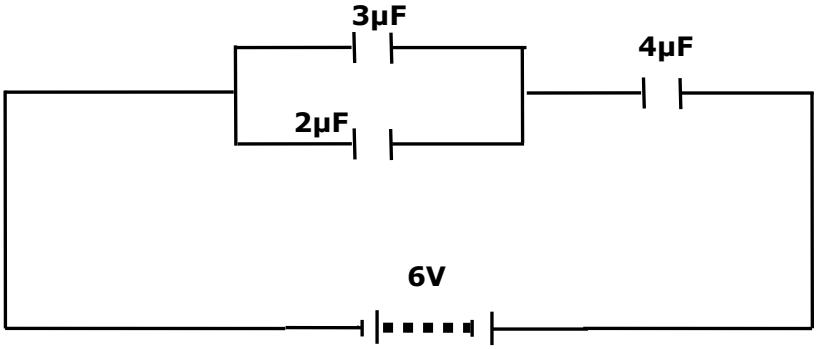


12. (a) The figure below represents two parallel plates of a capacitor separated by a distance **d.** Each plate has an area of **A** square units.



Suggest two adjustments that can be made on the plates so as to reduce the effective capacitance. ***(2 marks)***

(b) Figure shows a circuit diagram with three capacitors.



(i) Determine the effective capacitance of the arrangement. ***(3marks)***

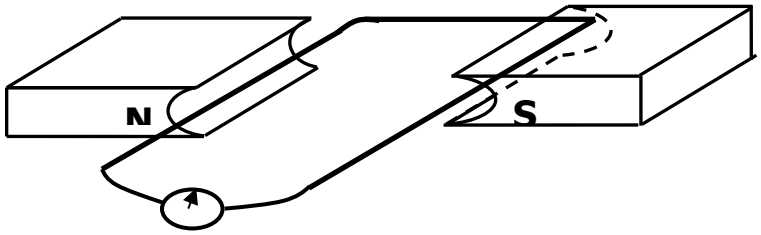
(ii) The potential difference across the 2μF capacitor. ***(2 marks)***

(c) State one application of capacitors ***(1 mark)***

13. (a) State Faraday's law of Electromagnetic induction. ***(1mark)***

(b) A single coil of wire is held between the poles of a magnet as shown in figure below. The ends of the coil are connected to a sensitive center-zero galvanometer. When the coil

is slightly rotated **clockwise** about its axis in between the magnet, the galvanometer deflects momentarily.

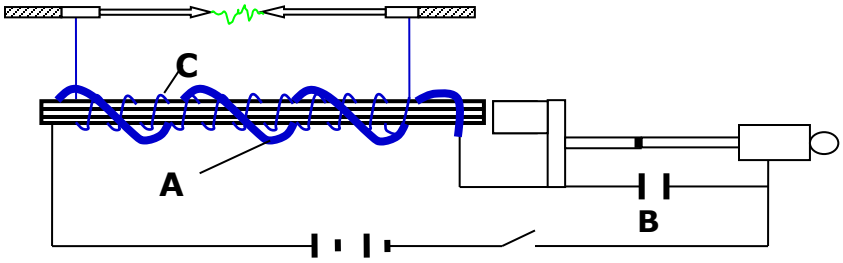


(i) On the diagram, indicate the direction of flow of current ***(1 mark)***

(ii) Explain why the galvanometer deflects ***(2marks)***

(iii) State and explain how the deflection would be made larger with the same apparatus ***(2marks)***

(c) The diagram below shows an induction coil used to produce sparks in the car ignition.



Explain how the sparking is produced when the switch is closed ***(3 marks)***

iii) State the purpose of the part labelled B in the circuit. ***(1mark)***

14. (a) Electrical energy is distributed in the gid network using thick aluminum cables as alternating current (a.c) at high voltage. Explain why:

(i) A grid system is important ***(1 mark)***

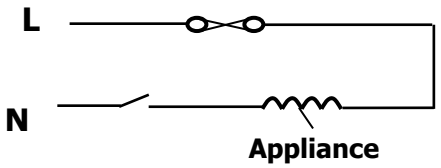
(ii) A very high voltage is necessary. ***(1mark)***

(ii) The power is transmitted as alternating (a.c.) voltage ***(1mark)***

(iii) A laminated core is used in transformers ***(1 mark)***

(b) Fig shows part of a domestic wiring system with a fault.

F



(i) Identify the fault and draw another diagram besides it with the correction. ***(2 marks)***

(ii) State the function of part labelled F ***(1 mark)***

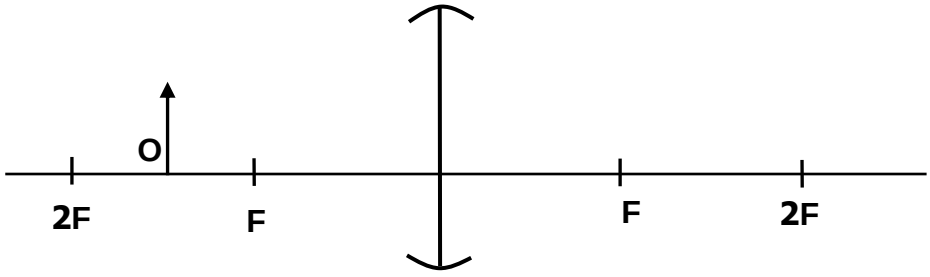
(c) The following electrical appliances were used as follows in a certain home.

- ~ A 2000W water heater for 2 hours per day,
- ~ A 75W bulb for 10 hours per day.
- ~ An 1500W electric iron for 1 hour per day.

Calculate the cost of using the following appliances in one month (30 days) if the electricity company rate is Ksh.12.50 per unit; and a *standing charge of Ksh.300 while fuel cost levy is at 90 cents per unit.* ***(4 marks)***

15. (a) Distinguish between a real and a virtual image. ***(2 marks)***

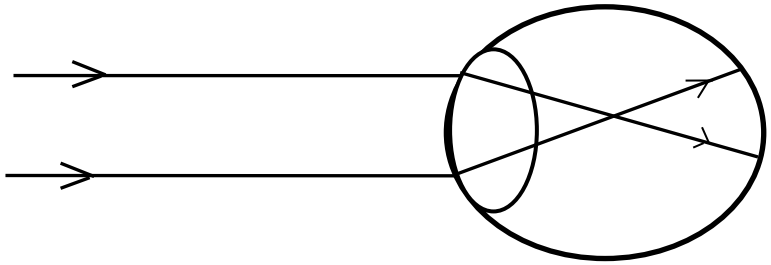
(a) Figure below shows an object **'O'** in front of a lens.



(i) By drawing appropriate rays on the same figure; show the position of the image formed ***(3marks)***

(ii) An object is placed 20cm in front of a diverging lens of focal length 10cm. determine the position of the image ***(2marks)***

(b) The figure below shows how a distant object is focused in a defective eye.



i) State the nature of the defect. ***(1mark)***

ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. ***(2marks)***

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Name …… **Admission number** ……

Candidate's Signature……**Date**……

KANGA SCHOOL TRIAL SERIES

232/2

PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

SECTION	QUESTION	CANDIDATE'S SCORE
A	1 – 14	
B	13	
	14	
	15	
	16	
	17	
	18	
TOTAL		

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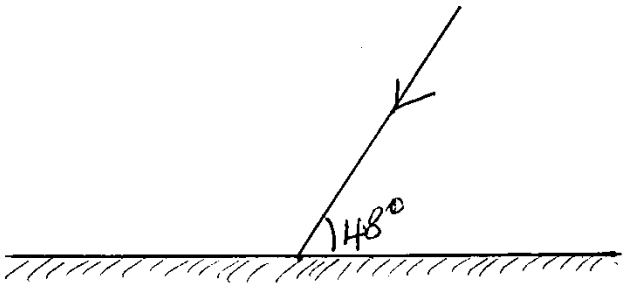
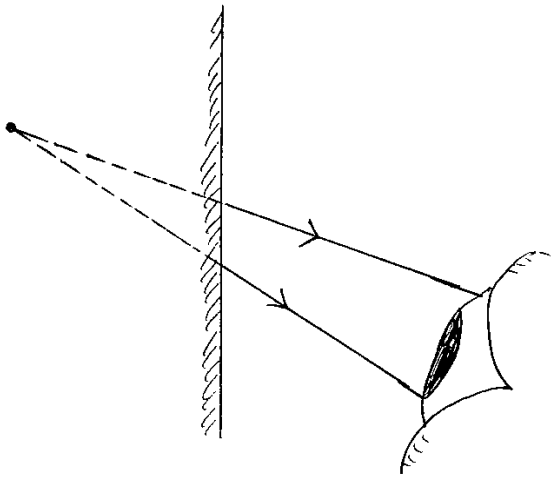
SECTION A (25 MARKS)

1. The diagram below shows a ray of light incident on a plane mirror. Determine the angle of reflection (1mk)

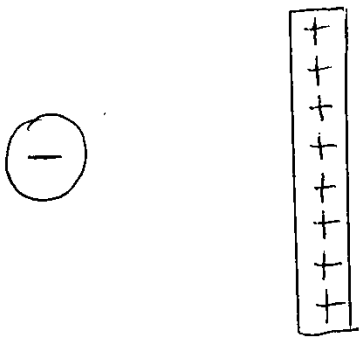


2. A pin hole camera of length 10cm is placed 0.5m away from a goal post. A sharp image of the goal post 15cm high is formed on the screen. Determine the height of the goal post. (2mks)

3. The figure below shows an image formed in a plane mirror. By drawing incident rays for the rays shown, locate the position of the object(2mks)



4. The figure below shows a negative charge near a plate carrying a positive charge. Draw the electric field pattern between them (2mks)

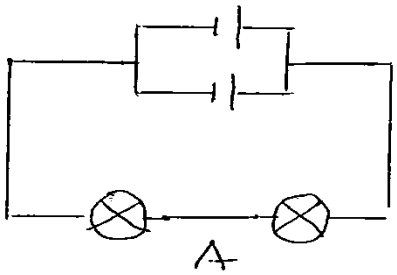


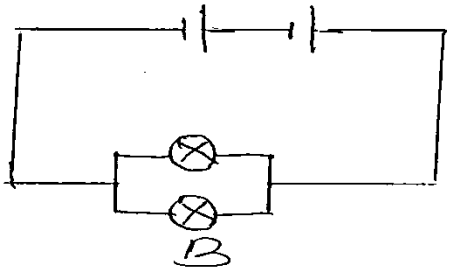
5. An electrostatic generator sets up a current of 20mA in a circuit. calculate the charge flowing through the circuit in 15 seconds (2mks)

6. State away in which polarization reduces the current in a simple cell (1mk)

7. A car accumulator can be used for long if well taken care of. Apart from recharging them regularly, state any other way of increasing its life span (1mk)

8. A form one student was investigating the brightness of bulbs in the setup of circuits below. He used identical bulbs and cells.





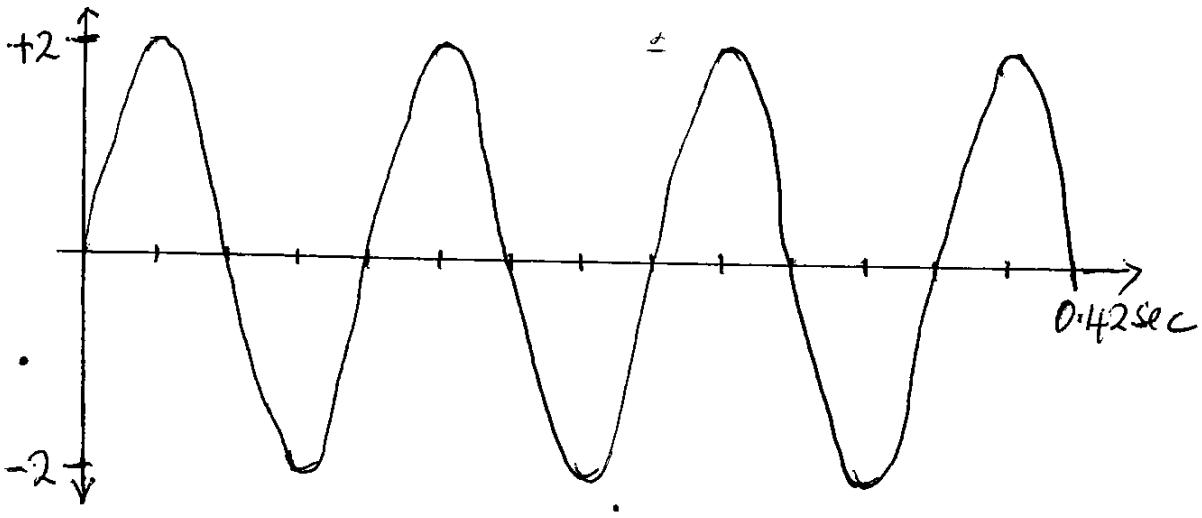
(i) State which setup had the brightest bulb (1mk)

(ii) Explain the answer in (i0 above (1mk)

9. State one factor that affect the speed of sound in air (1mk)

10. An echo sounder of a ship transmits sound waves to depth of the sea and receives the echo after 1.2 seconds. if the speed of sound in sea water is 1600n/s, determine the depth of the sea (3mks)

11. The figure below shows a transverse wave.



Calculate the frequency of the wave (2mks)

12. Sketch another wave on the same diagram (in question 11) that has double the frequency and half the amplitude and label it as m (2mks)

13. A heating element has a resistant coil of 75 ohms and it takes a current of 6A. calculate the heat developed in 2 minutes (2mks)

14. Calculate the current that a bulb rated at 100w and designed for a mains supply of 250v drawn when operating normally (2mks)

SECTION B (55 MAKS)

15. a) Define term focal plane as used in thin lenses (1 mark)

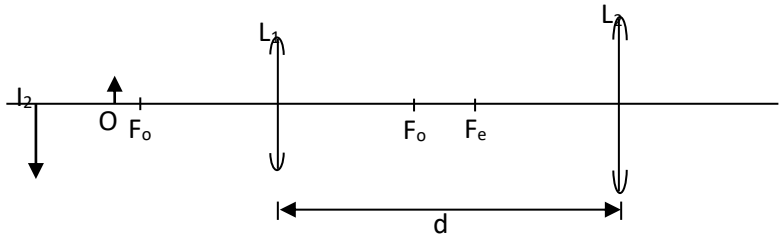
b) Give the functions of the following parts of a lens camera. (3 marks)

i. Shutter:

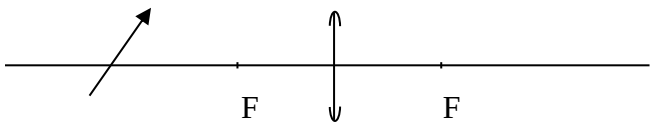
ii. Film:

iii. Diaphragm:

c) A compound microscope with objective lens L_1 of focal length 0.8cm and an eyepiece lens L_2 of focal length 2.5cm is shown in figure below. An object O is placed in front of the objective lens at a distance u_1 of 1.2cm. The system forms a final image I_2 at a distance of 10cm from L_2. Determine the distance of separation of lenses L_1 and L_2. (4 marks)

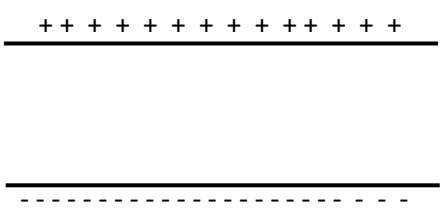


d) The figure below shows an object placed in front of a convex lens. Complete the ray diagram to show the position of the image.
(3 marks)



16. a) Define the term capacitance. (1 mark)

b) The figure below shows two charged plates close to each other



(i) Complete the diagram to show the electric field patterns between the plates (1 mark)

(ii) Without changing the area of overlap, suggest two ways of increasing the capacitance of a parallel plate capacitor. (2 marks)

c) You have been provided with **THREE** identical capacitors each of capacitance 12 μ F. State and show how you would combine them to get the following effective capacitance

(i) 36µF

(2marks)

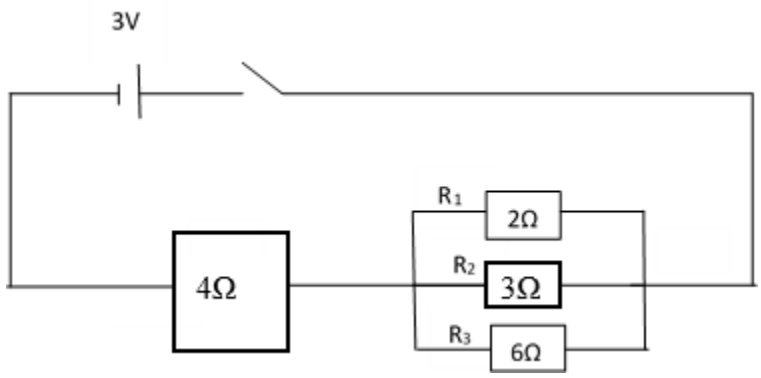
(ii) 4µF

(2marks)

(iii) 8µF

(2marks)

17. (a) Study the circuit diagram in **figure below** and answer the following question



(i) Calculate the effective resistance of the circuit. **(3 marks)**

(ii) Determine the current through the 3 □ resistor **(4 marks)**

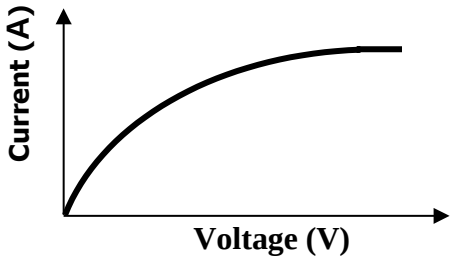
(c) b) State ohms law **(1 mark)**

(d) Eight dry cells can be arranged to produce a total e.m.f of 12v just like a car battery.

(i) Determine the e.m.f of an individual cell **(1 mark)**

(ii) Explain why it is possible to start a car with the lead acid accumulator, but not with theeight dry cells in series. **(2 marks)**

(e) For a particular bulb, a series of readings of the current through the bulb for differentpotential differences across it is taken and plotted as shown in **figure** below.

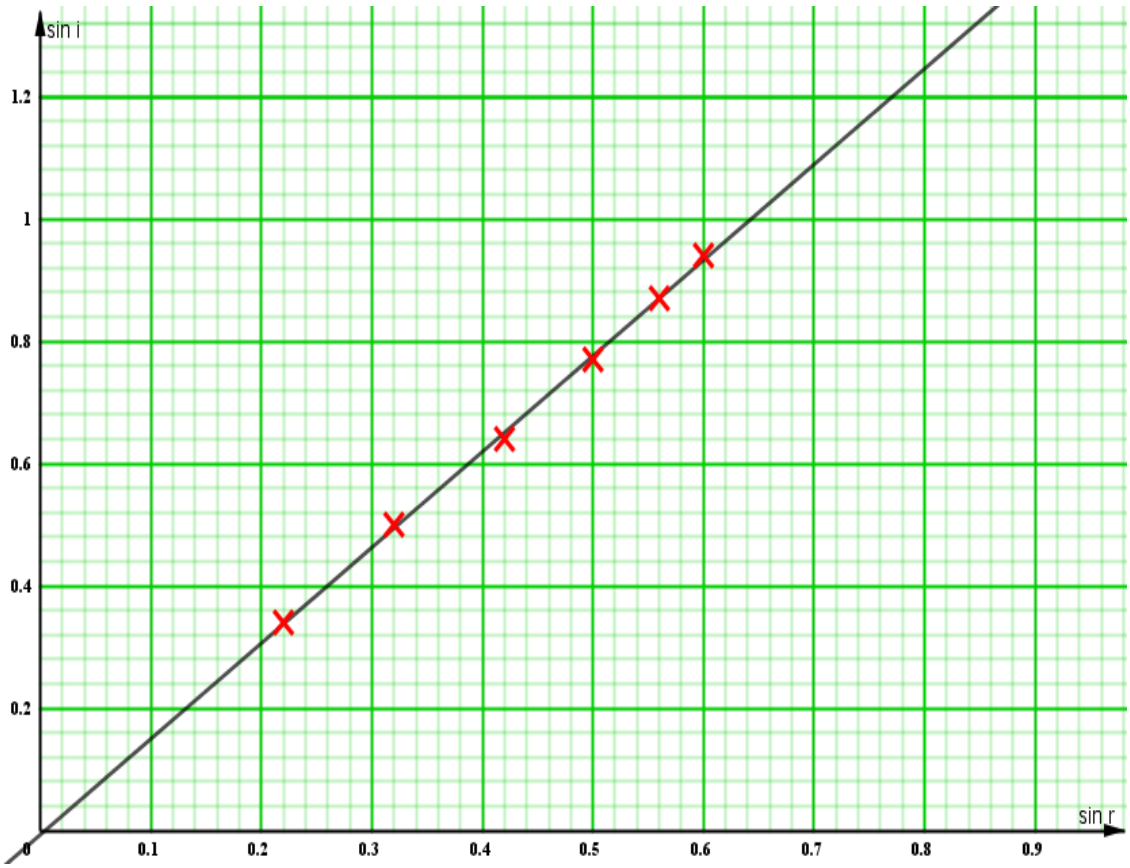


i) Draw the circuit diagram you would use for the experiment. **(1 mark)**

ii) Explain how the resistance of the bulb changes **(2 marks)**

18. (a) State two laws of refraction of light **(2 marks)**

b)A student carried out and experiment on refraction of light incident on a glassblock. She then drew the graph of sin **i** (y – axis) against sin **r** as shown in the **figure** below.

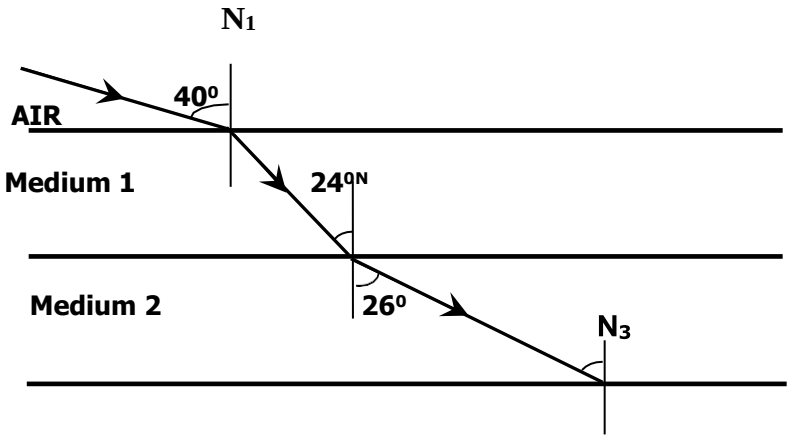


From the graph

(i) Determine the slope of the graph.(3 marks)
(ii) State what the value in b(i) represent. (1 mark)

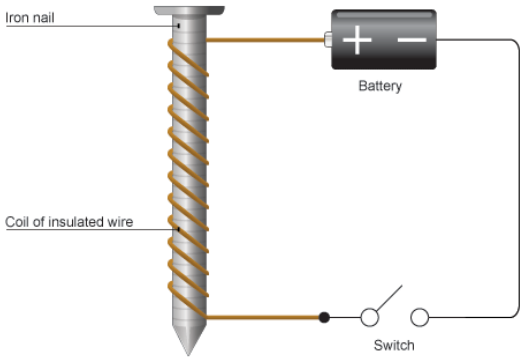
(iii)Use the results in b (i) to calculate the velocity of light in glass, given thatvelocity of light in vacuum is **3.0×10^8 m/s**.
(3 marks)

(c) A ray of light travels from air into medium 1 and 2 as shown in **figure** below



Calculate the refractive index of medium **2** relative to Medium **1 (1n2) (2 marks)**

18. (a) Study the diagram below on electromagnetic and then answer the questions after it.



(i) Give a reason for winding the wire into a coil. (1 mark)

b) Explain the difference between magnetism of electromagnets and bar magnets. (2 marks)

(iii)State ways in which electromagnet can be made stronger. (2 marks)

(b) Explain how an electric bell works. (3 marks)

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Name …… **Admission number** ……
Candidate's Signature……**Date**……

FRIENDS SCHOOL KAMUSINGA

PHYSICS
PAPER TWO
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your **name, index number** and **class** in the space provided above
- Sign and write the dates of the examinations in the spaces provide
- Attempt **All** questions in sections **A** and **B**
- All working **must** be shown clearly
- Non programmable scientific calculators may be used where necessary
- Candidates should answer all the questions in English

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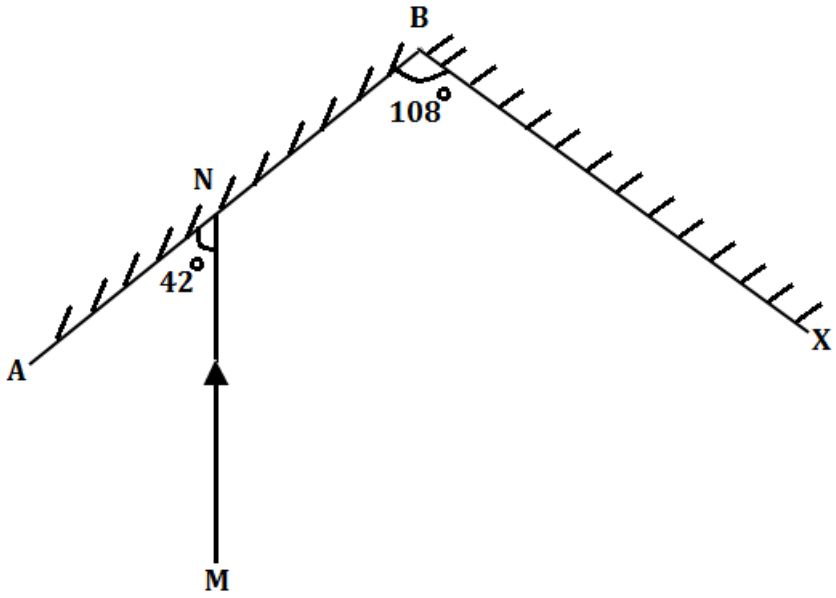
SECTION A: 25 MARKS

1. The figure below shows a ray of light MN striking the mirror AB held at an angle of 180 to the mirror BX

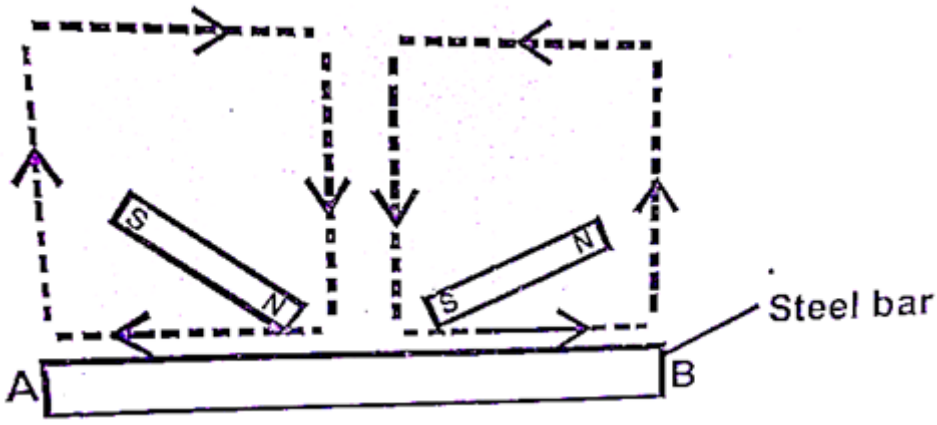


Complete the path of the ray MN and find the angle of reflection in the mirror BX (2 marks)

2(a) What is meant by the term **"topping"** as applied to a lead acid accumulator (1 mark)

(b) State one advantage of a lead-acid accumulator over a nickel-iron accumulator (1 mark)

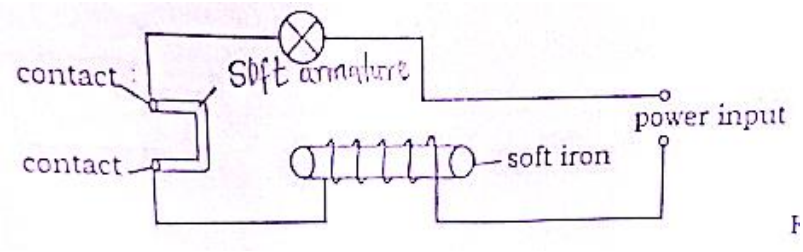
3. The figure below shows a method of magnetization used in making of a magnet



(i)Name the method shown above (1 mark)

(ii) Identify the polarities A and B of the magnet produced (1 mark)

(iii) The figure below shows a circuit breaker



Explain briefly how it works (2 marks)

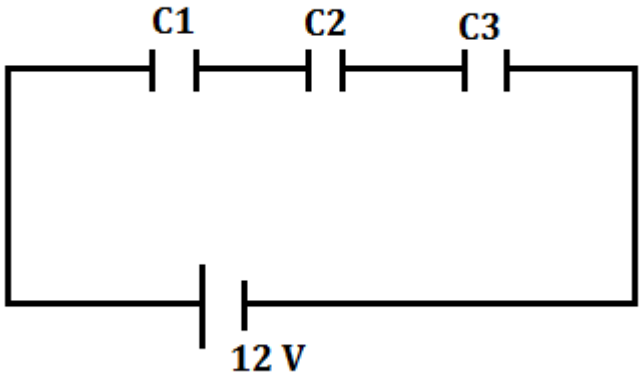
4.(a) The figure below shows region of complete electromagnetic spectrum. Name the regions A and B (2 marks)

A			**Visible light**		**B**	

(b) Calculate the wavelength of green light whose energy is 3.37×10^{-19}(h =6.63×10^{-34} J.S C=3.0×10^{8}) (3 marks)

5. (a) Distinguish between paper capacitor and electrolytic capacitor (1mark)

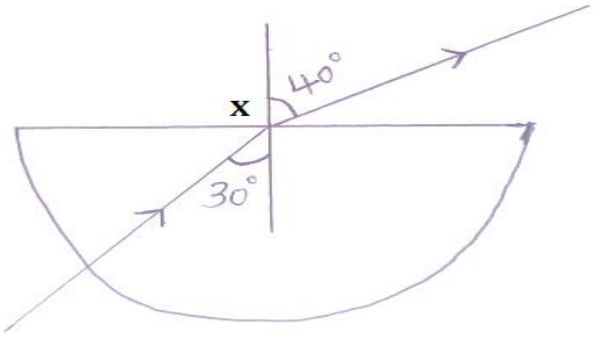
(b) The figure below shows capacitors arranged in series



Derive an expression for the effective capacitance (2 marks)

(c)Given that **C1=10.5µF, C2=2µF, C3=3µF**. Calculate the effective capacitance and hence determine the charge stored on the 3µF capacitor (3 marks)

6. The figure below shows a diagram where light strikes a semi-circular shape at X, meeting the opposite face at an angle of incidence of 30°



State and explain what happens to the ray as it moves from

(a) Air to glass at X (1 mark)

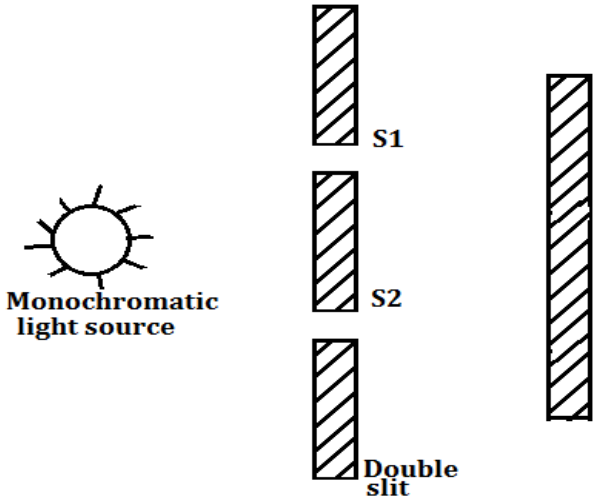
(b) Glass to air at O (1 mark)

(c) Calculate the refractive index of the block (2 marks)

(d)State two condition for the total internal reflection to occur (2 marks)

SECTION B: 55 MARKS

7. In an experiment to observe interference of light a double slit is placed close to the source



(a) State the function of the double slit (1 mark)

(b) Described what is observed on the screen (2 marks)

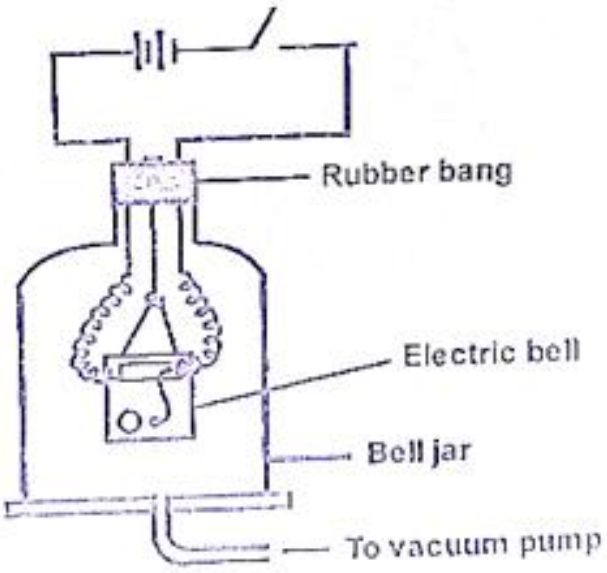
(c)State what is observed on the screen when

(i) the slit separation S1 and S2 is reduced (2 marks)

(ii) the slit separation S1 and S2 is increased (2 marks)

(iii) white light source is used in place of monochromatic light (1 mark)

(d) The diagram below shows a set-up used to demonstrate that sound is mechanical wave

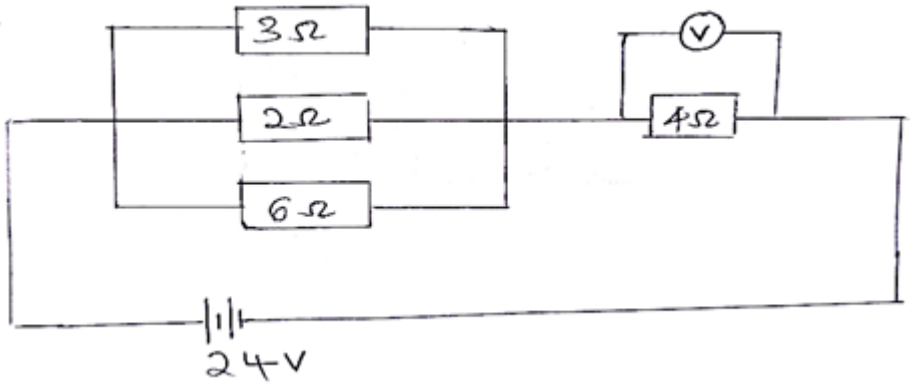


(i) State the function of the vacuum pump (1 mark)

(ii)When the switch is closed, state and explain what happens as the air is continuously drawn from the jar (3 marks)

(iii) State the reason why it is not possible to reduce the sound completely (1 mark)

8.(a) Use the figure below to answer the question that follow.



(i) Calculate the total resistance of the circuit (2 marks)

(ii) Calculate the effective current if the circuit (2 marks)

(iii) Calculate the current through the 3Ω resistor (2 marks)

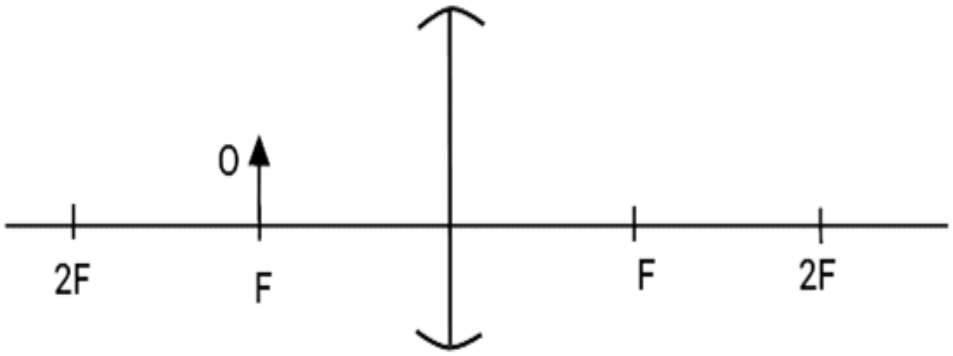
(iv) What is the voltage reading (2 marks)

(b) A wire was connected to a battery and it was found that an energy of 30J was produced when 20 coulombs of charge flowed through it in 5 seconds, calculate
(i) The pd between the ends of the wire (2 marks)

(ii) Current flowing through the wire (2 marks)

9 (a) The figure below shows an object in front of a converging lens

(i) Using ray diagrams locate the image of the object (3 marks)



(ii) Give one application of such a lens as used above (1 mark)

(iii) An object is placed 16 cm in front of a converging lens of focal length 12 cm. Find the
(a) The position of the image (2 marks)

(b) Magnification of the image (1 mark)

(b) Show that the lens magnification M of a convex lens is given by (3 marks)

$$\boldsymbol{M = \frac{V}{F} - 1}$$

(c). (i) Define the term **"accommodation:"** as applied in a human eye (2 marks)

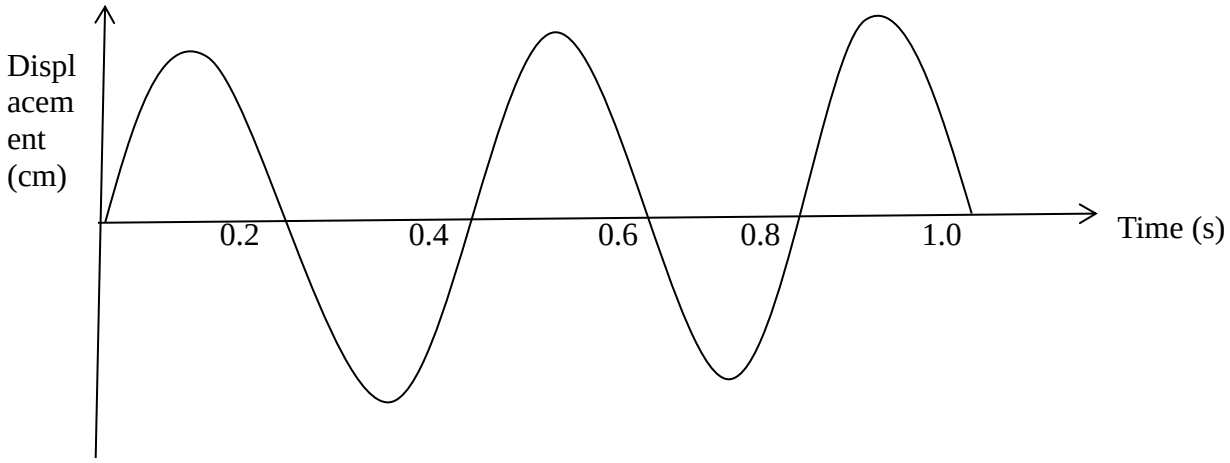
(ii). A form four student from Anestar boys high school resists sitting away from the whiteboard and scrambles for the first seat at all times

(a) What eye defect could this student be suffering from (1 mark)

(b) Draw a sketch diagram to show how the defect can be corrected (3 marks)

(c) State three similarities between an eye and a camera (3 marks)

(10) The figure below shows a displacement-time graph for a progressive wave travelling at $200cms^{-1}$



Determine:

i) The periodic time. (1mk)

ii) The frequency of the wave. (2mks)

iii) The wavelength of the wave. (3mks)

c) Two vertical cliffs are x distance apart. A mine-worker stands between the two vertical cliffs, 400m from the nearest cliff. Every time he strikes the rock once, he hears two echoes; the first one after 2.5 seconds, while the second follows 2 seconds later. From this information, calculate:

i) The speed of sound in the mine. (2mks)

ii) The value of x. (3mks)

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PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

SECTION	QUESTION	CANDIDATE'S SCORE
A	1 – 14	
B	13	
	14	
	15	
	16	
	17	
	18	
TOTAL		

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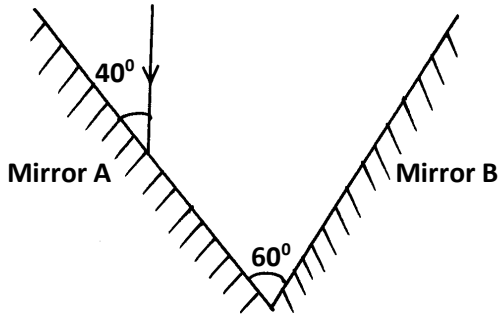
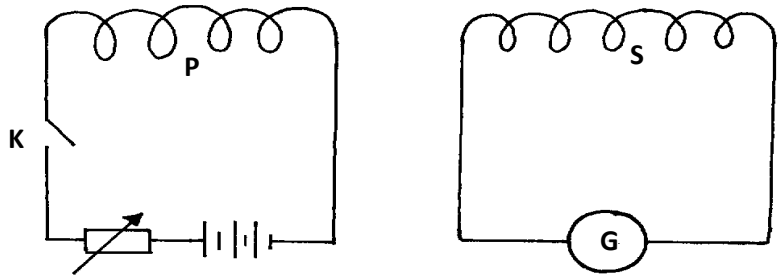
SECTION A (25 MARKS)

1. A ray is incident on two mirrors inclined at 60^0 as shown in the diagram below. (3mks)



Determine the angle of reflection on mirror **A**, hence trace the path of the ray as it leaves mirror **B.**

2. a) The coils **P** and **S** are connected as shown below. **P** is connected to a battery, rheostat and a switch **K**. **S** is connected to a galvanometer **G**.



State the behavior of the pointer on **G** in the following cases;

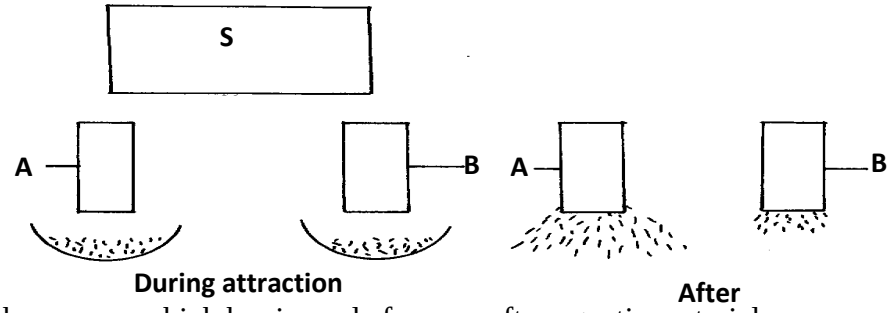
i) When **K** is switched on (closed) (1mk)

II) When **K** is opened. (1mk)

b) A transformer has 200 turns in the primary coil and 1000 turns in the secondary coil. If the transformer is 100% efficient and the current in the secondary coil is 0.15A, determine the current in the primary coil. (3mks)

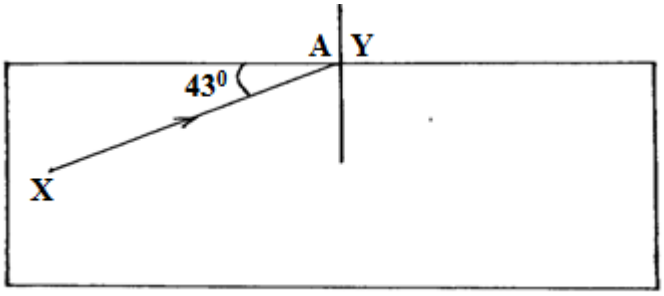
3. Figure below shows a simple experiment using a permanent magnet and two metal bars **A** and **B**

   Put close to the iron filings.



   State with a reason which bar is made from a soft magnetic material. (2mks)

4. The diagram below shows a ray of light **xy** traveling through a glass block of critical 42^0 to point **A**

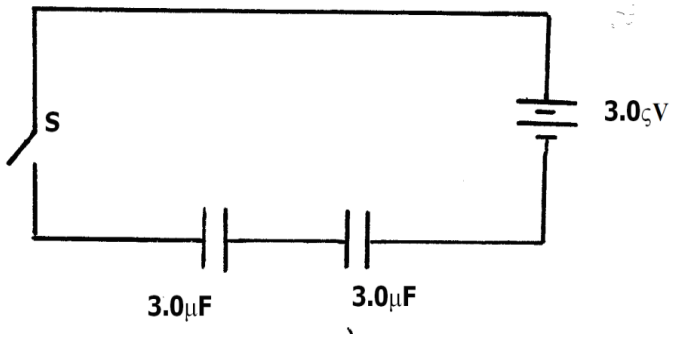


a) Calculate the refractive index of the glass block. (3mks)

b) On the same diagram, draw the path of the ray as it travels past point **A**. (1mks)

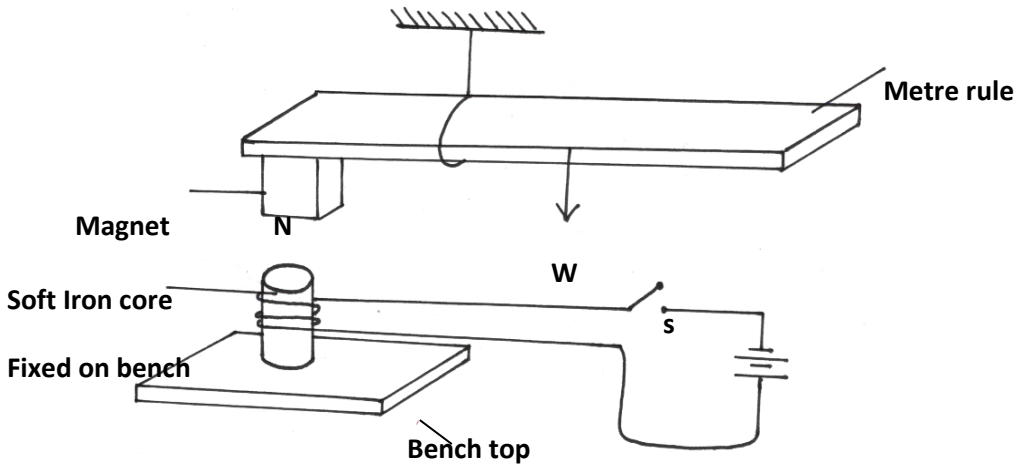
5. The photoelectrons liberated from an illuminated metal surface constitute a photoelectric current. What is the effect of decreasing the intensity of illumination on the magnitude of the photoelectric current? (1mk)

6. Figure below shows a battery of e.m.f 3.0v connected in series will two capacitors.



Determine the energy stored in the combined capacitors when the switch is closed. (3mks)

7. The figure below shows a meter rule in equilibrium with the magnet and weight W. The Soft iron core is fixed to the bench.



State and explain the effect on the meter rule when the switch S is closed (2mks)

8. State how polarization is reduced in a dry cell. (1mk)

9. State two differences between the cathode ray tube (CRT) of a T.V and the cathode ray oscilloscope (CRO). (2mks)

10. Distinguish between a P-type and a N-type extrinsic semiconductors. (2mks)

SECTION B (55 MARKS)

11. (a) Students set up a mass attached to a spring such that when it oscillates it taps on water surface in a wide shallow tank as in figure 11 below.

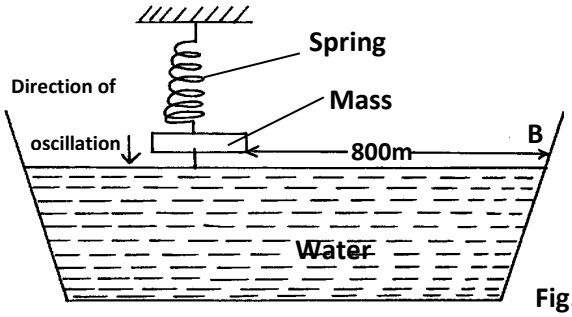


Fig. 11

The students measured time for 20 oscillations and found that the mass takes 36 seconds.

Determine:

(i) The periodic time of the mass (2mks)

(ii) The frequency of the waves produced on the water surface (2mk)

(iii) The speed of the waves if the students counted four ripples between the mass and end **B** of the tank (3mks)

(b) State any **two** factors that would increase the speed of sound in air (2mks)

(c) An echo sounder of a ship received the reflected waves from a sea bed after 0.20s.

(i) Determine the depth of the sea bed if the velocity of sound in water is 1450m/s (2mks)

(ii) When the ship above passes over a sunken reef, the echo sounder receives an echo after 0.16s. Determine the height of the sunken reef (2mks)

12.(a) An experiment was performed in the laboratory in the sequence described

I. Brought a positively charged plastic ruler near to the cap of an uncharged leaf electroscope

II. Touched the cap momentarily with the finger

III. Removed the ruler

Draw diagram to show charge distribution on the cap and leaf of the electroscope and the position of the leaf after each of the above procedure. (3mks)

(b) What will be the effect observed if the ruler is removed before removing the finger? (1mk)

……

(c) In a separate experiment, the charged plastic ruler was allowed to touch the cap of electroscope. State giving a reason whether or not there will be any difference in the results obtained in (a) above (2mks)

……

(d) In a nylon manufacturing factory heavy rubber units were put under the spinning machines which were made of metal to absorb the noise. The following effects were observed

A. Workers sometimes received electric shock when there was no leakage of charge from the main cable.

B. Small pieces of nylon stuck to the thread but whenever the room was moist this did not occur

(i) State and explain the reasons for the observation in **A and B** above. (4mks)

……

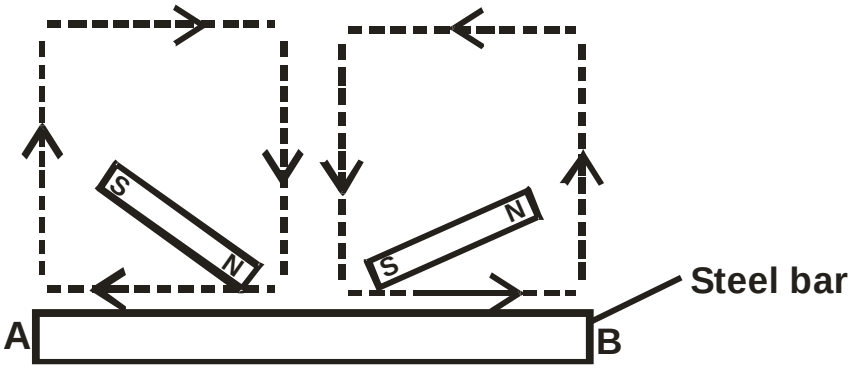
……

(ii) How would the effect in **(d) A** be corrected

(1mk)

……

13. a) The figure below shows a method of magnetization used in making magnets.



i) Name the method. (1 mark)

_____

ii) Identify the polarities A and B of the magnet produced. (2 marks)

A _____

B _____

iii) Apart from this method, state any other method used in magnetization. (1 mark)

_____

b) In demagnetization by electrical method:

i) State the type of current used. (1 mark)

_____

ii) Explain your answer in (i) above. (2 marks)

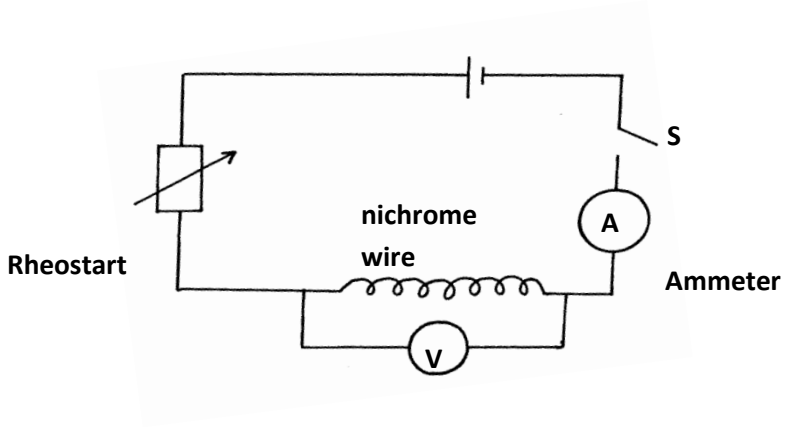
_____

a) Explain why when demagnetizing a magnet, the magnet should be held in the East-West direction. (2 marks)

_____

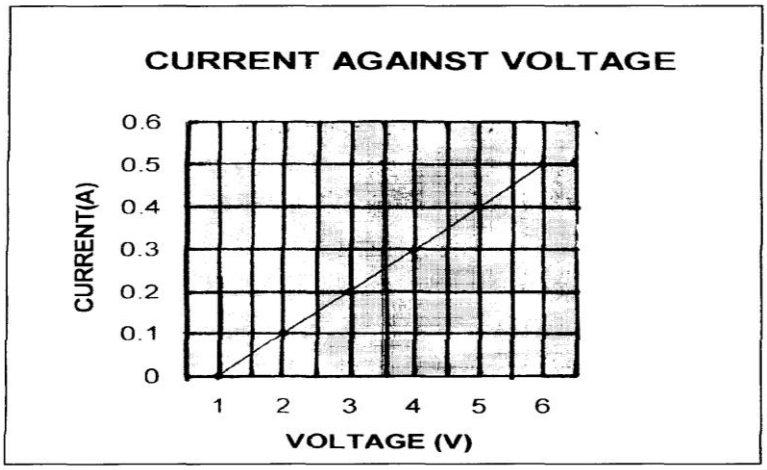
14. a) State Ohm's Law. (1mk)

b) The figure below shows a circuit that can be used to verify Ohm's law



Explain briefly how the setup can be used to verify ohm's law (3mks)

c) The graph below was obtained from experiment to determine the effective resistance of two resistors connected in parallel. If the value of one resistor is 50 ohms. determine the value of the other resistor.



From the graph, determine

i) effective resistance of the two resistors (2mk)

ii) the value of the other resistor (3mks)

15. (a) An object **O** stands on the principal axis of a concave mirror as shown in figure 9 below.

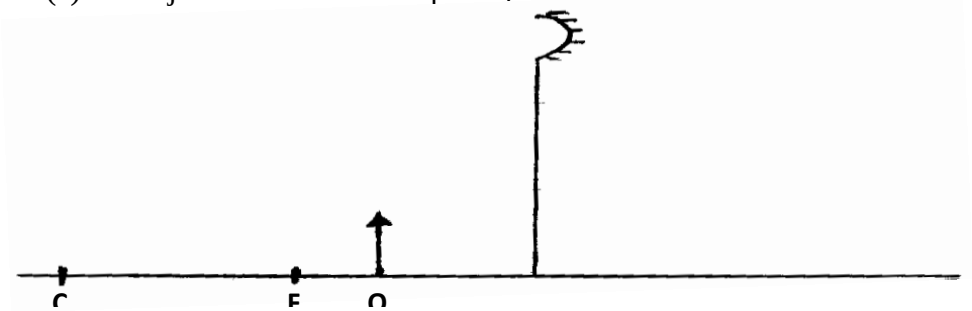
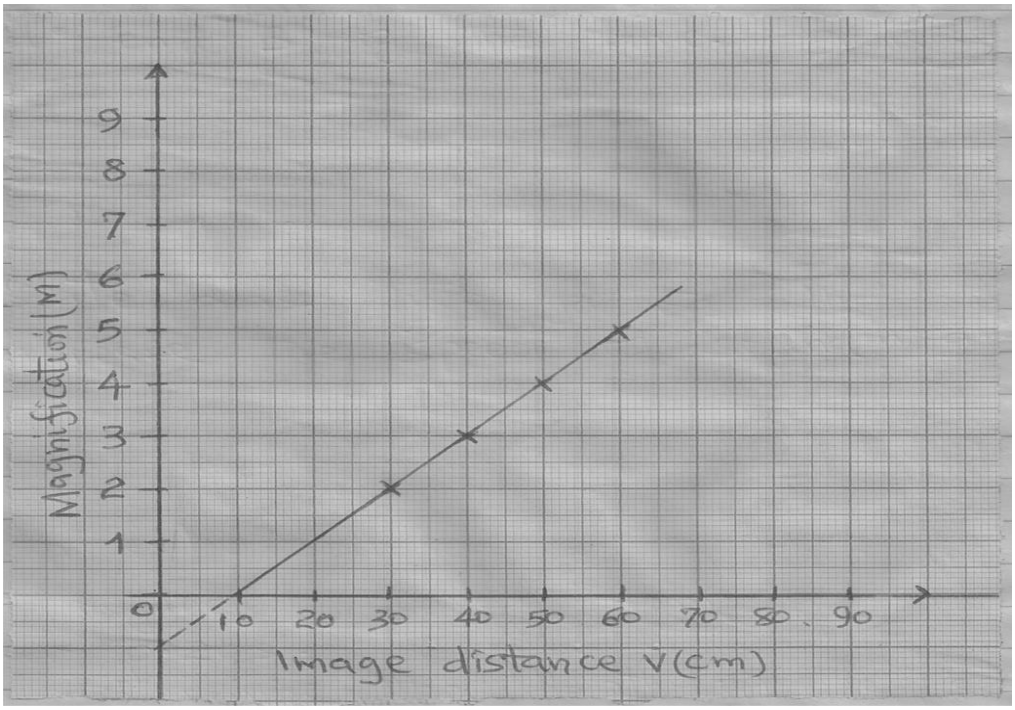


Fig. 9

(i) By drawing suitable rays, show the position of the image (3mks)

(ii) Determine the magnification of the image formed (2mks)

(b) In an experiment to determine the focal length of a converging lens, a group of form four students collected some data and used the results to plot the graph shown in figure below.



Using the graph above, determine:

(i) The object position when the image position is 45 cm (2mks)

(ii) Slope of the graph. (2mks)

(iii) The focal length of the lens given $\mathbf{m = \frac{v}{f} - 1}$

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PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

SECTION	QUESTION	CANDIDATE'S SCORE
A	1 – 12	
B	13	
	14	
	15	
	16	
	17	
	18	
TOTAL		

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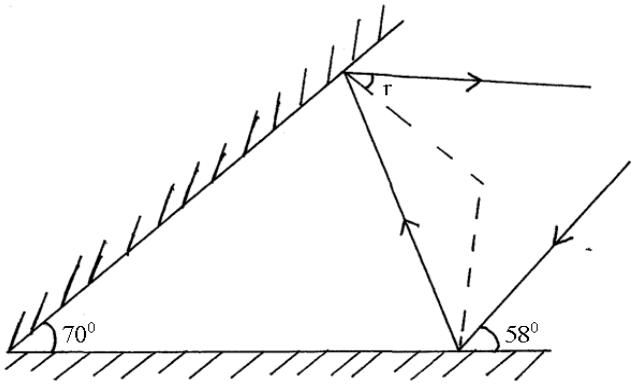
SECTION A (25 MARKS)

Answer All questions in this section in the spaces provided

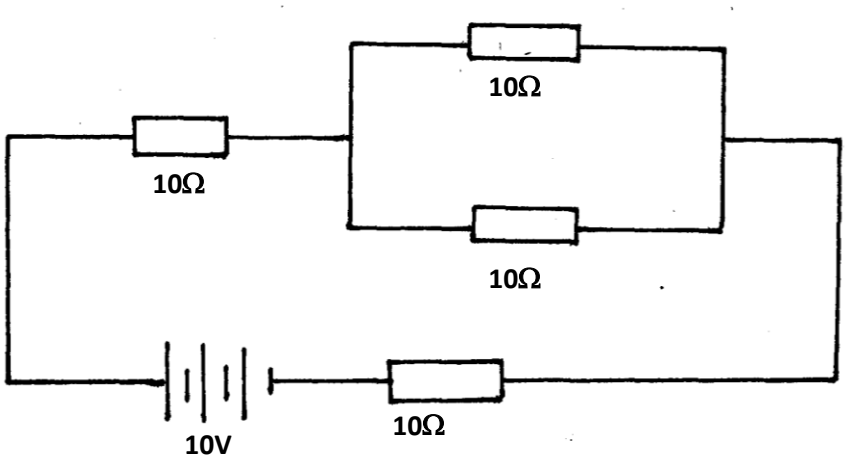
1. Briefly explain how polarization can be overcome in a simple cell (1mark)

2. Determine the angle of reflection r in the diagram below(3marks)



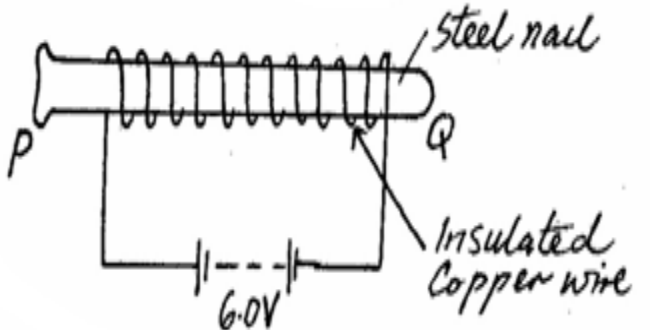
3. In a house electrical system the appliances used on a ring circuit must have their plugs with fuses. Explain how the fuse protects the appliances used.(1mark)

4. Four 10Ω resistors are connected to a 10V dc supply as shown in the diagram below.

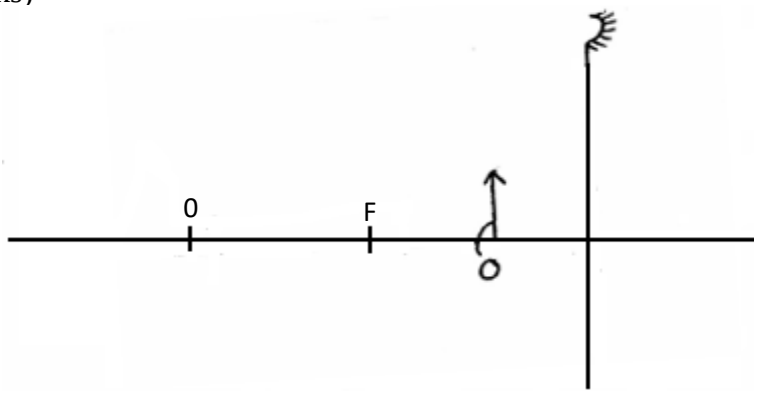


Calculate the total current flowing in the circuit. (3marks)

5. A steel is to be magnetized by electrical method as shown below. Identify the pole **P** and **Q** of the resulting magnet.(2marks)



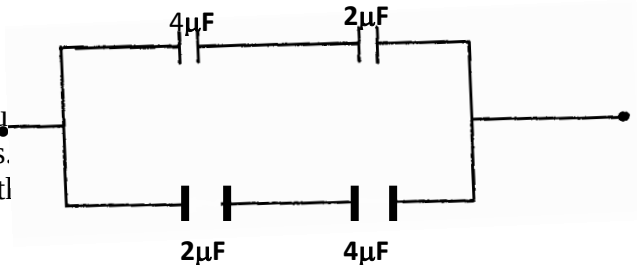
6. An object O is placed in front of a concave mirror and on the principal axis, as shown in the figure **below**. Complete the light ray diagram to locate the position of the image. (3marks)



7. Arrange the following electromagnetic waves in order of increasing frequency; Visible light: Gamma rays; Ultraviolet rays and Microwaves (l mark)

8. A charged conductor is slowly brought near the cap of a positively charged electroscope. The leaf first collapses and then diverges. Explain(2marks)

9. The circuit diagram in figure13 below shows four capacitors connected between two points **A** and **B.** Determine the capacitance across **AB**. (3mks)

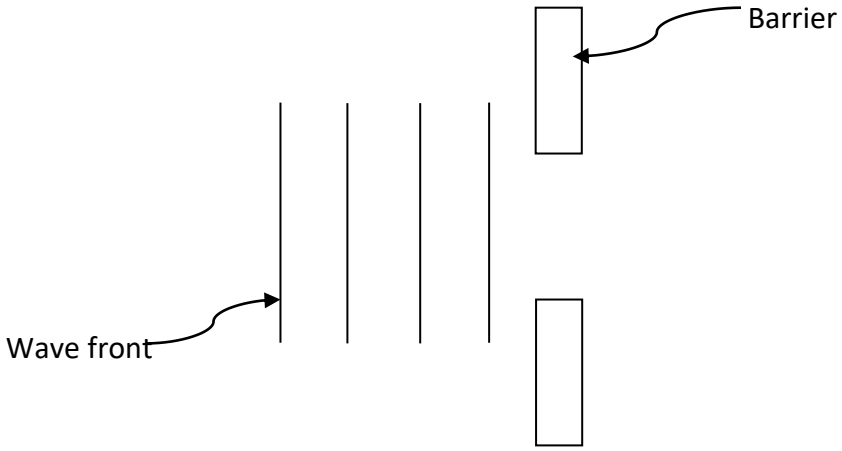


10. The figu ed within the magnetic field of two magnets. rn and the direction of force F that acts on tl

11. Explain why electric power is transmitted over long distances at high voltages.(1mark)

12. (a) Define diffraction with respect to waves.(1 mark)

(b) In the diagram below the size of the aperture at the barrier is 10cm while the distance between two consecutive wave fronts is 3cm. If the waves are moving towards the barrier, draw the wave fronts as they appear after passing through the aperture. (2 marks)



SECTION B (55 MARKS)

Answer all questions in this section in the spaces provided

13. a) State Faraday's Law of electromagnetic induction.(1mark)

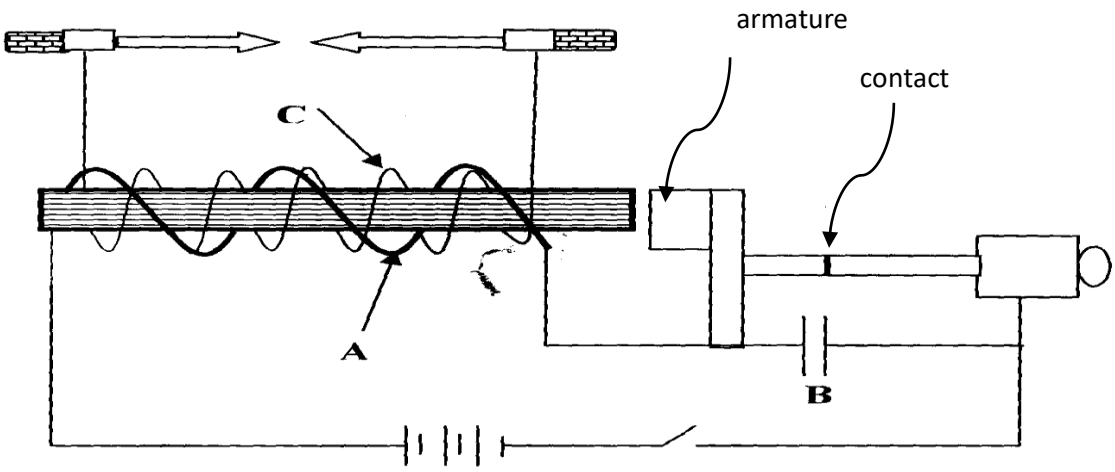
b) An Armature composed of turns of insulated copper wire wound on a soft iron core is rotated in a magnetic field to produce an e.m.f. Other than the speed of rotation, state two other factors that affect the magnitude of the generated e.m.f (2marks)

c) Briefly explain why the soft iron is laminated.(1mark)

d) A transformer with 500turns in the primary and 50 turns in the secondary is connected to 240V a.c. mains. If a 50Ω resistor is connected to the secondary coil, determine the energy dissipated by this resistor if the transformer is 100% efficient. (3marks)

e) Give one major difference between a step up transformer and step down transformer. (1 mark)

f) The diagram below shows an induction coil used in the car ignition system.



(i) Name parts labelled A and B. (2 marks)

(ii) Give the function of B. (1mark)

14. (a) (i) What is the difference between stationary and progressive waves (2marks)

(ii) State two distinctions between the way mechanical waves and electromagnetic waves are transmitted.(2marks)

(b) A student stands between two halls and 400m from the nearest hall. The halls are x metres apart. Every time the student claps, two echoes are heard by the student such that the first echo comes after 2.5 seconds while the second follows 2 seconds later. From this information calculate.

(i) The speed of sound in air. (3marks)

(ii) The value of x. (3marks)

(c) Explain the effect of temperature of air on the speed of sound. (1mark)

15. a) Define the term critical angle. (1mk)

b) The critical angle of a certain material medium is 43.2º. Determine the refractive index of the material.(2marks)

c) The following results were obtained in an experiment to determine the reactive index of as certain liquid.

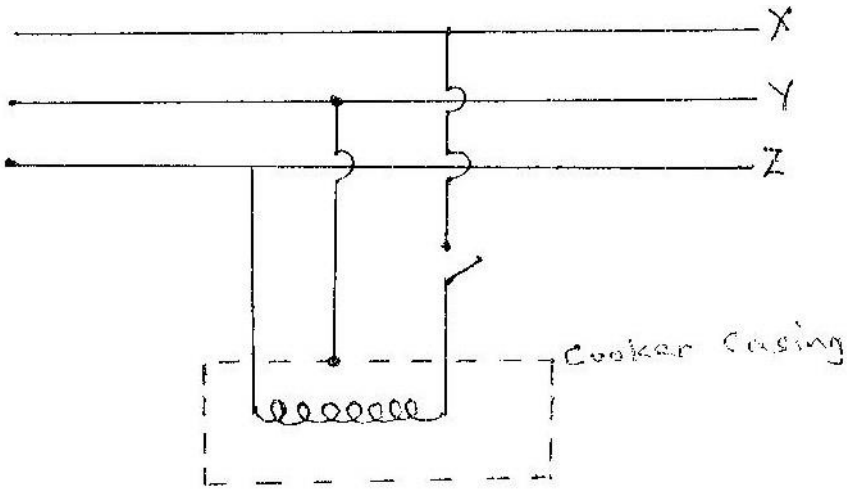
Real depth (mm)	40.5	60	80	100
Apparent depth (mm)	29.5	45	60	75.5

(i) Plot a graph of apparent depth against the real depth.(4marks)
(i) From the graph, determine the refractive index of the liquid.(2mks)
(ii) Identify the liquid. (1mk)

d) Give two conditions necessary for total internal reflection to occur. (2marks)

16. a) Differentiate between electromotive force (e.m.f) and potential difference(2marks)

b) The figure shows the electric wiring of an electric cooker X, Y and Z are main wires.



Giving a reason, identify X and Y. (2 marks)

c) A student has a large number of 240V, 60W coloured bulbs he wishes to use for decorations so that the bulbs operate normally.

(i). How many bulbs can be connected to a 240V supply through a 5A fuse (2 marks)

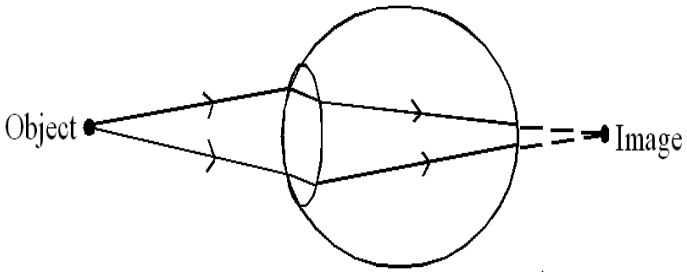
(ii). If electric energy cost Kshs. 6.75 per unit, what will be the cost of running the above circuit for 5 hours a night for 20 nights?(2 marks)

e) A cell drives a current of 5A through a 1.6Ω resistor. When connected to a 2.8Ω resistor, the current that flows in 3.2A. Find E and r for the cell. (3marks)

b) Calculate the length of a nichrome resistance wire of cross-sectional area $7 \times 10^{-8} m^2$ required to make a resistor of 10 ohms. (Take resistivity of nichrome = $1.10 \times 10^{-6} \Omega m$). (3 marks)

17. a) Define the term accommodation as used in lenses.(1mk)

b) (i) Identify the defect.(1mk)



(iii) State how the defect can be corrected (1mark)

c) Give one difference between the eye and the camera.(1mark)

d) An object of height 10cm stands before a diverging lens of focal length 30cm and at a distance of 20cm from the lens. Determine the image distance and state two characteristics of the image formed. (3 marks)

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STAREHE GIRLS' CENTRE MOCK EXAMINATION

232/2
PHYSICS
PAPER 2
2 HRS

INSTRUCTIONS TO CANDIDATES

a) This paper consists of two sections; A and B
b) Answer all questions in the spaces provided below each question
c) All working must be clearly shown
d) Mathematical tables and non-programmable electronic calculators may be used

FOR EXAMINER'S USE ONLY

SECTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	25	
B	55	
TOTAL	80	

This paper consists of 11 printed pages.
Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing

SECTION A (25 MARKS)

Answer ALL question in this section in the space provided below each.

1. Light passes through an opening of width 2 cm. Explain why light is not diffracted in the same way as sound at a similar size opening. (2 marks)

……

……

……

2. The table 1 below shows the arrangement of electromagnetic waves arranged in order of decreasing wavelength.

Table 1

A	B	C	D	E	F

If F represents the wave having the shortest wavelength among the e.m radiations, identify the wave represented by letter C and state one use of the wave. (2 marks)

……

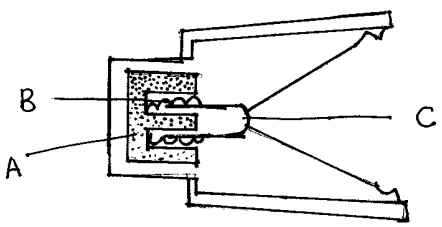
……

3. The fundamental frequency of a note produced by a vibrating string is 250 HZ. Determine the frequency of the note produced when the string is vibrating at 3rd overtone frequency. (2 marks)

4. The refractive index of medium 1 is 1.62 and of medium 2 is 2.46. Determine the refractive index of medium 2 with respect to medium 1. (2 marks)

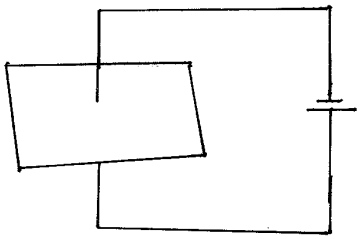
5. The figure 1 below shows a diagram of a microphone. Label the parts A, B and C. (3marks)

Figure 1



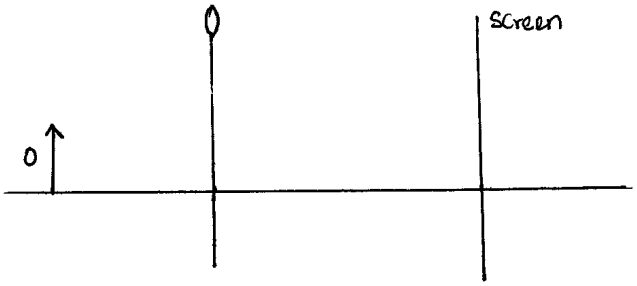
6. The figure 2 below shows a cell connected to a copper wire, which passes vertically through a horizontal card. When the current is switched on magnetic field lines are produced round the wire. On the diagram, show the direction of magnetic field lines due to the current. (2 marks)

Figure 2



7. The figure 3 below (drawn to scale) shows a lens L_1 placed 30 cm from an object O. The image is formed on the screen S, 50 cm from the lens. On the same figure draw the appropriate rays to determine the focal length of the lens. (3 marks)

Figure 3



8. State why mains electricity for long distances is transmitted at high voltages. (1 mark)

……

9. A student wishes to use a 5.5Ω resistor into a circuit but has only 2Ω resistors. She uses a combination of eight 2Ω resistors. Draw a circuit diagram to show how she would arrange them. (2 marks)

10. The circuits in Figure 4(a) and 4(b) below show short circuits. In both the fuse has blown. Whereas (a) is now safe (b) is still dangerous even though the lamp is out. Explain (2 marks)

Figure 4(a)

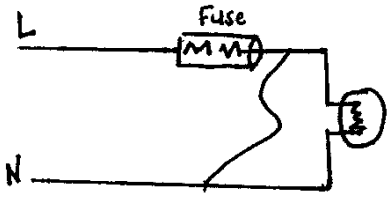
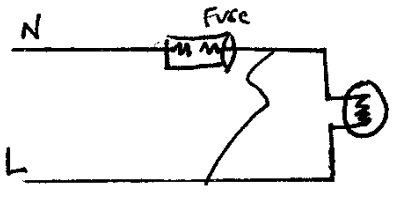


Figure 4(b)



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11. State three properties of cathode rays. (3marks)

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12. State one application of total internal reflection. (1mark)

……

SECTION B (55 MARKS)

Answer ALL questions in this section

13.(a) An angle of reflection of a reflected ray from a plane mirror is 20^0. If the mirror is rotated through an angle of 25^0, calculate the angle between the incident ray and the new reflected ray. (2 marks)

(b) A concave spherical mirror has a focal length of 10 cm. Calculate the distance where an object must be placed in order to produce a real magnified image three times the size of the object. (3 marks)

(c) An object is placed 20 cm in front of
 i) a plane mirror
 ii) a concave mirror
State two differences between the images formed in each case. (2 marks)

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(d) A convex mirror of focal length 18 cm produces an image on its axis, 6 cm away from the mirror. Calculate the position of the object. (2 marks)

(e) State one application of each of the following. (2 marks)

i) convex mirror……..

ii) parabolic mirror……..

14. (a) When Moses rubbed a glass rod on a duster and then held it near a few pieces of paper, it did not move them or pick them up. He concluded that there was no transfer of electric charge between the duster and the brass rod. He was wrong.
Give a reason why he was wrong. (1 mark)

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(b) Define capacitance (1 mark)

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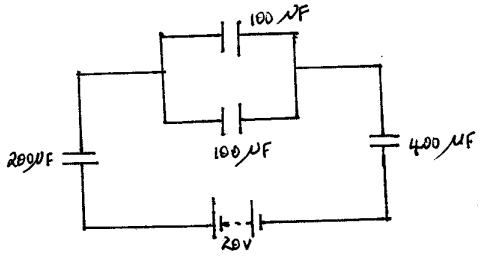
(c) The Figure 5 below shows a combination of capacitors across a power supply

Figure 5



Determine the energy stored in the 200μF capacitor. (3 marks)

(d) State two applications of capacitors. (2 marks)

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(e) A metal sphere on an insulating stand has a positive charge of 12 units. It is brought into contact with an identical metal sphere and then separated. With the aid of diagrams, show the charge distribution on the two spheres. (2 marks)

(f) State two ways of increasing the capacitance of a capacitor. (2 marks)

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15. (a) What is meant by threshold wavelength? (1 mark)

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(b) How does intensity of radiation incident on a metal surface affect the photoelectrons emitted. (1 mark)

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(c) In an experiment using a photocell, light of varying frequency but constant intensity was made to strike a metal surface. The maximum kinetic energy of the photoelectrons for each frequency, f, was measured. The values obtained are shown in table 2 below

Table 2

Maximum K.E (X 10^{-19})	2.8	5.4	7.4	9.0	10.0	11.0
Frequency (X 10^{15}) HZ	1.5	1.9	2.2	2.42	2.57	2.75

i) Plot a graph of maximum K.E against frequency. (5 marks)

ii) From the graph determine the values of Planck's constant and the work function of the metal surface.

I) Planks constant (3 marks)

II) Work function (3 marks)

16.(a) A source of beta radiation is held near a GM tube which is connected to a ratemeter. The table 3 below shows how the count-rate recorded by the ratemeter varies with time.

Table 3

Time(minutes)	0	5	10	15	20
Count-rate(counts per second)	1660	1100	750	510	350
Actual count-rate per second					

If the count-rate due to background radiation is 6000 counts per minute, find the half-life of the source by plotting a graph on the graph paper provided. (6 marks)

(b) A nucleus of the radioactive isotope ${}^{24}_{11}Na$ emits a radiation when it decays to a nucleus of the element Mg.

i) Complete the equation representing this event: ${}^{24}_{11}Na \rightarrow {}^{-}_{12}Mg +$ (2 marks)

ii) How many neutrons are there in an atom of Mg above? (1mark)

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(c) State two uses of radioactivity in medicine. (2 marks)

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17. (a) Distinguish between intrinsic and extrinsic semiconductors. (2 marks)

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(b) The Figure 6 below shows a bridge rectifier circuit using diodes.

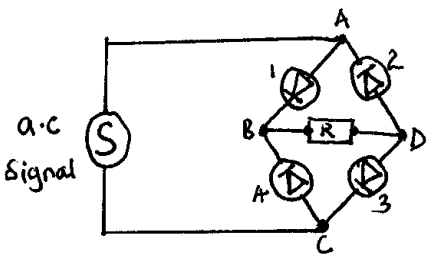


Figure 6

Draw the trace of the signals obtained on a CRO when connected across AC and BD. (2 marks)

(c) The Figures 7(a) and (b) below show lamps L_1 and L_2. State which lamp lights up and explain. (2 marks)

Figure 7(a)

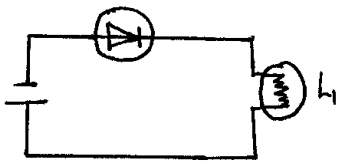
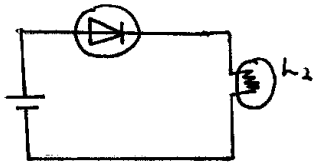


Figure 7(b)



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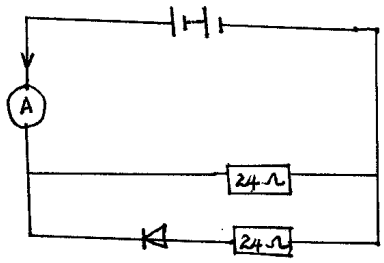
(d) Two identical resistors and a diode are connected as shown in the circuit in Figure 8 below.

Figure 8



i) What can be said about the resistance of the diode when it is connected as shown? (1 mark)

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ii) Show by calculation, the reading on the ammeter A. (2 marks)

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ALLIANCE BOYS HIGH SCHOOL

232/2

PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 12	25	
B	13	13	
	14	07	
	15	11	
	16	13	
	17	11	
TOTAL		80	

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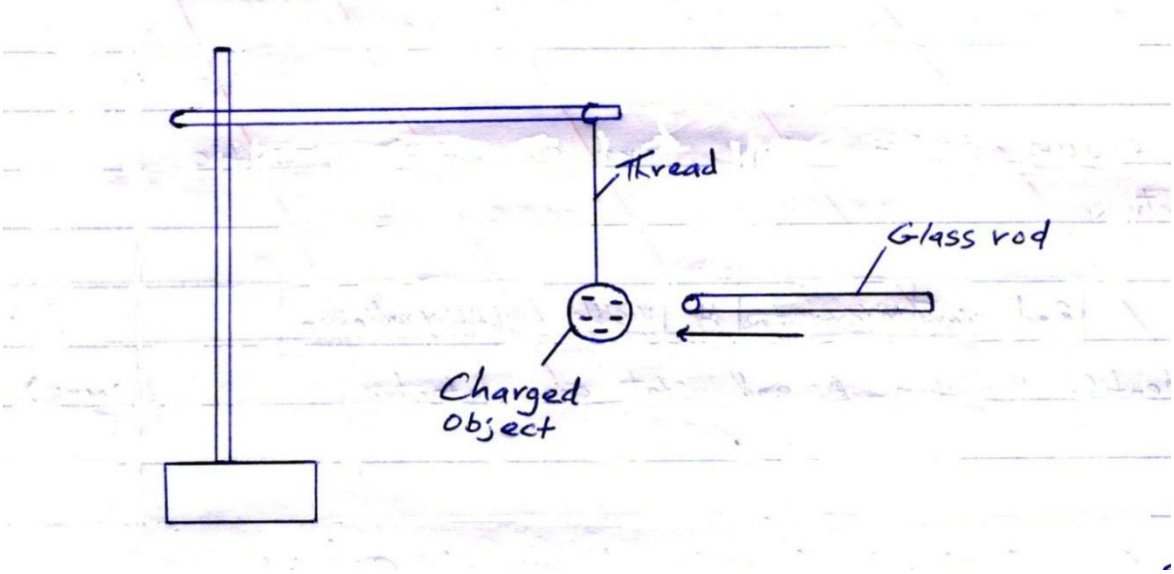
SECTION A – 25MARKS

1. On the diagrams below, show how a convex mirror gives a wider field of view than a plane mirror.
(2 marks)

2. Figure 1 below shows a negatively charged object suspended using a thread. A glass rod was rubbed using a wooden cloth and then brought closer to the object.



State the observation made when a rubbed glass rod is brought closer to the object. (1 mark)
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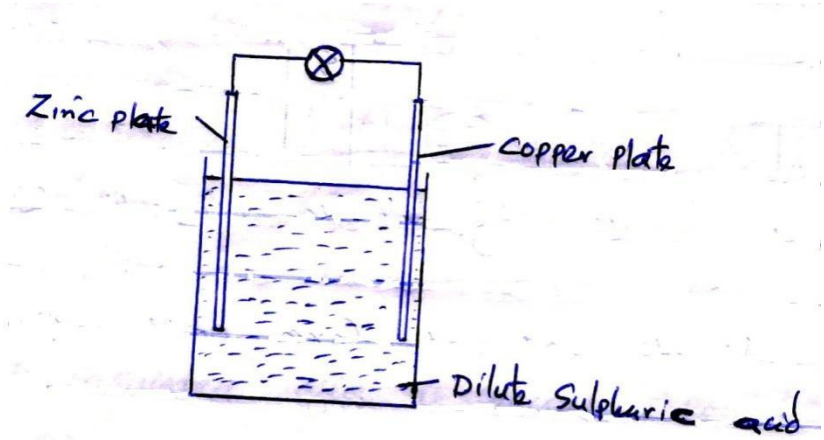
3. Figure 6 below shows a simple cell.



a) On the same diagram, indicate the direction of current. (1 mark)

b) It is observed that the bulb goes off after a short time. Explain this observation.
(1 mark)

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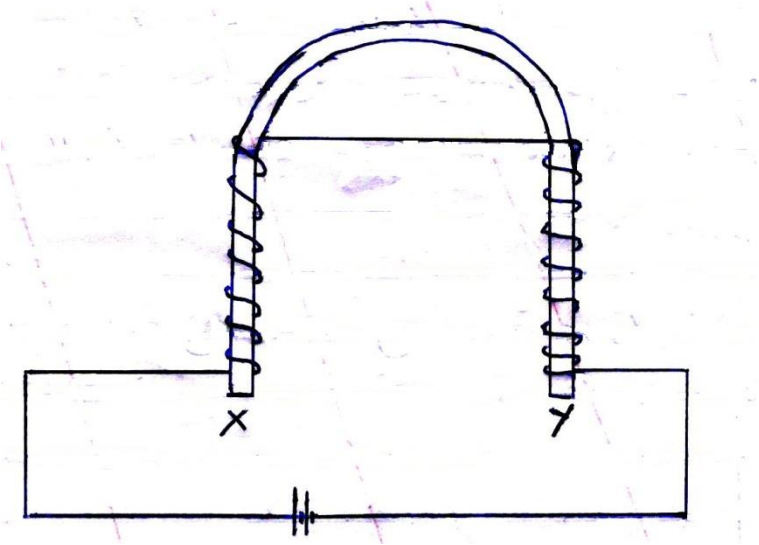
4. A coil of insulated wire is wound around a U-shaped soft iron core XY and connected to a battery as shown in the figure 3 below.



a) On the same diagram, indicate the direction of current in the coil. (1 mark)

b) State the polarity of end X (1 mark)

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5. A soldier standing between 2 cliffs fires a gun. He hears the first echo after 2.16s and the next after 4.75s. Determine the distance between the two cliffs. (Take speed of sound as 30m/s)
(3 marks)

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6. (i) Arrange the following waves in order of decreasing wavelength; x-rays, infrared, microwaves and visible light. (1 mark)

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(ii) State **one** application of visible light. (1 mark)

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7. An electric bulb is rated 40W, 240v, what is the resistance of the filament. (2 marks)

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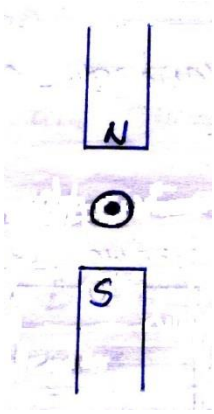
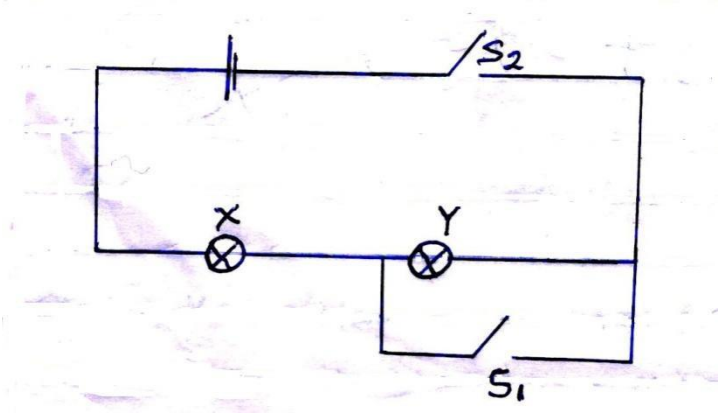
8. The figure 4 below shows a current carrying conductor placed perpendicularly between the poles of a magnet.



(i) Show on the diagram; the magnetic field pattern. (1 mark)

(ii) The direction of net force on the conductor. (1 mark)

9. Study the circuit shown below.



State and explain what happens to the identical lamps X and Y in the circuit, when:

(i) Switch S_2 only is closed. (2 marks)

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(ii) Switches S_1 and S_2 are closed. (2 marks)

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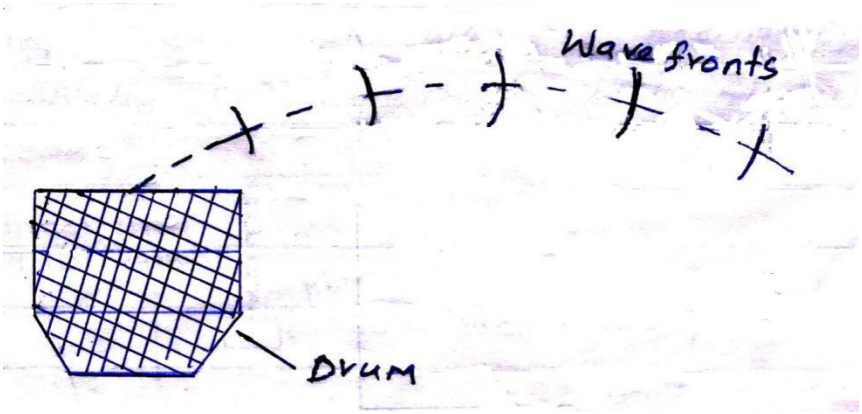
10. Figure 5 below shows sound waves emitted by a drum struck by a stone. The sound waves are transmitted through air.



Explain why the wave fronts are directed towards the ground. (2 marks)

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11. State one advantage of using optical fibre in communication. (1 mark)

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12. A cell supplies a current of 0.6A through two 2Ω resistors connected in parallel. When the resistors are connected in series, the current is 1.8A. Calculate the internal resistance of the cell. (2 marks)

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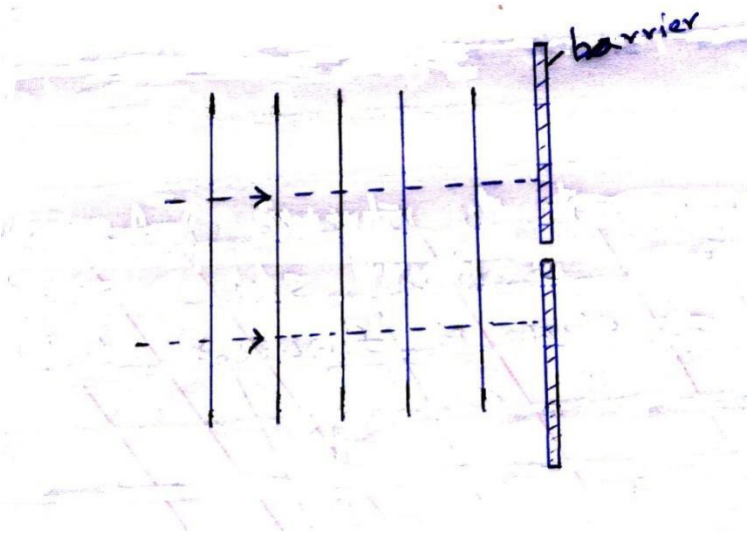
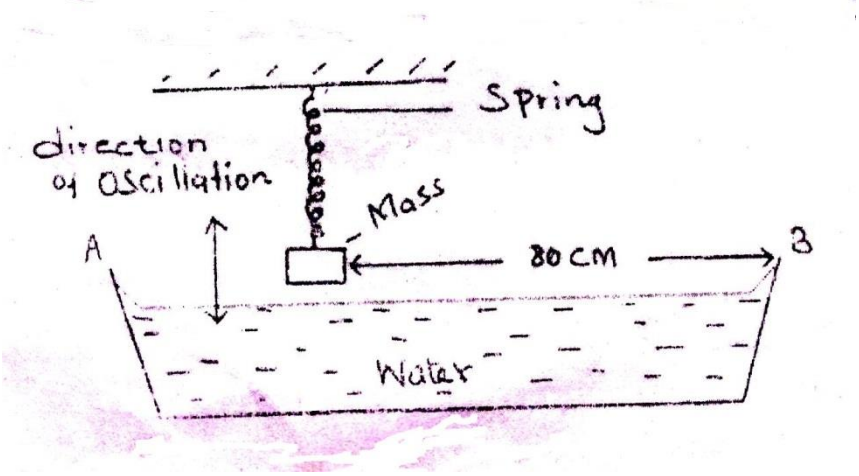
SECTION B (55 MARKS)

13. (a) Figure 7 below shows a series of wave fronts one wavelength apart approaching a gap between two barriers in a ripple tank.



Show on the figure what happens as the waves pass the gap. (1 mark)

(b) A student set up a mass attached to a spring such that when it oscillates, it taps on the water surface in a wide shallow tank.



The student measured time for 20 oscillations and found that the mass takes 36seconds. Given that the student counted four ripples between the mass and end B of the tank;

I. Determine,

(i) The frequency of the water waves. (2 marks)

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(ii) The speed of the waves. (3 marks)

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II. What would happen to the waves produced if the water is made shallower? (1 mark)

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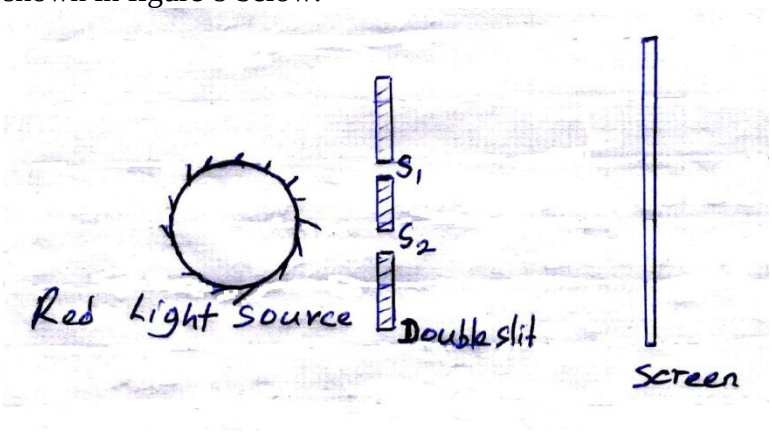
(c) In the experiment to observe interference of light waves, a double slit is placed close to the source as shown in figure 8 below.



(i) State the function of the double slit (1 mark)

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(ii) State and explain what is observed on the screen (3 marks)

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(iii)State what is observed on the screen when:

I. The slit separation S_1S_2 is reduced. (1 mark)

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II. Violet light source is used in place of red light source. (1 mark)

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14. (a) State the conditions to be satisfied for total internal reflection to occur. (2 marks)

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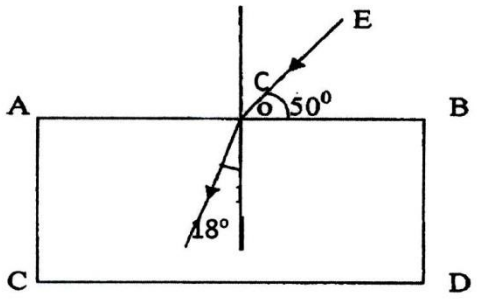
(b) A ray of light traveling in the direction EO in air enters a rectangular block as shown in the diagram. The resulting angle of refraction is 18^0.



Find:

(i) The refraction index of the block. (2 marks)

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(ii) The critical angle ***c*** of the block. (3 marks)

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15. (a) State Ohm's law. (1 mark)

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(b) A starter coil has a current of 6A passing through it. If the p.d across it is 12V, determine the resistance of the starter coil. (3 marks)

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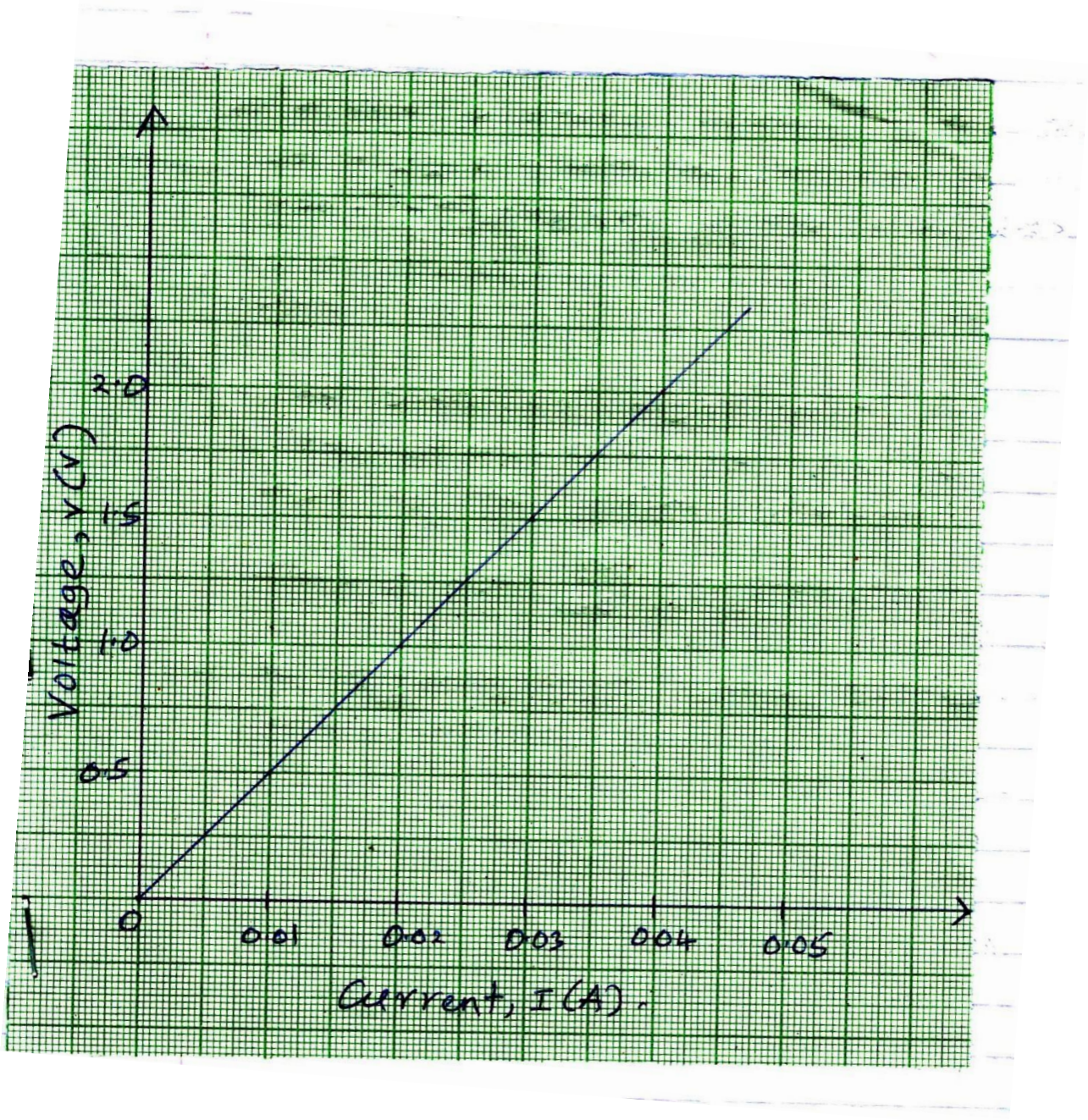
(c) The graph below shows the voltage – current relationship for a conductor.



(i) Determine the resistance of the conductor. (3 marks)

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(ii) State with reasons whether the conductor obeys Ohm's law. (2 marks)

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(d) State two factors that determine the resistance of a conductor. (2 marks)

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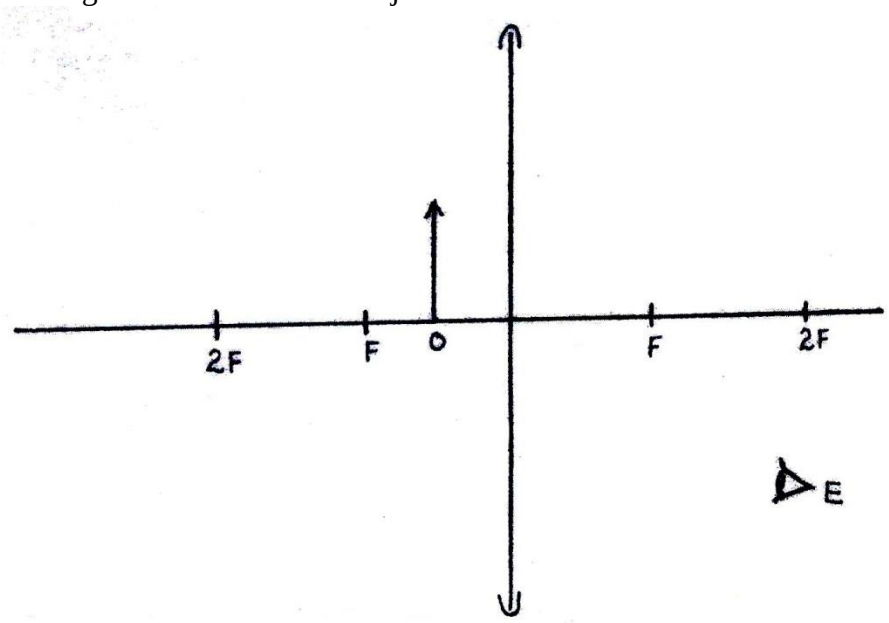
16. (a) The figure below shows an object in front of a lens.



(i) Using rays, locate the image as seen by observer E. (2 marks)

(ii) Give one application of such lens as used above. (1 mark)

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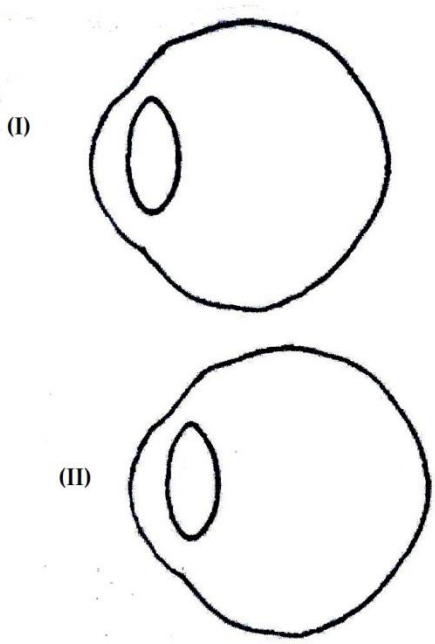
(b) Figure I and II show diagrams of the human eye.



(i) In figure (I), sketch a ray diagram showing long sightedness. (1 mark)

(ii) In figure (II), sketch a ray diagram showing how lens is used to correct long sightedness. (2 marks)

(c) An object of height 10.5cm stands before a converging lens of focal length 10cm and a distance of 20cm from the lens. Determine;

(i) Image distance. (3 marks)

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(ii) Magnification (2 marks)

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(iii)Height of the image. (2 marks)

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17. (a) Define capacitance of a capacitor. (1 mark)

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(b) State two factors affecting capacitance of parallel plate capacitor. (2 marks)

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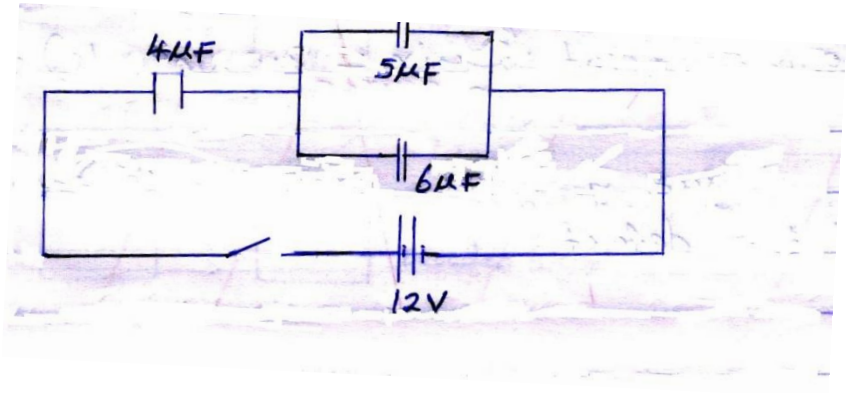
(c) The diagram shows 3 capacitors 4μF, 5μF and 6μF connected to a 12V d.c supply.



Determine;

(i) The effective capacitance (3 marks)

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(ii) The charge stored in the 4μF capacitor. (2 marks)

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(iii)The p.d across 5μF capacitor. (3 marks)

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Candidate's Signature……**Date**……

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PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

FOR EXAMINER'S USE ONLY

For Examiners' Use Only

Section	Question	Maximum Score	Candidate's Score
A	1-14	25	
B	15	13	
	16	14	
	17	11	
	18	13	
	19	8	
Total Score		80	

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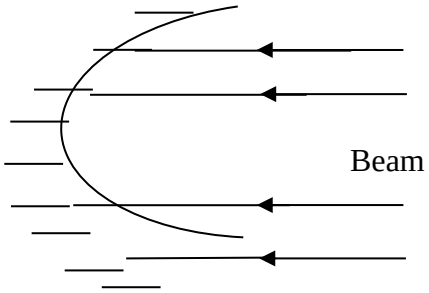
SECTION A (25marks)

1. The figure below shows a beam of light incident of a parabolic reflector.



Complete the diagram to show the path of the rays after reflection. (1mark)

2. When a candle flame is brought near the top cap of a charged electroscope, the electroscope discharges. Explain this observation. (2marks)

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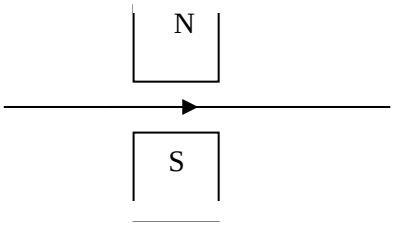
3. The figure below shows a horizontal conductor in a magnetic field parallel to the plane of the paper.

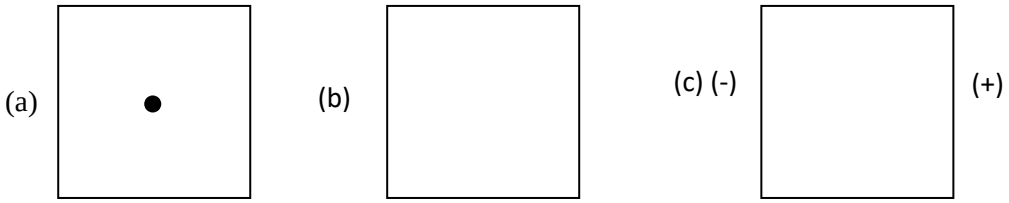


State the direction in which the wire may be moved so that the induced current is in the direction shown by the arrow. (1mark)

……

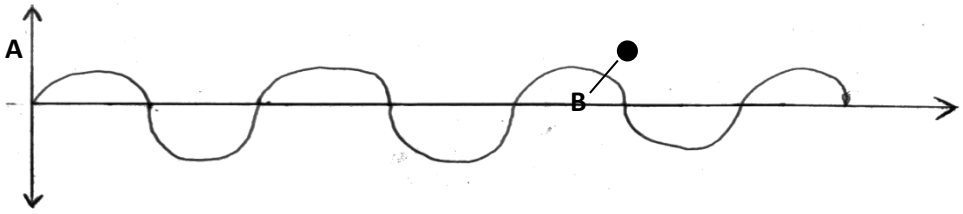
……

4. The diagram below shows the position of the bright spot on the screen of a C.R.O when there is no signal on both Y and X –plate. Indicate on the diagram (b) when the Y-plate is connected to a.c signal and for (c) the X-plate is connected to d.c signal i.e the display on the screen. (2marks)



6. The diagram below shows a wave travelling to the right . The time taken by the wave from O to B is 0.0025 seconds.

redraw for better waves



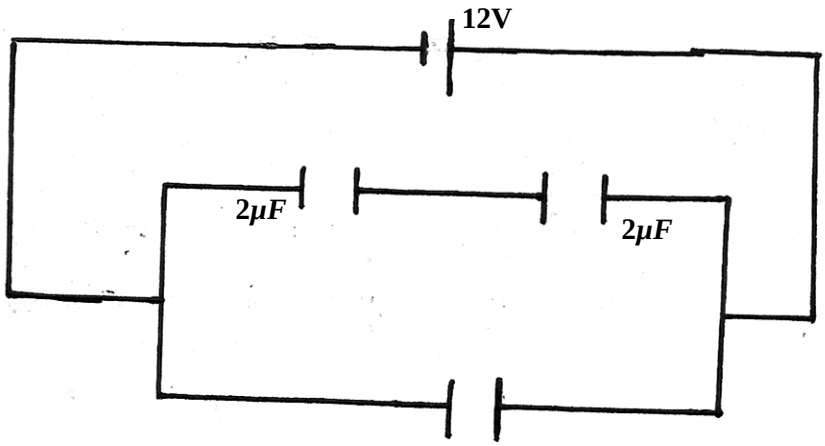
Calculate the frequency of the wave. (2marks)

7.State **one** difference between an image formed by a plane mirror and that observed through a pin hole camera. (1mark)

……

……

8.The figure below shows capacitors connected to a d.c supply.



Calculate the charge stored in one of the **2*μF*** capacitor. (3marks)

9. Give a reason why lecture theatre halls are covered with soft perforated materials. (1mark)

……

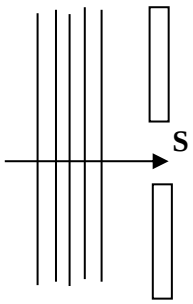
……

10. Arrange the following in order of decreasing wavelength: infrared, microwave, gamma rays visible light. (1mark)

……

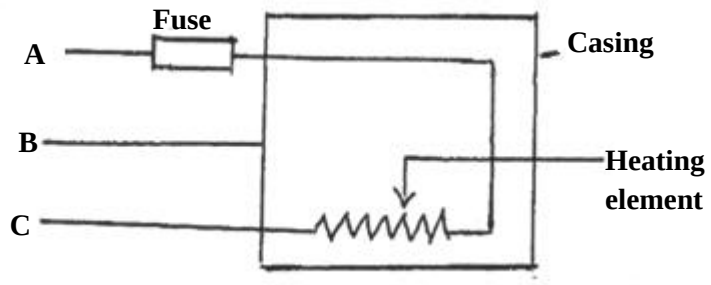
……

11. The figure below shows plane waves approaching a very narrow slit S.



Complete the diagram to show the pattern after crossing the slit. (2marks)

12. The diagram below shows an electrical appliance connected to the mains.



Name the colour codes for leads A, B, and C and state the purpose of the fuse. (3marks)

A…… B……

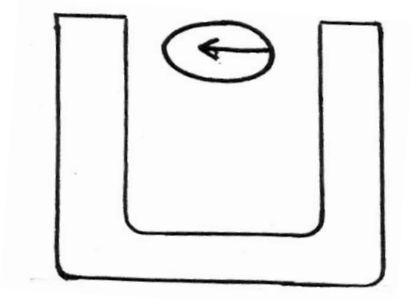
C…….

Purpose for fuse: (1mark)

……

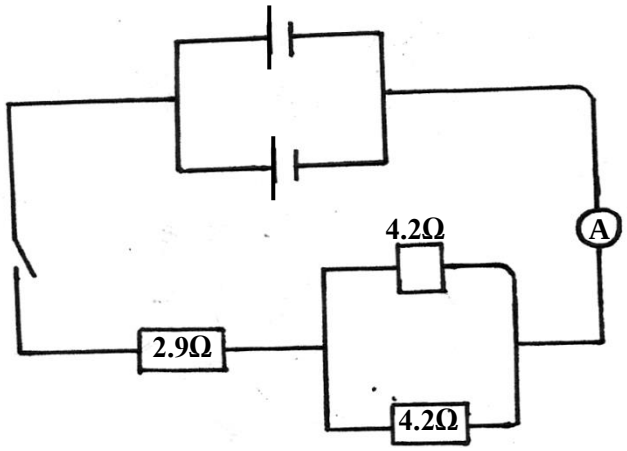
……

13. The figure below shows a V-shaped magnet with a plotting compass placed between its poles



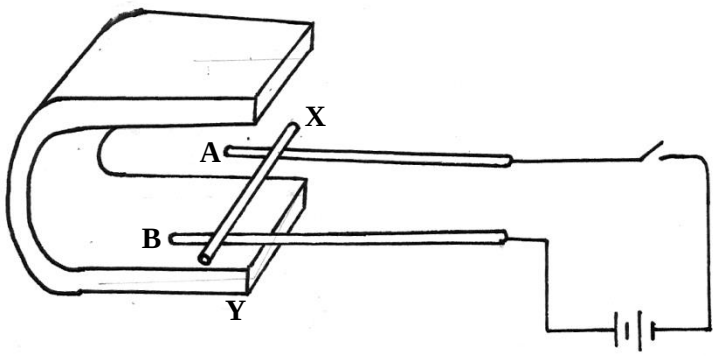
Draw a diagram indicating the magnetic field pattern around the U-shaped magnet. (2marks)

14. Each cell in the diagram below has an e.m.f of 2.0 v and zero internal resistance.



Determine the ammeter reading when the switch is closed. (2marks)

15. A conductor XY is placed between the poles of a magnet as shown below. When the current is allowed to flow, the conductor rolls along the rod A and B



Show with an arrow the direction in which it will move. (1marks)

SECTION B (55 MARKS)

16. (a)(i) Distinguish between threshold frequency and threshold wavelength. (1mark)

……

……

(ii) The maximum wavelength required to cover photoelectric emission on a metal surface is 8.0×10^{-7}m. The metal surface is irradiated with light of frequency 8.5×10^{14}Hz.

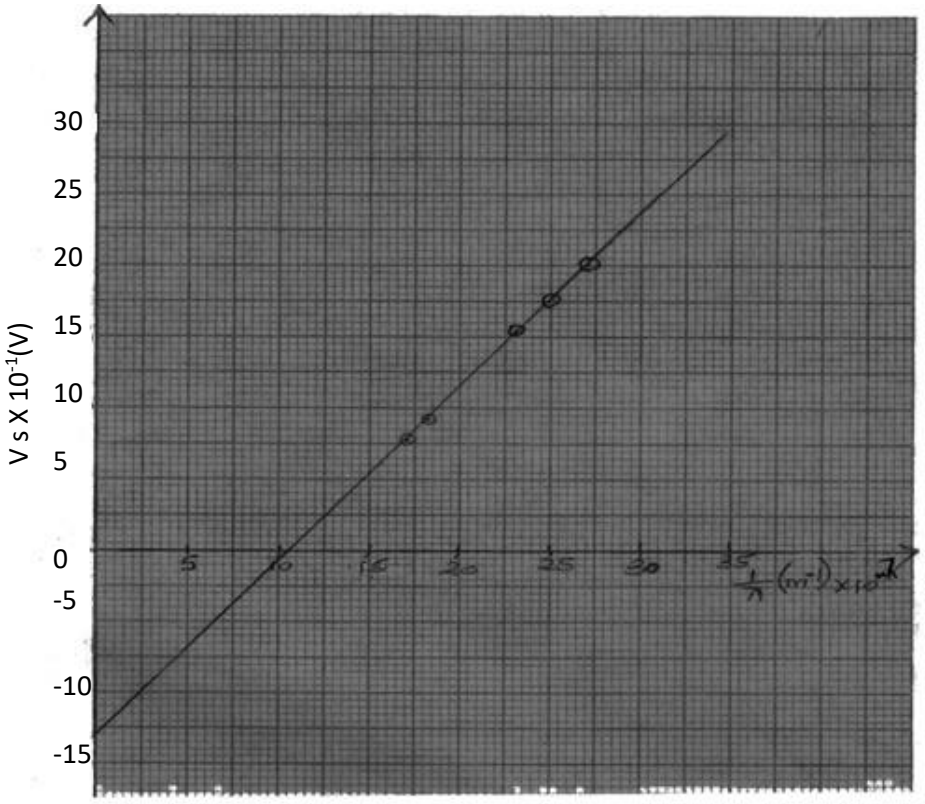
Determine:

(I)The threshold frequency (1mark)

(II)Maximum kinetic energy of the electrons (3marks)

(b) Below shows a plot of the graph of stopping potential Vs against reciprocal of the wave length $\frac{1}{\lambda}$.

The work function of the metal used was 2.08 X 10^{-19}J and velocity of electromagnetic waves is 3.0 X 10^{8}m/s



The equation of the graph is given by $Vs = \frac{hc}{e\lambda} - \frac{wo}{e}$

Use the graph to determine:

I. The threshold frequency (f_o) (2marks)

……

……

II. The charge of an electron (e-) (2marks)

……

……

The slope (2marks)

III. The value of planks constant (2marks)

……

……

17. (a) (i)Explain why carbon $\left(-14\ {}^{14}_{6}\mathrm{C}\right)$ is radioactive while carbon ${}^{12}_{6}C$ is not. (2marks)

……

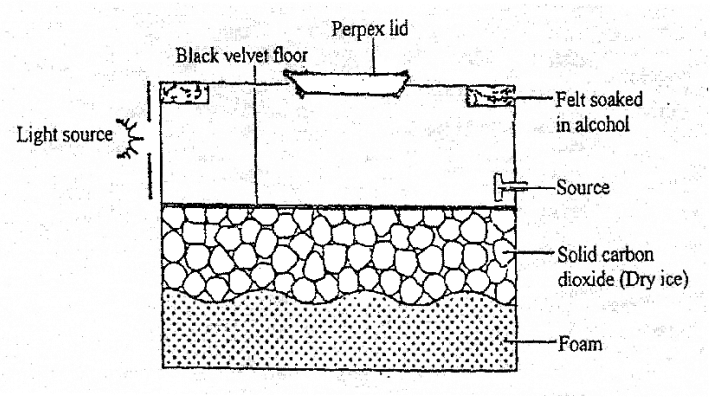
……

(ii) A radioactive isotope showed a count rate of 82 counts per second initially. After a time of 210seconds, the count rates dropped to 19 counts per second. The average background count remained constant at 10 counts per second. What is the half life of the material? (2marks)

……

……

(b) The figure below shows the features of a diffusion cloud chamber used for detecting Radiations from a radioactive source.



Explain how the chamber works when a radioactive particle is introduced at the source (2marks)

……

……

(c) (i)What is the purpose of solid carbon(iv) oxide? (1mark)

……

……

(ii)State **one** advantage of the cloud chamber over a G.M tube as a detector of radio -active radiations. (1mark)

……

……

(d) (i) Using a diagram explain how doping produces a p-type semi-conductor (3marks)

……

……

……

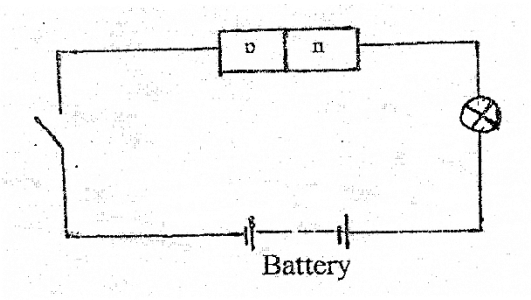
……

(ii) What is biasing? (1marks)

……

……

(iii) The diagram below shows a circuit with a p-n junction and a very lower power bulb



State with reason the observation made on the bulb when the switch is closed. (2marks)

……

……

18. The figure below shows the construction and circuit of the modern X-ray tube.

(i) Name the part marked C and state its function (2marks)

……

……

(ii) Name the metals used in A and B and state their functions (2marks)

……

……

……

(iii) Why are cooling tins necessary (2marks)

……

……

……

(b)Explain how energy of the X-rays can be increased. (2marks)

……

……

(c) An X-ray tube operated at a potential of 10KV and a current of 0.2A flows in the tube. Calculate the number of electrons reaching the target per second.

(Electrons charge= 1.6 $X16^{-19}$ Coulombs). (3marks)

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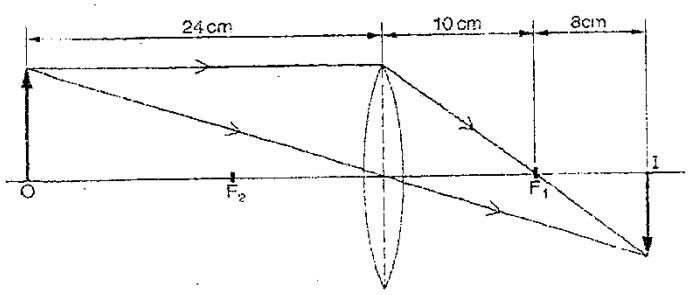
19. The figure below shows how an image is formed by a converging lens.

Redraw



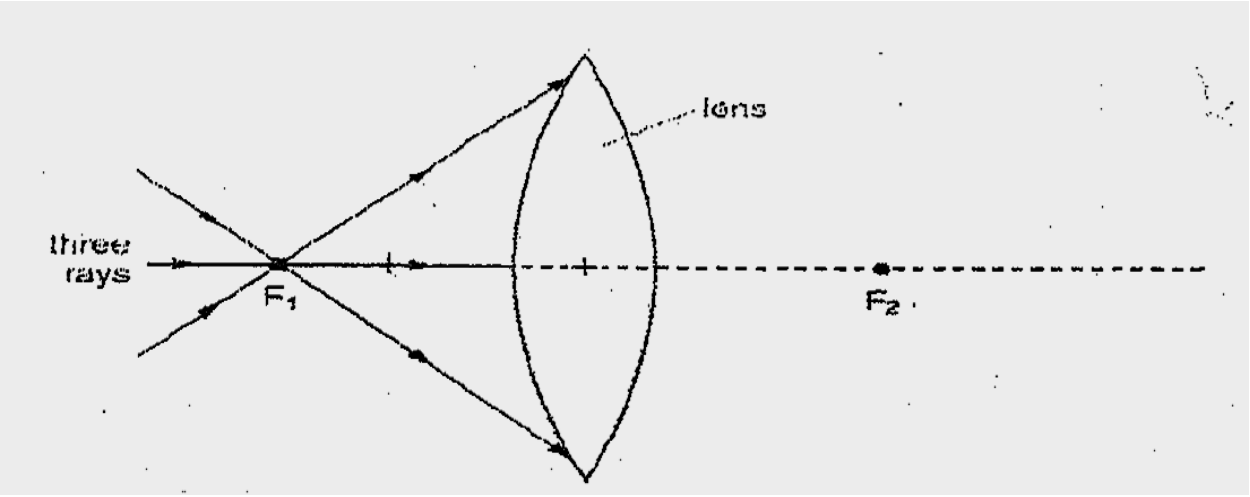
(i)State the value of the focal length of the lens. (1mark)

……

……

(ii) Calculate the magnification of the image produced (2marks)

(b) The figure shows a glass lens in air and its two focal points F_1 and F_2.



Three rays of light pass through F_1 to the lens.

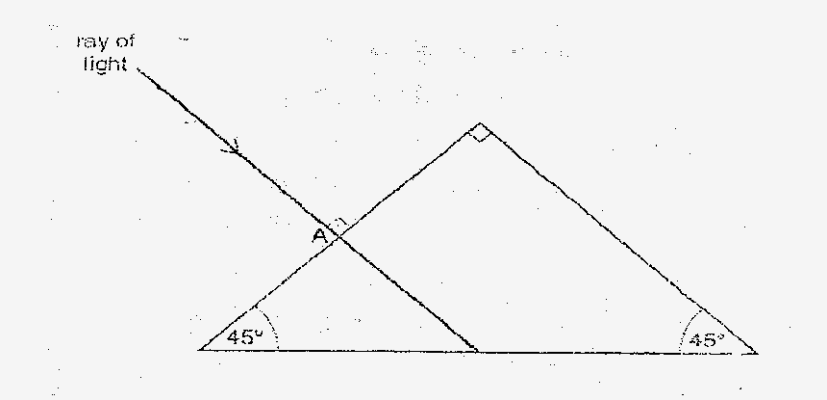
(i) On the figure continue the three rays through the lens and into the air. (2marks)

(ii) State what happens to the speed of light on entering the glass lens from air. (1mark)

……

……

(c) A ray of light passes through one surface of a glass prism at right angles to surface. Given that the critical angle of the glass materials is 42^0, complete the ray to show how it travel until it leaves the prism. (2marks)



(d) An object is placed 30cm in front of a convex of focal length 20cm. Determine the image distance. (2marks)

(e) (i)State **two** possible causes of long sightedness. (2marks)

……

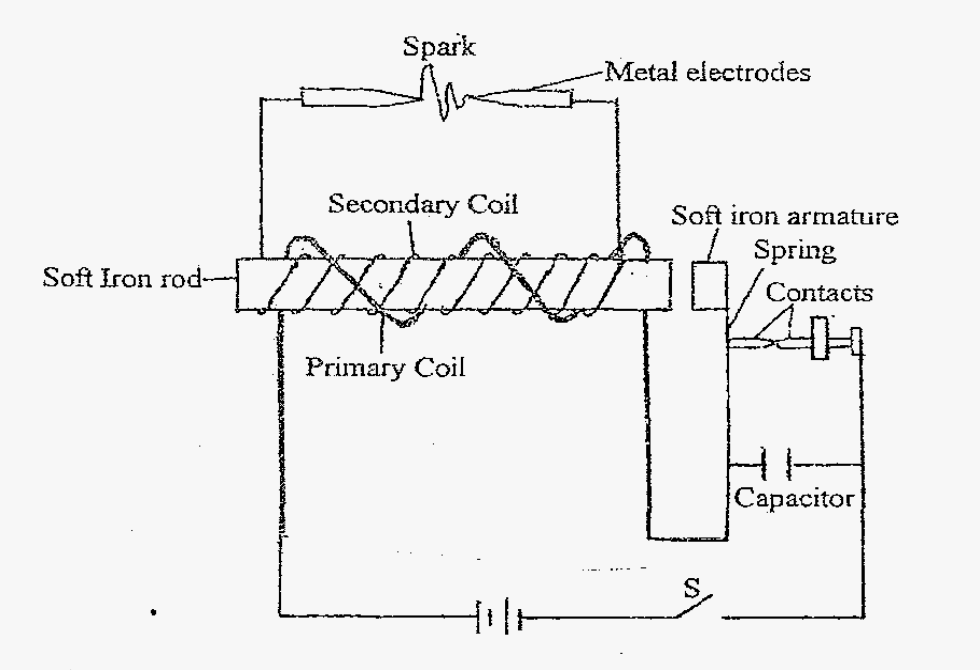
……

(ii) What type of lens is used to correct long sightedness? (1mark)

……

……

19. The figure below shows an induction coil used to step up voltage.



(i) State the difference between the induction coil and step-up transformer. (1mark)

……

……

(ii) Explain how voltage is stepped up by the induction coil. (2mks)

……

……

(iii) The voltage is stepped up from 12V to 15V. Determine the ratio of the secondary to primary coil in the induction coil. (1mark)

……

……

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PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page.*

b) *This paper consists of two sections; A and B.*

c) *Answer ALL the questions in the spaces provided.*

d) *Mathematical tables and electronic calculator may be used.*

e) *Candidates should answer the questions in* ***English.***

FOR EXAMINER'S USE:

SECTION	QUESTION	MAXIMUM SCORE	STUDENTS SCORE
A	1-12	25	
B	13	12	
	14	11	
	15	13	
	16	08	
	17	11	
	TOTAL	80	

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SECTION A (25 MARKS)

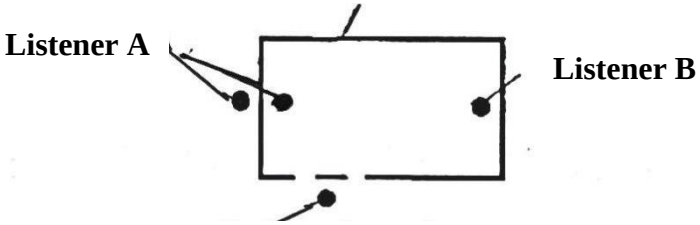
Answer ALL the questions in this section in the spaces provided.

1. State any **one** condition under which a pinhole camera may form an image on its screen which has the same size as the object. (1 mark)

_____

_____

2. The source of sound and two listeners are positioned close to a tall building as shown in the figure below.



i) State the property of sound by which Listener A is able to hear the sound produced. (1 mark)

_____

ii) Listener **B** is moving directly towards Listener **A** and has a problem hearing the sound produced. Explain. (2 marks)

_____

_____

_____

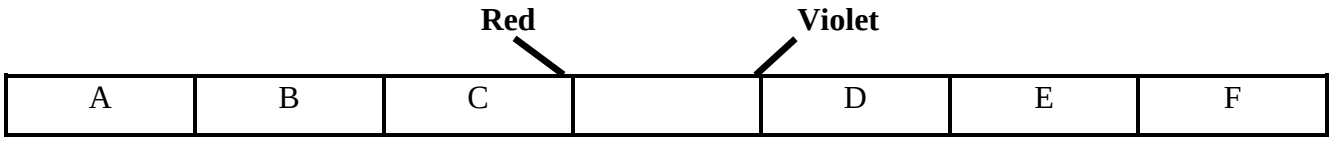
3. Give **two** differences between a transformer and induction coil. (2 marks)

_____

_____

_____

4. The figure below shows some region of part of the electromagnetic spectrum.



i) Name the region that is detected by a blackened bulb thermometer. (1 mark)

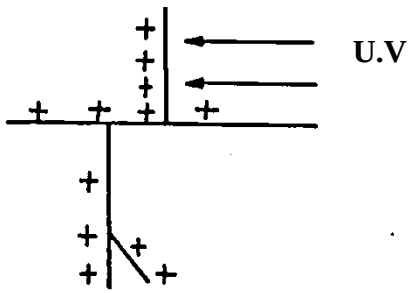
_____

ii) State **one** use of the E-M wave in the region labelled **B.** (1 mark)

_____

_____

5. The figure below shows ultraviolet light striking a clean Zinc plate on a positively charged leaf electroscope.



Explain the following observations:

i) The leaf does not fall. (1 mark)

_____

_____

_____

ii) When the same experiment is carried with a negatively charged electroscope, the leaf falls. (1 mark)

_____

_____

_____

6. A girl observes her face in a concave mirror of a focal length 90cm. If the mirror is 70cm away, state **two** characteristics of the image observed. (2 marks)

_____

_____

_____

7. The ammeter in the circuit in figure 3 has negligible internal resistance. The cell has an internal resistance of 0.5Ω and an electromotive force of 3.0V.

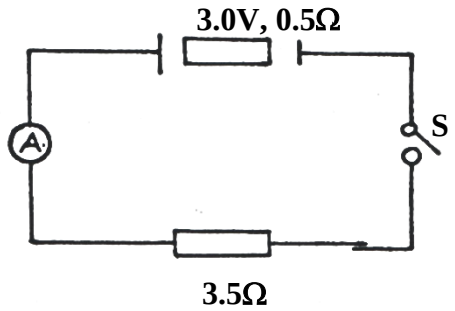


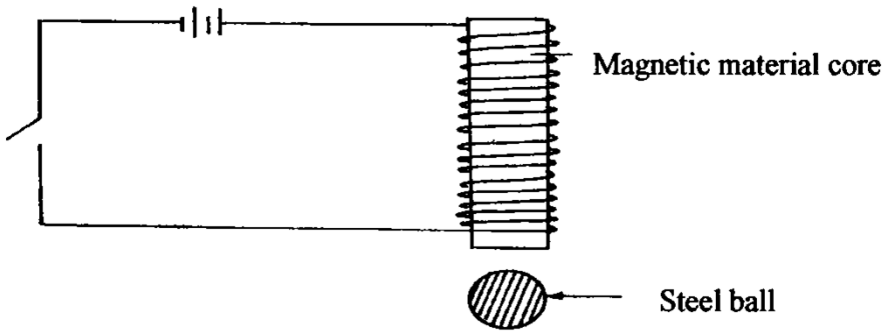
Figure 3

Determine the value of current the ammeter registers when switch S is closed. (2 marks)

8. An electric heater is rated 3 kW. Find the electrical energy in kWh(kilo watt- hours) consumed by the heater when used on a 240V supply for 180 minutes. (2 marks)

9. An echo sounder produces a pulse and an echo is received from the seabed after 0.4 seconds. If the speed of sound in water is 1500m/s. Calculate the depth of the sea bed. (2 marks)

10. The set up in figure 4 below can be used in a laboratory for lifting and releasing a steel ball.



i) State the material which is suitable for use in the core. (1 mark)

_____

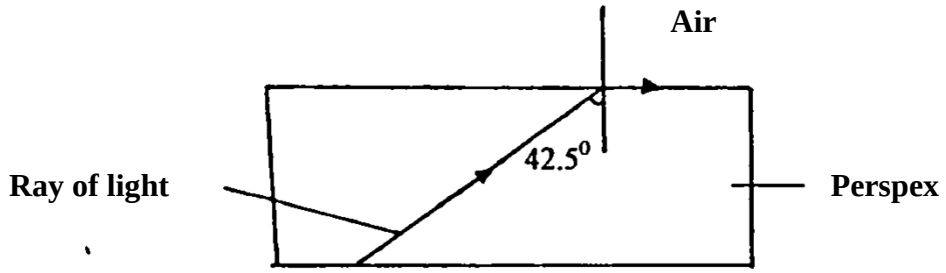
iii) If a slightly larger ball is to be lifted, it is necessary to make an electromagnet stronger. Name **two** ways of increasing the strength of the magnet. (2 marks)

_____

_____

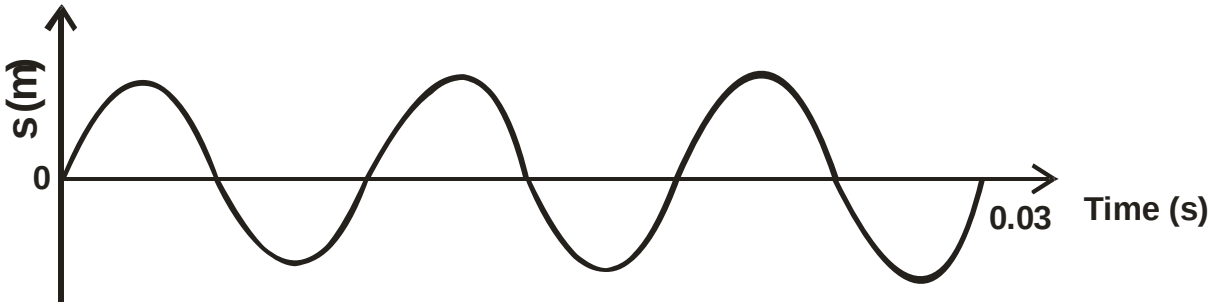
_____

11. The figure 5 below shows the path of a ray of light passing through a rectangular block of Perspex placed in air.



Calculate the refractive index of Perspex. (2 marks)

12. The sketch shown below is a displacement-time graph of a wave traveling at $320ms^{-1}$



Find the wavelength of the wave. (2 marks)

SECTION B (55 MARKS)

Answer ALL the questions

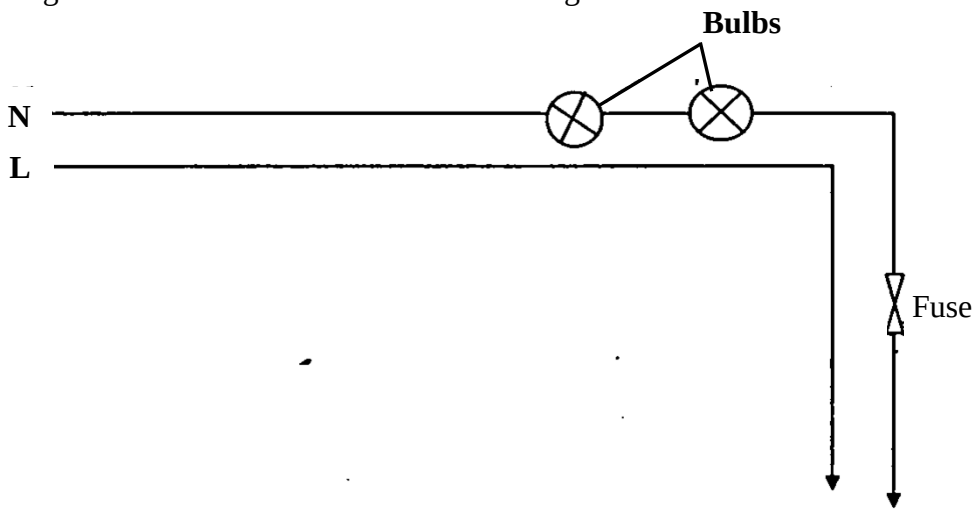
13. a) The mains electricity is transmitted through high tension voltage (H.T).

State **one** danger of this transmission. (1 mark)

_____

_____

b) The figure shows a section of a domestic wiring.



i) Identify **two** serious mistakes in the circuit. (2 marks)

_____

_____

_____

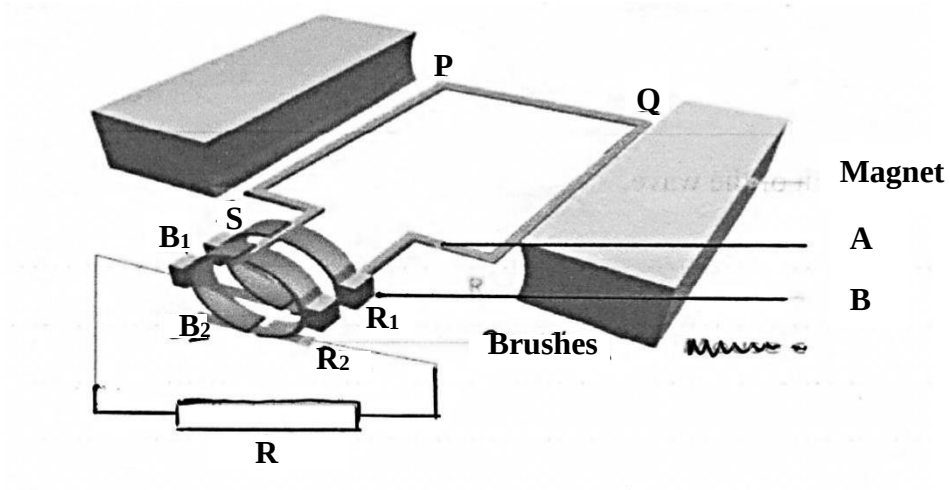
ii) Explain why the circuits in domestic wiring should be connected in parallel with the main supply. (2 marks)

_____

_____

_____

c) Study the figure shown below



i) State the name of the machine shown in figure above. (1 mark)

_____

ii) What are the names of the parts labelled A and B? (2 marks)

A _____

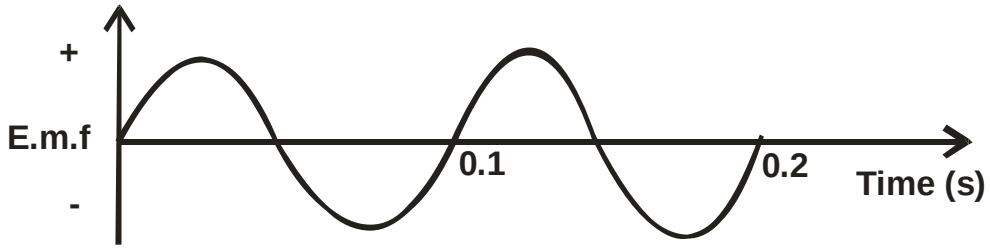
B _____

iv) What would be the effect of doubling the number of turns of the coil if the speed of rotation remained unchanged? (1 mark)

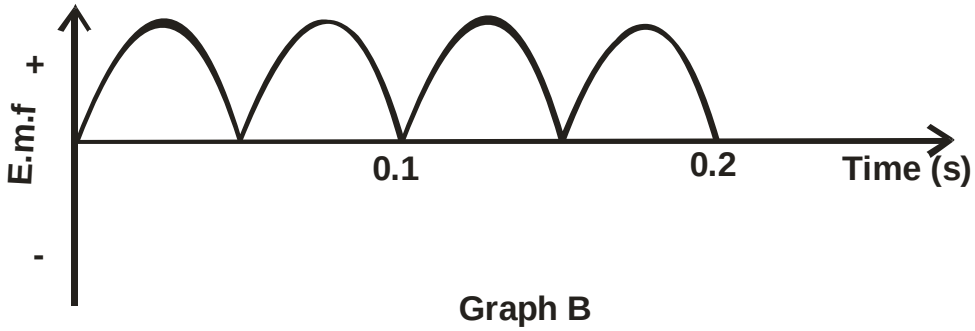
_____

_____

d) The voltage-time signals obtained is as shown in the diagram below in graph A



Graph A

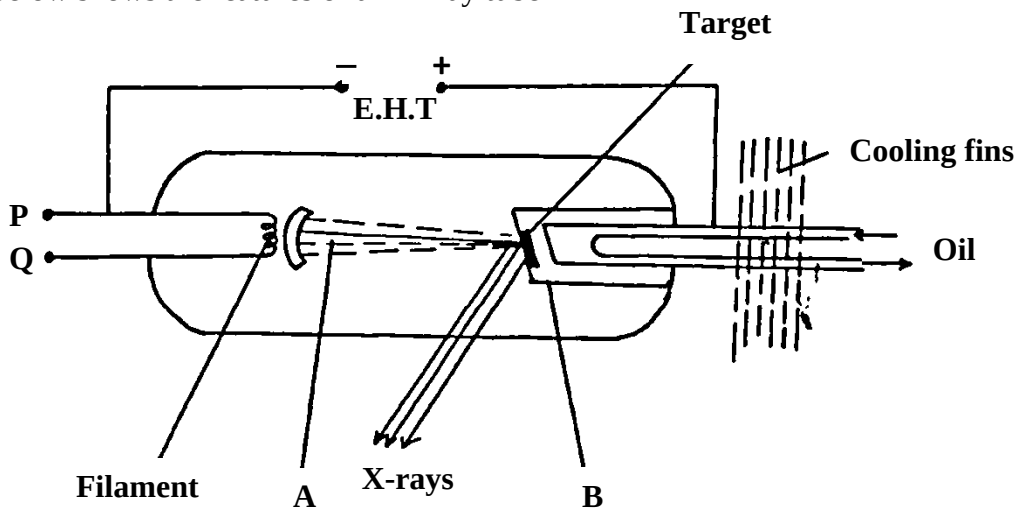


Graph B

i) Find the frequency of the alternating E.m.f shown by graph A. (2 marks)

ii) What alterations have been made to the machine in c) above to produce the emf represented by graph B? (1 mark)

14. The figure below shows the features of an X- ray tube



a) Name the parts labelled A and B. (1 mark)

A _____

B _____

b) Explain how a change in the potential across PQ changes the intensity of the X-rays produced in the tube. (2 marks)

_____

_____

_____

_____

c) What property of lead makes it suitable for use as shielding material? (1 mark)

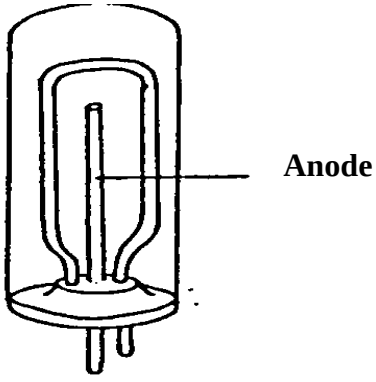
_____

_____

d) In an X-ray tube operating at 100kV, the tube current is 20mA. Determine the number of electrons hitting the target every second. (2 marks)

(Charge of an electron = 1.6×10^{-19}C)

e) The figure below shows a cell. Use it to answer questions that follow:



i) Name the type of cell. (1 mark)

_____

ii) Label the cathode. (1 mark)

iii)The maximum kinetic energy of the photo-electrons emitted from a metal surface is

9.95×10^{-20}J. If the threshold frequency of light required to cause photo-electric emission with this metal is 5×10^{14} Hz. Calculate the frequency of the incident radiation. (Plank's constant = 6.63×10^{-34} JS) (3 marks)

15. a) i) Explain why carbon -14 ($^{14}_{6}C$) is radioactive while carbon ($^{12}_{6}C$) is not. (1 mark)

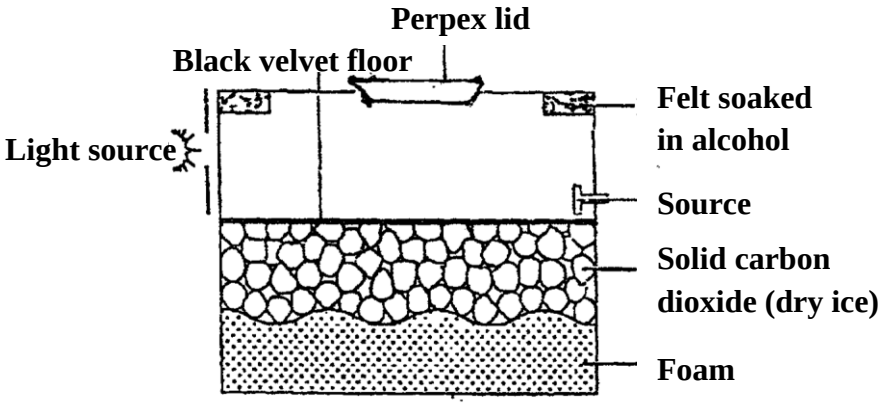
_____

_____

_____

ii) A radioactive isotope showed a count rate of 82 counts per second initially. After a time of 210 seconds, the count rate dropped by 19 counts per second. The average background count remained constant at 10 counts per second. What is the half-life of the material? (2 marks)

b) The figure below shows features of a diffusion cloud chamber used for detecting radiations from a radioactive source.



Explain how the chamber works when a radioactive particle is introduced at the source. (2 marks)

_____

_____

_____

_____

c) i) What is the purpose of solid carbon (IV) oxide. (1 mark)

_____

_____

ii) State **one** advantage of the cloud chamber over a G.M tube as a detector of radioactive radiations. (1 mark)

_____

_____

d) P-type and n-type semiconductors are made from a pure semiconductor by a process known as "doping".

i) State what is meant by doping. (1 mark)

_____

_____

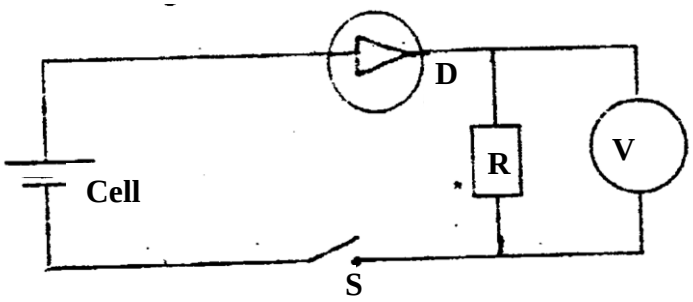
ii) Explain how the doping produces an n-type semi-conductor. (2 marks)

_____

_____

_____

e) In the circuit in the figure below, when the switch S is closed, the voltmeter shows a reading.



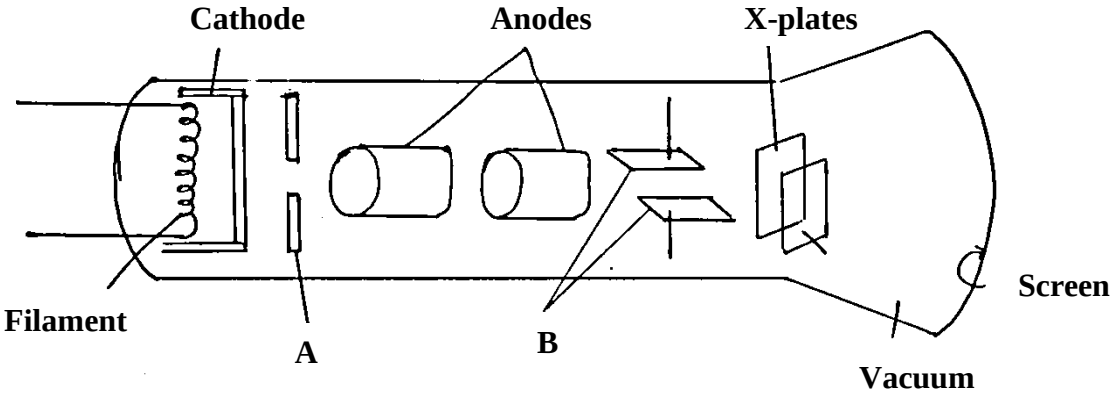
When the cell terminals are reversed and the switch is closed, the voltmeter reading is zero. Explain these observations. (2 marks)

_____

_____

_____

16. a) The figure below shows the features of a cathode ray oscilloscope;-



i) Name the parts A and B. State the role played by each of the parts A and B. (2 marks)

A _____

_____

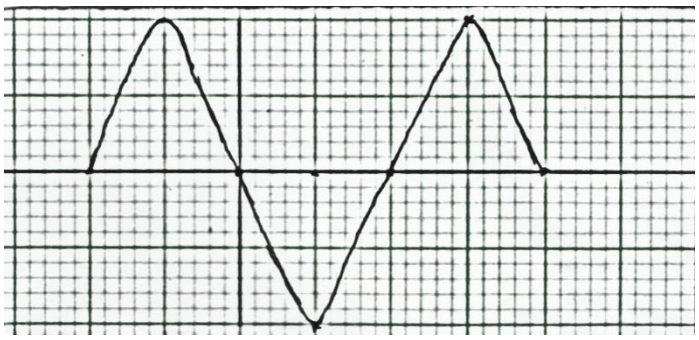
B _____

_____

ii) Explain how electrons are produced. (2 marks)

iii) State the factors considered when choosing the material for the cathode. (1 mark)

b) The figure below shows the trace on the screen of an a.c signal connected to the y-plates of a C.R.O with time base on. Given that the time base control is 100ms/div and the y-gain is at 120V/division.

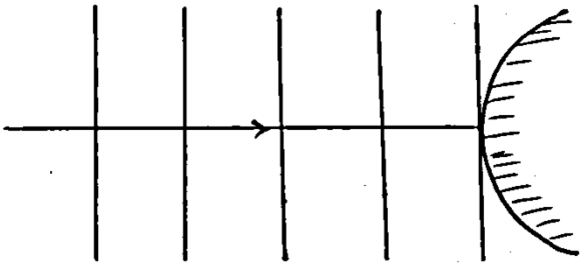


Determine:

i) The frequency of the a.c signal. (2 marks)

ii) The peak voltage of the input signal. (2 marks)

17. a) The figure below shows straight wave fronts incident on convex reflector.
Complete the diagram to show the reflected wave fronts. (1 mark)

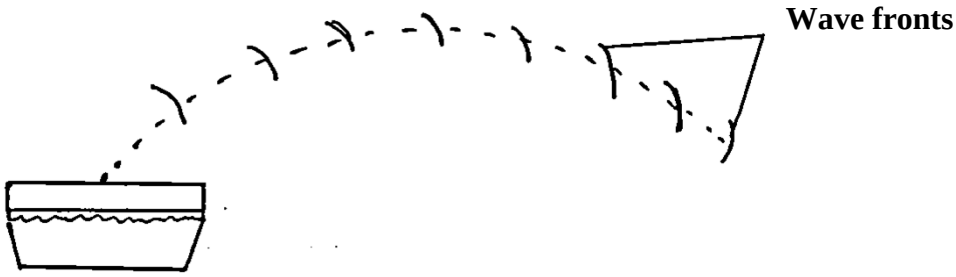


b) Narrow slits cannot be used to demonstrate interference of sound waves. Explain. (1 mark)

_____

_____

c) The figure below shows sound waves emitted by a drum struck.



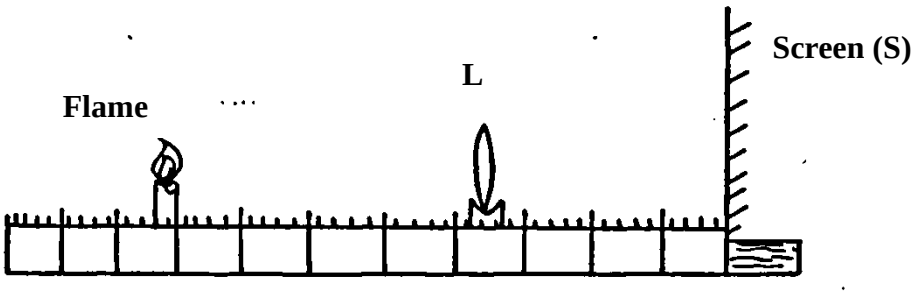
Explain why the wave fronts are directed to the ground. (2 marks)

_____

_____

_____

d) Figure below shows an experimental set up consisting of a mounted lens, I, A screens, a metre rule and a candle



i) Describe how the set up may be used to determine the focal length f, of the lens. (3 marks)

_____

_____

_____

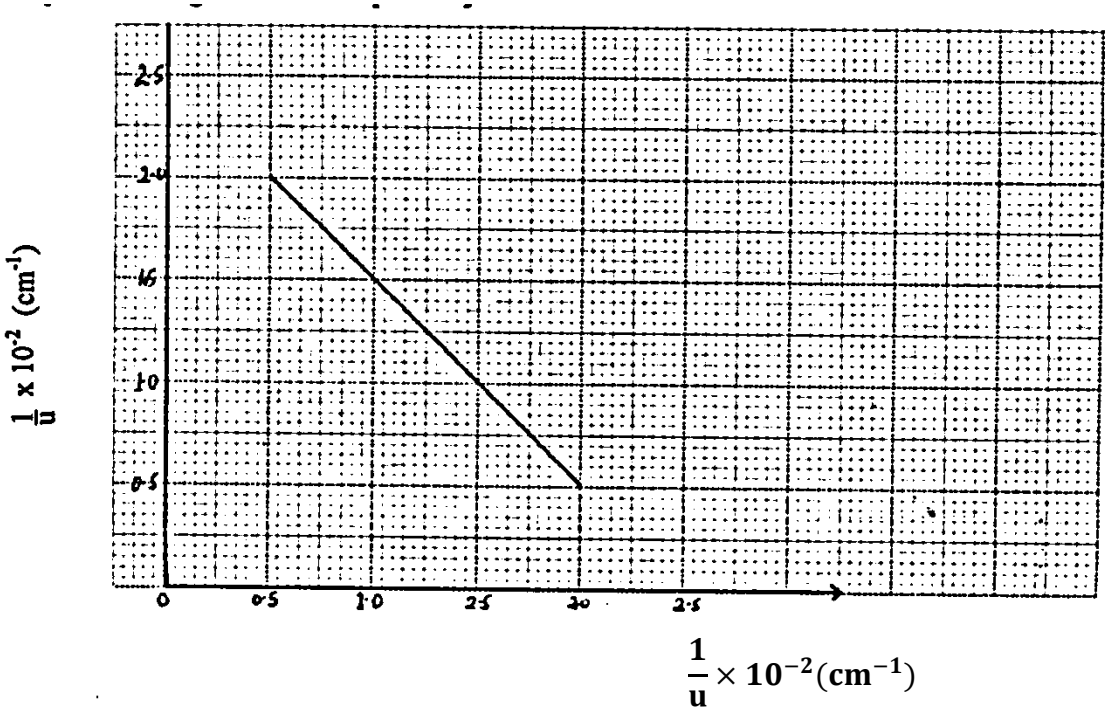
_____

ii) State why the set up would not work if the lens were replaced with a diverging lens. (1 mark)

_____

_____

e) The graph figure below shows the relationship between $\frac{1}{u}$ and $\frac{1}{v}$ for a converging lens where u and v are the object and image distances respectively.



From the graph, determine the focal length, f of the lens. (3 marks)

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MANGU HIGH SCHOOL

232/2

PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

For Examiner's Use Only

Section	Question	Maximum Score marks	Candidates Score
A	**1- 14**	**25**	
	15	**12**	
	16	**10**	
	17	**10**	
	18	**13**	
	19	**10**	
Total		**80**	

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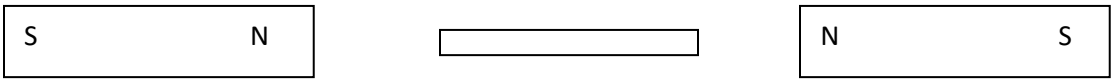
SECTION A (25 MARKS)

Answer all question in the spaces provided

1. An object is placed between two morrow inclined to echo ether at an angle of 45^{o}. determine the number of images formed. **(2 marks)**

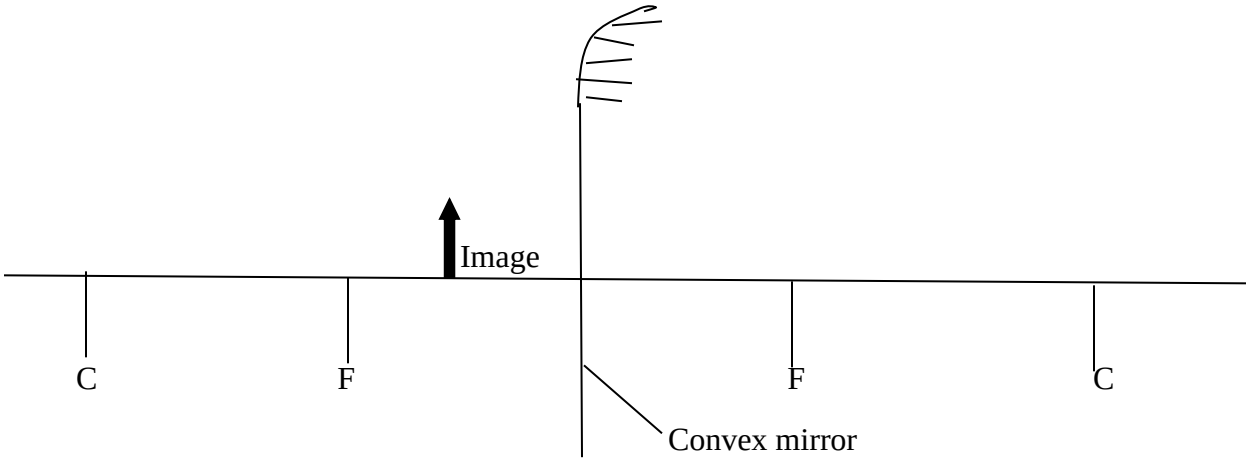
2. State and explain one defect of a simple cell. **(2 marks)**

3. Fig. 1 below shows a soft iron bar [laced between the poles of two strong magnets.



Sketch the magnetic field pattern formed. **(1 mark)**

4. Fig.2 below shows an image produced by an object placed in front of the convex mirror. By drawing an appropriate rays locate the position of the object on the diagram. **(1 mark)**



5. Sketch the magnetic field lines associated with the current carrying conductor A and B in fig.3 below. **(1 mark)**

6. A ship uses echo sound to search for a sunk boat. One echo is heard after 0.16 seconds and the second one 0.02 second later. If the speed of the sound in water is 300m/s, determine the height of the sunk boat. **(3 marks)**

7. A wave whose wavelength is 2×10^{-2} meters has a period of 0.2 seconds. Determine the velocity of the wave. **(2 marks)**

8. A 4 Ω resistor is connected a cross 6 volts d,c supply, determine the power dissipated. **(2 marks)**

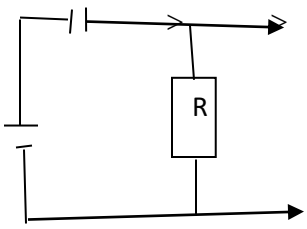
9. Arrange the following radiations in the order of decreasing energy

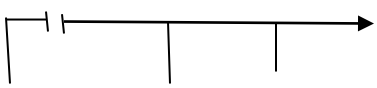
UV, Microwaves, Blue light, Yellow light and red light. **(1 mark)**

10. An optical pin length 40mm is placed horizontal along the principal axis of a convex lens focal length of 40mm. if the near end of the pin is 50 mm from the lens, determine the length of the image.**(3 marks)**

11. Explain why deflection a television screen is done using magnetic field while in A C.R.O screen is done using an electric field. **(1 mark)**

12. Fig. 4 (a) shows a d.c supply connected to a diode and ammeter, R. while fig. 4 (b) shows an a.c supply connected to a diode, a capacitor and resistor, R. sketch current- time graphs as displayed on the C.R.O for each case. **(2 marks)**





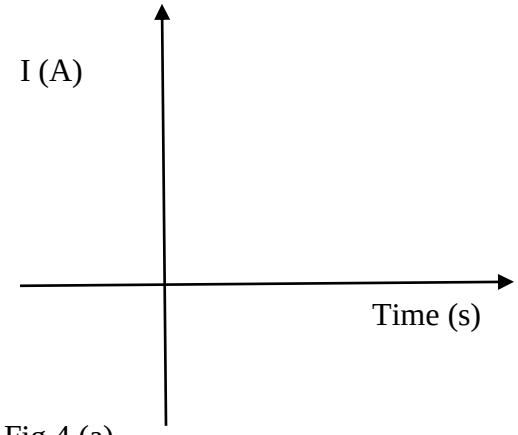


Fig 4 (a)

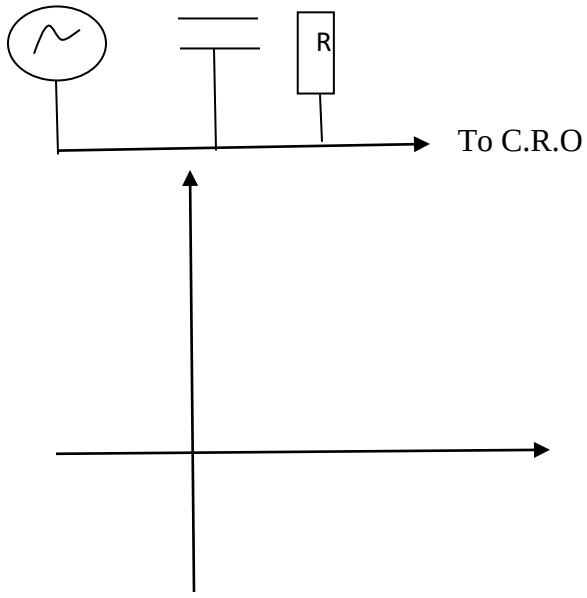


fig 4(b)

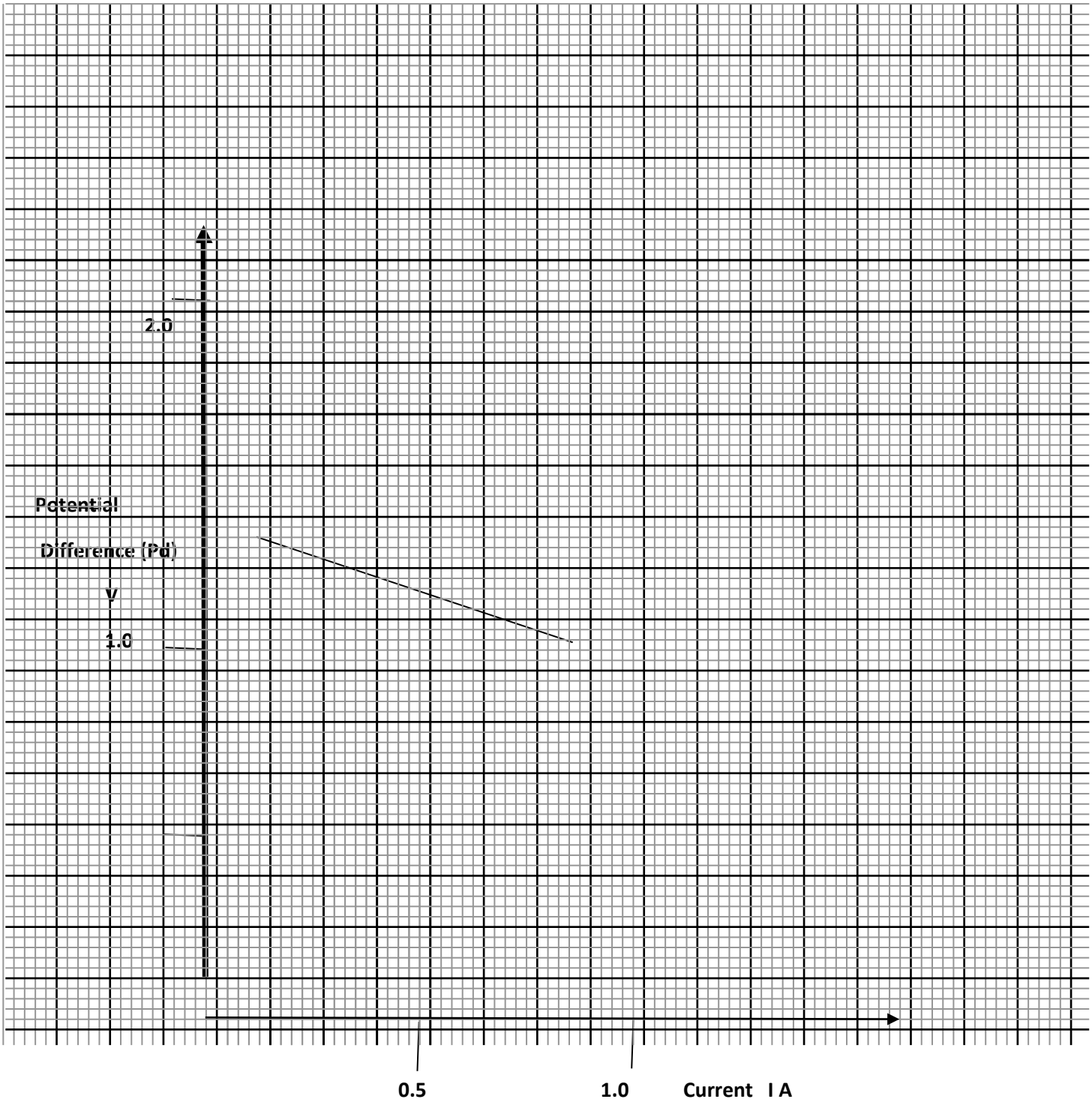
13. Four 60W bulbs are used for 4 hours every day for 30 days. If the unit cost of electricity is Ksh 5 determine the cost of this electricity. **(2 marks)**

14. Three capacitors 6µF , 3 µF and 2 µF are connected in series with a 4 V d.c supply. Determine their effective capacitance. **(2 marks)**

SECTION B

15. (a) What is meant by an open circuit? **(1 mark)**

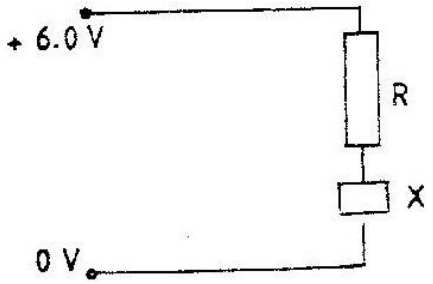
b) The graph in figure 5 shows the terminal voltage, V, of a certain battery varies with the current, I, being drawn from the battery.



(i) Write an expression relating the e.m.f. E, terminal voltage, V, current, I and the internal resistance, r, of the battery for the circuit drawn in (i) above. **(1 mark)**

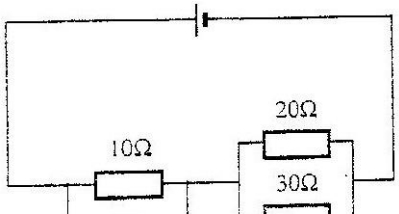
(ii) From the graph determine the; I internal resistance, r, of the battery. **(2 marks)**

(b) When the device, X is connected in the circuit below, the voltage across it is 0.70 V.



Calculate the value of the resistance R. **(3 marks)**

(c) The cell in figure 10 has an e.m.f of 2.1 V and negligible internal resistance.



Determine the

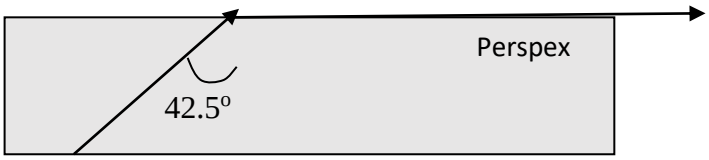
(i) Total resistance in the circuit **(2 marks)**

(ii) Current in the circuit **(1 mark)**

(iii) Reading of the voltmeter **(2 marks)**

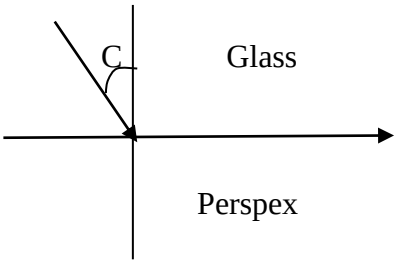
16. a) What is refraction of light **(2 marks)**

(b) The figure below shows a ray of light passing through a rectangular block of Perspex into the air. The angle of incidence at boundary is 42.5^{o}



(i) determine the refractive index of Perspex **(3 marks)**

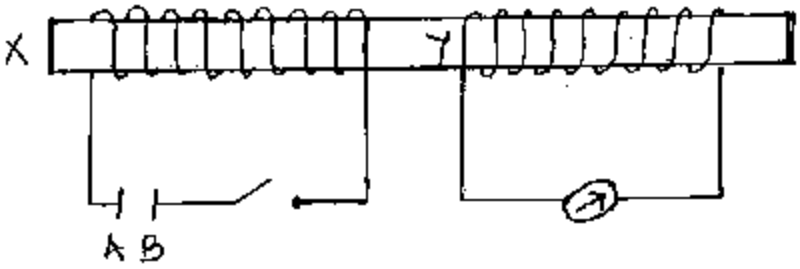
(ii) A ray of light now travels from glass into Perspex as shown below.



Calculate the critical angle C if the refractive index of glass is 1.55 **(3 marks)**

(iii) State with reasons in which material medium the velocity of light will be higher. **(2 marks)**

17. The figure below shows two coils connected using a soft iron core.



When the switch is closed, the galvanometer deflected in the direction shown. Determine

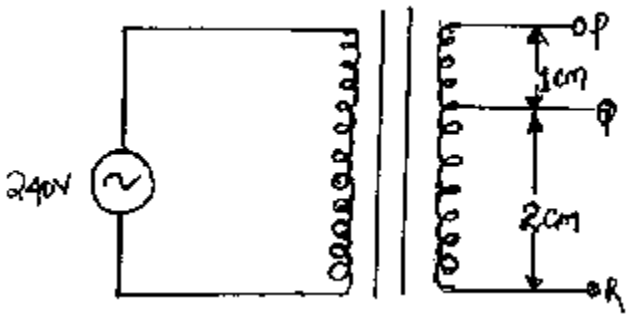
i) The magnetic poles x and y. **(2 marks)**

ii) The electric polarities A and B of the cell. **(1 mark)**

iii) Compare the deflection of the galvanometer when the switch is closed and when it is opened. **(2 marks)**

b) i) State one property of soft iron that makes it suitable for use as transformer core. **(1 mark)**

ii) The figure below represents a step down transformer with 600 turns in the primary and 60 turns in the secondary. The turns are wound uniformly on the core.



iii) The lengths PQ and QR are as indicated. Determine the P.d across PQ **(4 marks)**

18. a) Name **two** properties common to both X-rays and gamma rays. **(2 marks)**

b) **Figure 8** shows an X-ray tub

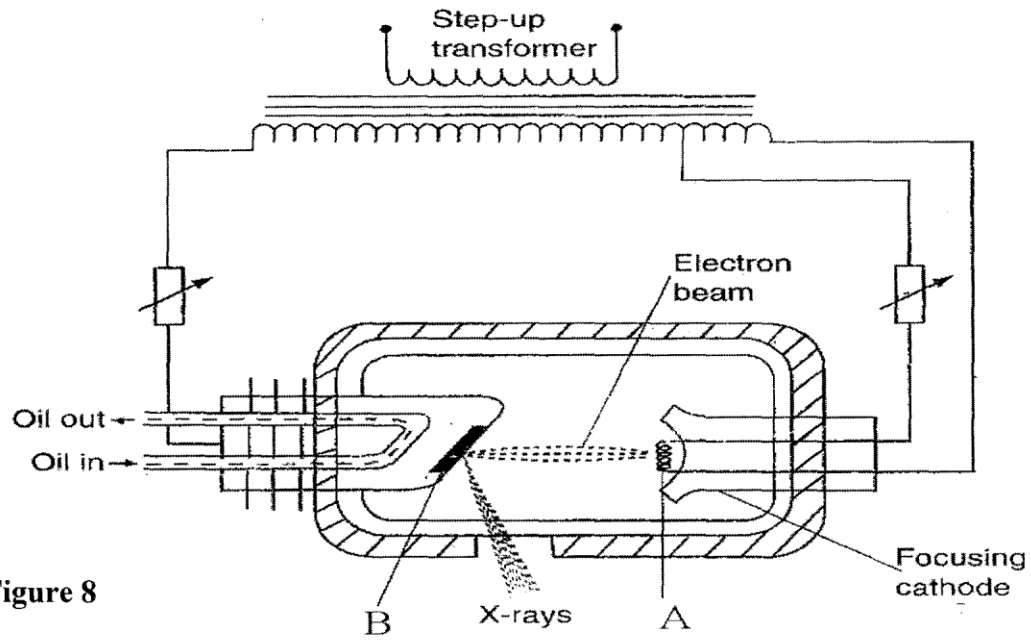


Figure 8

(i) Name the parts labelled A and B **(2 marks)**

A

B

(ii) State the function each of the parts you have named in (i) **(2 marks)**

A

B

(iii) In the X-ray tube the voltage between the cathode and anode is more than 50 000V.

Give a reason for this. **(1 mark)**

c) An X-ray tube operates with a potential difference of 150 kV between the cathode and the anode. Only 0.5% of the kinetic energy of each electron is converted into X-rays. (Take electronic charge, $e = 1.6 \times 10^{-19}C$)

Determine the maximum:

(i) Kinetic energy of each electron. **(2 marks)**

(ii) Energy of the X-rays **(2 marks)**

d) A radioactive substance has a half –life of 30 minutes. What amount of mass originally 3kg will remain after 120 minutes? **(2 marks)**

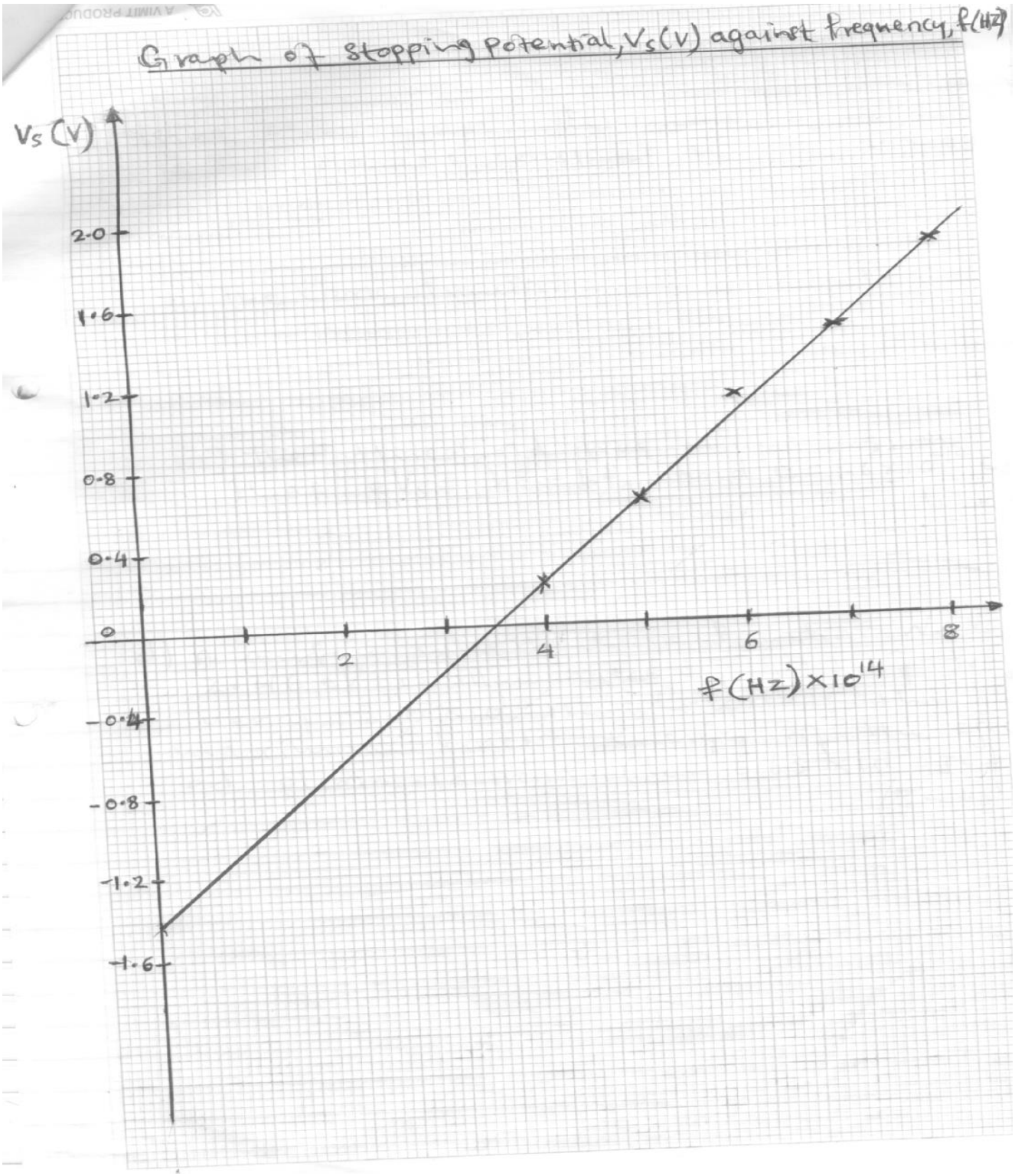
19. (a) What is meant by the term work function? **(1 mark)**

(b) When the frequency of the illuminating radiation is just equal to the threshold frequency of the surface, no photoelectric effect observed. Explain. **(1 mark)**

c) In a photoelectric effect experiment, a certain surface was illuminated with radiation of different frequencies and stopping potential determined for each frequency. A graph of stopping potential

(y – axis) against frequency was then plotted as shown

Graph of stopping potential Vs (v) against frequency, £ (HZ)



Using the graph determine.

(i) The Plancks constant, h **(2 marks)**

(ii) The work function **(2 marks)**

(iii) The threshold frequency given that $eVs = hf - hf_0$ and $e = 1.6 \times 10^{-19}C$. **(1 mark)**

(d) A surface whose work function W_0 is 2.4eV is illuminated by light of frequency 3.0×10^{15} HZ. Calculate the maximum kinetic energy of the ejected photo electrons ($h = 6.63 \times 10^{-34}$ Js) **(3 marks)**

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PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page.*

b) *This paper consists of two sections; A and B.*

c) *Answer ALL the questions in the spaces provided.*

d) *Mathematical tables and electronic calculator may be used.*

e) *Candidates should answer the questions in* ***English.***

For Examiner's Use Only

Section	Question	Maximum Score	Candidates' Score
A	Q1 – Q15	25	
B	Q16	14	
	Q17	13	
	Q18	15	
	Q19	13	
		80	

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SECTION A (25 MARKS)

1. A plane mirror is suspended on a wall by a string shown in the diagram

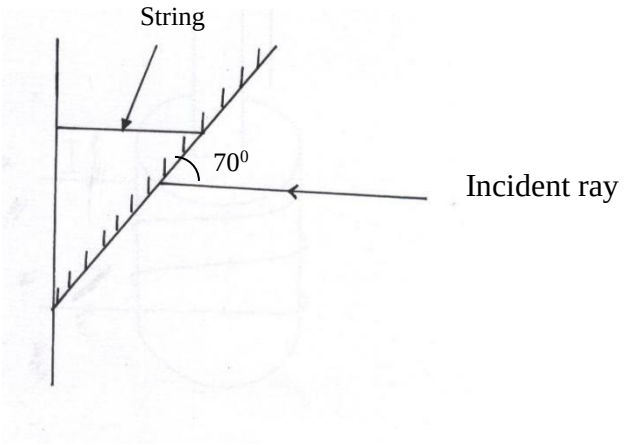

Fig 1

An incident ray then strikes the mirror at an angle of 70^0. Determine the angle formed between the incident ray and reflected ray. **(2 marks)**

2. Give a reason why a prism disperses white light into the component colours

(1 mark)

……

……

3. Fig 2 below shows a conductor y placed in a magnetic field. The conductor carries a current flowing into the paper.

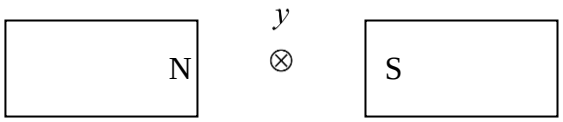

Fig 2

Sketch the resultant magnetic field between the poles of the bar-magnet

(1 mark)

Show on the diagram the direction of the force, F acting on the conductor

(1 mark)

4. Determine the largest number of 75W bulbs which can be safely used to run on a 240V source with a 5A fuse. **(3 marks)**

5. A charge of magnitude $12\times10^{3}C$ flows through a point in 15 minutes. Calculate the current. **(2 marks)**

6. Fig 3 below shows a 5μF and a 3μF capacitors connected to a 6V battery

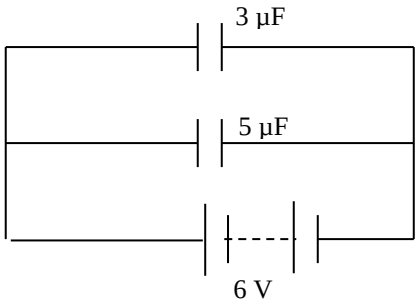

Fig 3

Calculate the charge stored in the circuit **(3 marks)**

7. Complete the diagram below to show how diffraction would occur as the incident waves pass through the obstacle.

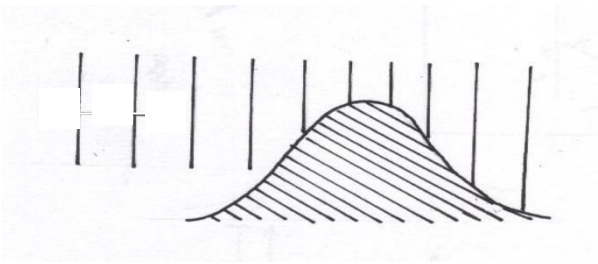

Fig 4

8. State the effect on conductivity of increasing the temperature of a semi-conductor **(1 mark)**

……

……

9. Arrange the following waves in the order of increasing wavelength :- X-rays, visible light, infra-red, T.V waves, micro waves **(1 mark)**

……

……

10. An Electric heater is rated 1000W, 240V. Calculate the resistance of this element **(2 marks)**

11. A freely pivoted spike is charged to a high negative voltage in the air

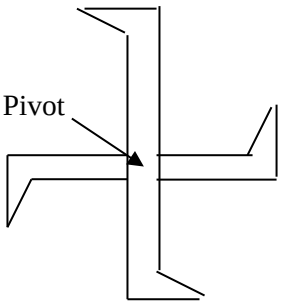

Fig 5

Explain why the spikes move **(2 marks)**

……

……

……

……..

12. What are the values of **m** and **a** in the nuclear equation given below:- **(1 mark)**

$$\underset{m}{a}X \rightarrow \underset{90}{230}Y + 2\propto$$

Figure **6** below shows the features of a diffusion cloud chamber used for detecting radiations from radioactive sources. Use it to answer questions 13 and 14.

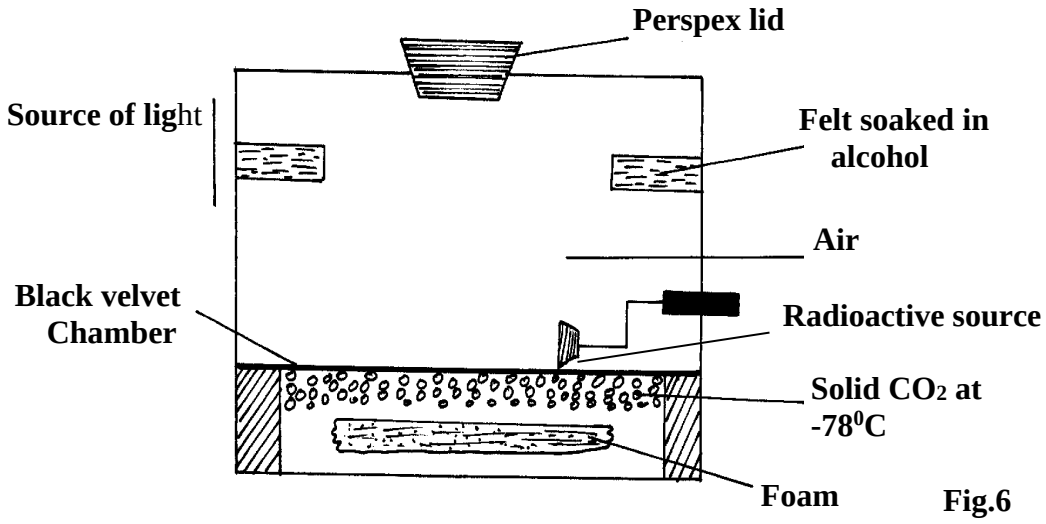

Fig.6

13. State the property of alcohol that makes it suitable for use in the chamber **(1 mark)**

…….. ……

……

14. Explain how the radiation from the radioactive source is detected in the chamber. **(4 marks)**

……

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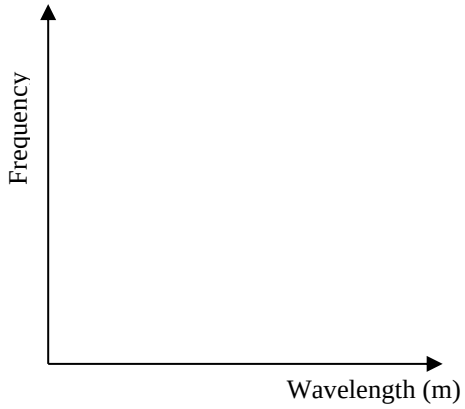
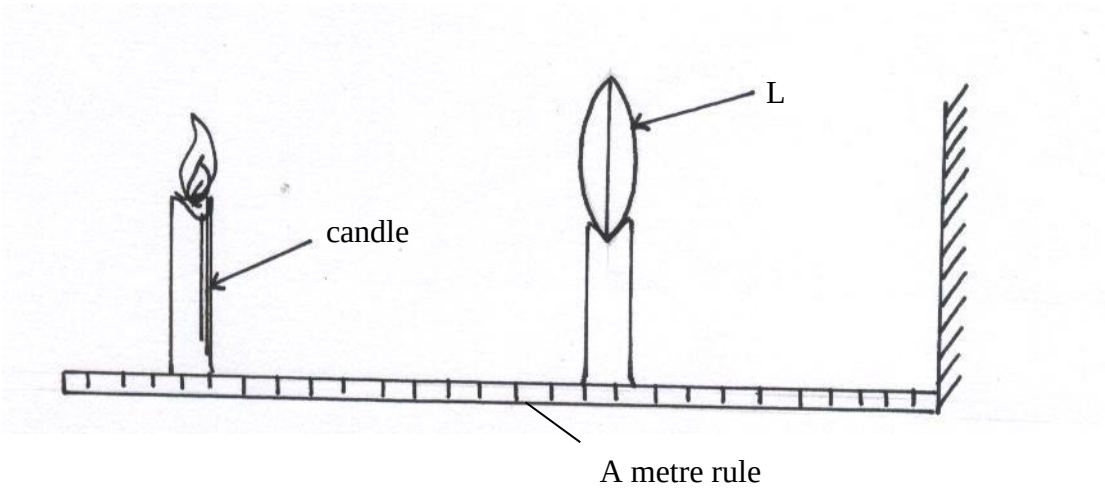
15. On the axes provided in the figure below, sketch a frequency-wavelength graph for an electro-magnetic wave. **(1 mark)**



SECTION B: (55 MARKS)

16. (a) The diagram below shows an experimental set up consisting of a mounted lens, L, a screen, S, a metre rule and a candle.



(i) Describe how the set-up may be used to determine the focal length, f of the lens.

(5 marks)

……

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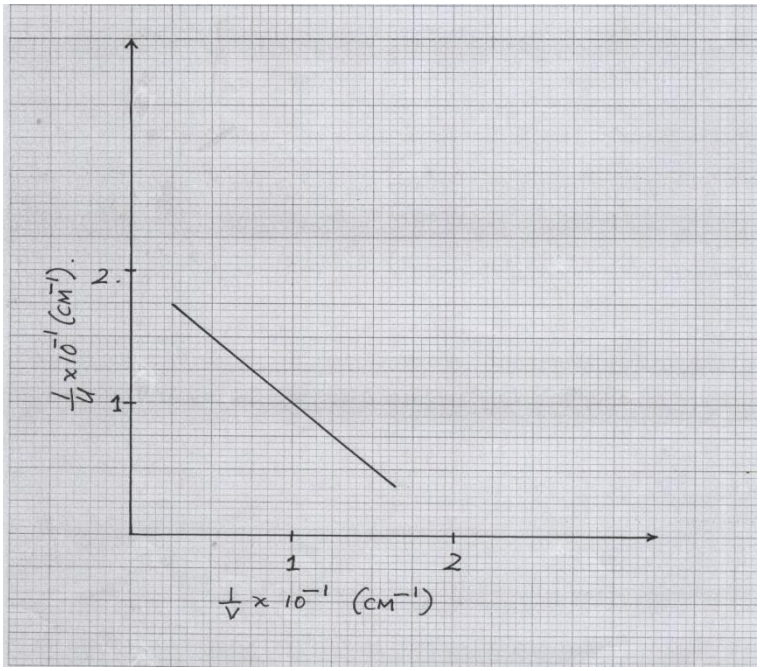
……

(ii) State the reason why the set-up would not work if the lens were replaced with a diverging lens **(1 mark)**

……

……

(b) The graph below shows the relationship between $\frac{1}{u}$ and $\frac{1}{v}$ for converging lens where u and v are the object and image distances respectively.



From the graph, determine the focal length, f, of the lens. **(5 marks)**

(c) An object placed 15cm from a convex lens is magnified two times. Determine the focal length of the lens. **(3 marks)**

17. (a) Which law relates the potential difference between the points of the conductor and the current flowing **(1 mark)**

……

……

(b) Two resistors 4Ω and the other unknown resistor x are connected in a circuit as shown in the fig 7 below

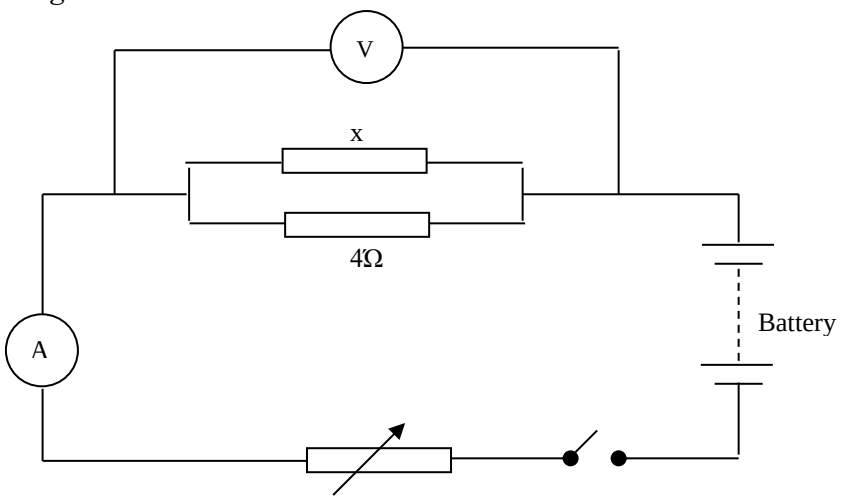
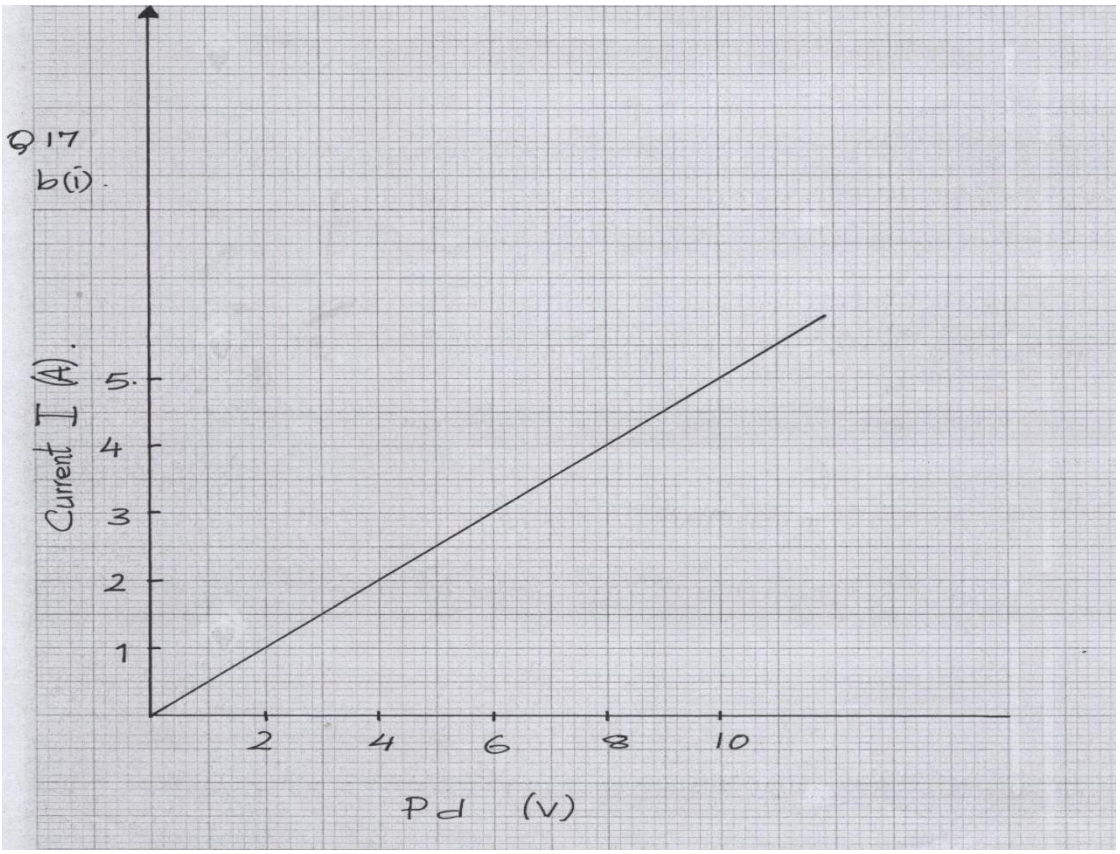


Fig 7

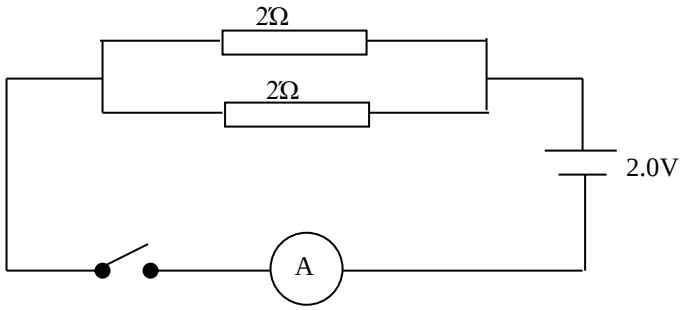
The current I passing through the combination is measured for various potential differences, A graph of p.d. against current is shown in the grid below.



(i) Use the graph to determine the total resistance of the combination. **(3 marks)**

(ii) Determine the value of the unknown resistance x **(2 marks)**

(c) The reading of the ammeter in the figure below is 0.5A when the switch is closed.



Determine the internal resistance of the cell **(3 marks)**

(d) A battery is connected to an external resistor, R. State any two factors that determine the magnitude of the current produced in the circuit. **(2 marks)**

(e) On the axes provided, sketch a graph to show how current, I varies with potential difference, V, across a metallic conductor that is being heated at the same time. Explain your answer **(2 marks)**

18.(a) (i) What is meant by photo-voltaic effect? **(1 mark)**

……

……

(ii) You are provided with a clean Zinc plate, a leaf electroscope, a charging rod and a source of ultra-violet (U.V). Describe briefly with the aid of a diagram how photo-electric effect may be demonstrated **(5 marks)**

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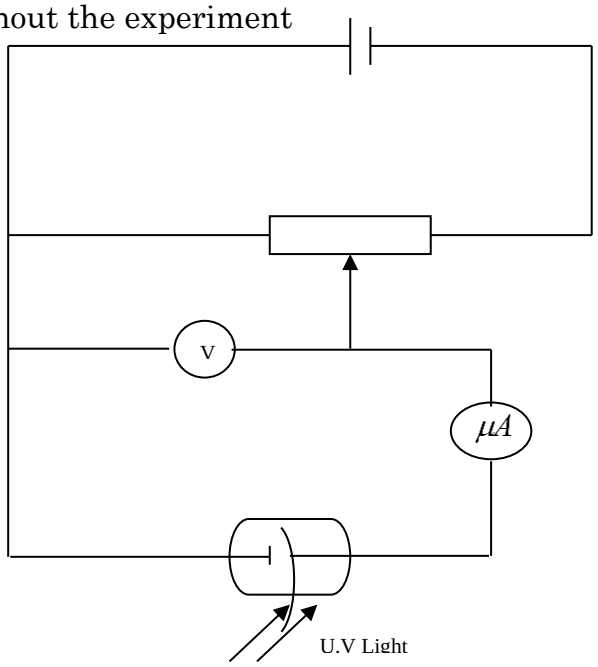
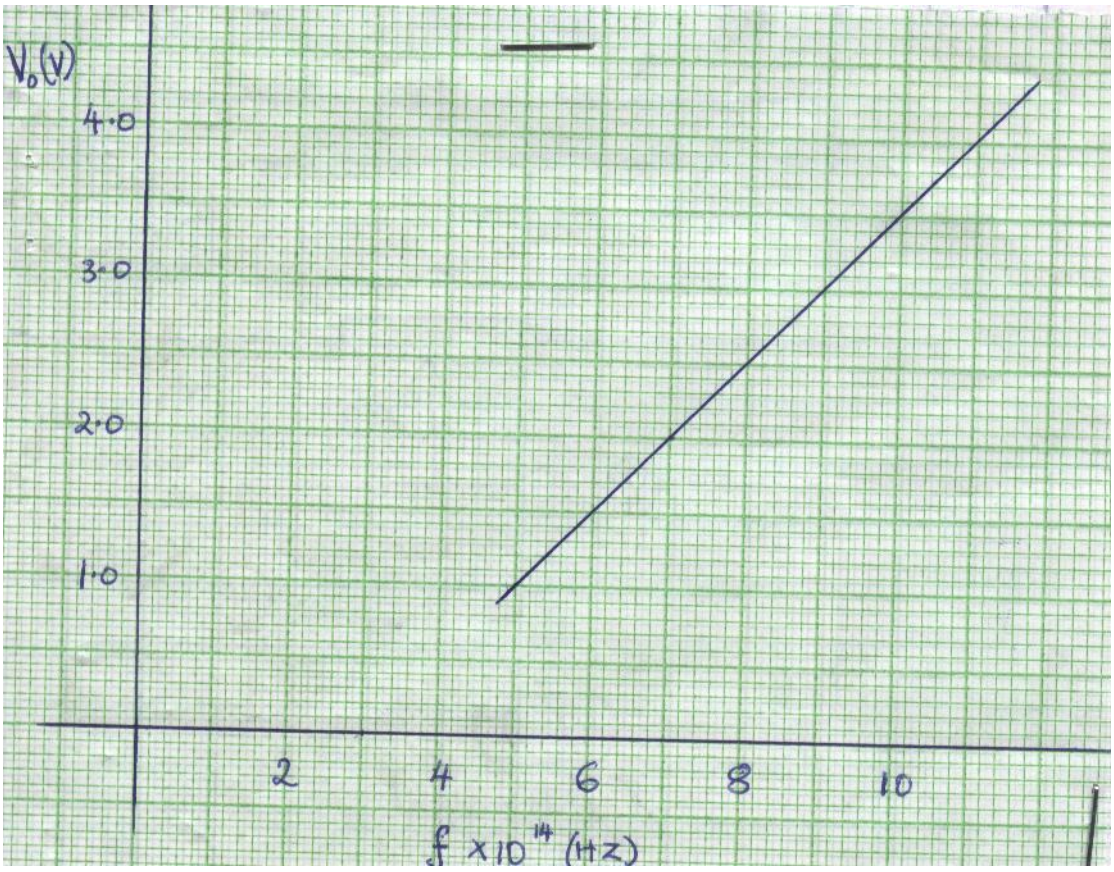
(b) The figure below shows the diagram of a setup used in an experiment to investigate photo-electricity. The frequency of the ultra-violet light was constant throughout the experiment



Sketch on the same axes the graphs of photo-electric current (y-axis) against the voltage for two different intensities A_1 and A_2 of ultra-violet where $A_1 > A_2$

(3 marks)

The graph below shows the variation of stopping potential, V_0, with incident frequency, f_1 for a certain metal producing photoelectrons



(i) What is meant by stopping potential? **(1 mark)**

……

……

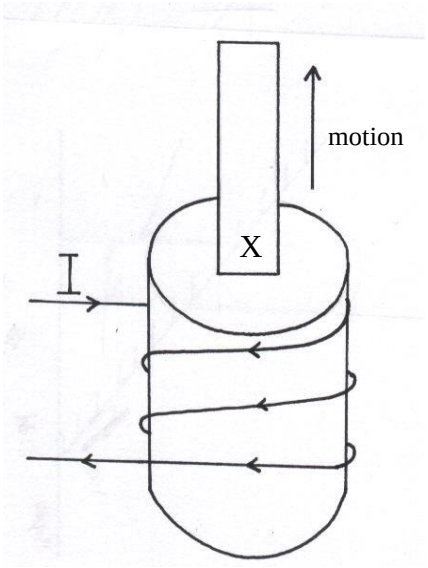
(ii) Use the graph to determine the working function of the metal **(5 marks)**

19. (a) State Lenz's law of electo-magnetic induction **(1 mark)**

……

……

(b) In the figure below, the bar magnet is moved out of the coil



(i) If the current, I is induced in the coil in the direction shown, what is the polarity of x of the magnet? **(1 mark)**

……

……

(ii) Explain briefly the source of electrical energy in the circuit **(1 mark)**

……

……

……

(c) A hydro-electric power station produces 500KW at a voltage of 10KV. The voltage is then stepped up to 150KV and the power is transmitted through cables of resistance 200Ω to a step down transformer in a sub-station. Assuming that both transformers are 100% efficient calculate;

(i) The current produced by the generator **(2 marks)**

(ii) The current that flows through the transmission cables **(2 marks)**

(iii) The voltage drop across the transmission cables **(2 marks)**

(iv) The power loss during transmission **(2 marks)**

(v) The power that reaches the sub-station **(2 marks)**

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KCSE TOP NATIONAL SCHOOLS TRIAL SERIES 2025

Name …… **Admission number** ……
Candidate's Signature……**Date**……

MASENO SCHOOL TRIAL 1

232/2

PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

FOR EXAMINER'S USE ONLY.

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-13	25	
B	14	10	
	15	12	
	16	11	
	17	12	
	18	10	
TOTAL		**80**	

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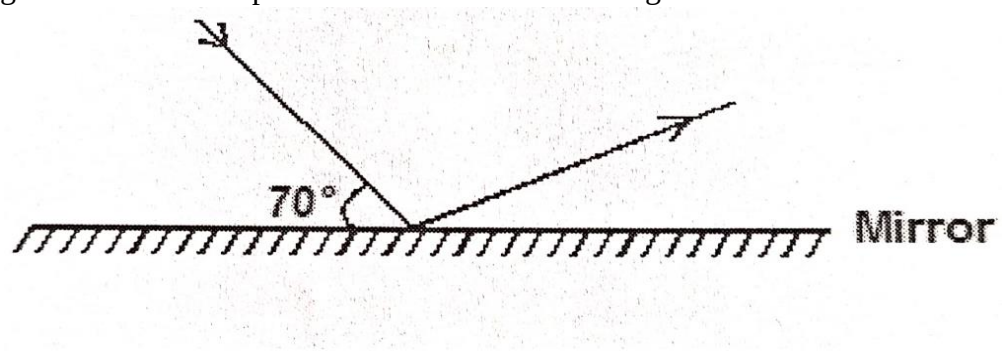
SECTION A (25MARKS)

1. A ray of light is incident on a plane mirror as shown in the figure below.



If the mirror is rotated anticlockwise through angle of 8^o what will be the angle of rotation of the reflected ray? (1mark)

……

……

2. State two uses of a charged gold leaf electroscope (2marks)

……

……

3. The table below shows part of the electromagnetic spectrum in order of decreasing wavelength.

A	B	Infrared Radiation	Visible Light	C	D

a)Name the radiation C (1mk)

……..

b)Give one use of the wave D in medicine (1mark)

……..

4. A current of 0.5A flows in a circuit. Calculate the amount of charge that crosses a point in the circuit in 4 minutes. (2marks)

……

……

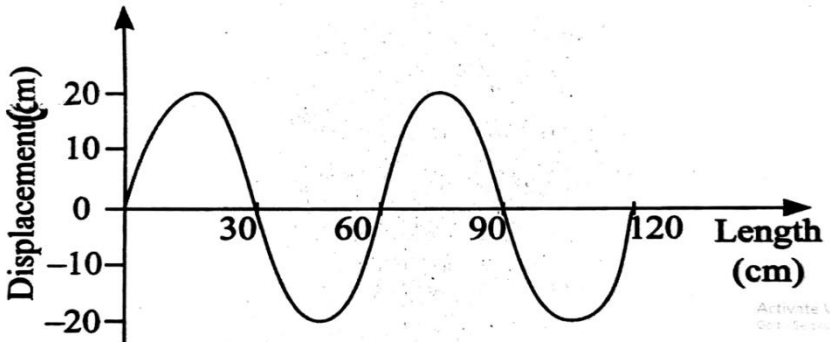
……....

5. Give two properties of magnetic field lines around a bar magnet. (2marks)

……

……

6. The diagram below shows a displacement- position graph for a slinky spring as it is continually vibrated at one end.



What is the

i) Amplitude of the displacement? (1mark)

……

ii) Wavelength of the waves (1mark)

……

7. The critical angle for a ray travelling from glass to air is 42^{o}. Determine the refractive index of the glass. (2marks)

……

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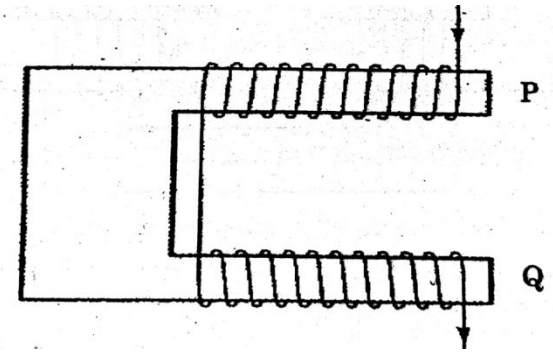
8. The diagram below shows a current – carrying wire wound on a U-shaped soft iron.



Draw the magnetic field patterns at P and Q (2marks)

9. An electrical heater rated 240V, 3000W is to be connected to a 240V mains supply through a 10 A fuse. Determine whether the fuse is suitable or not. (3marks)

10. State one cause of power loss in long distance transmission wire and how this loss can be minimized. (1mark)

……

……

……

11. Explain why walls of the studio are padded with woolen materials. (1mark)

……

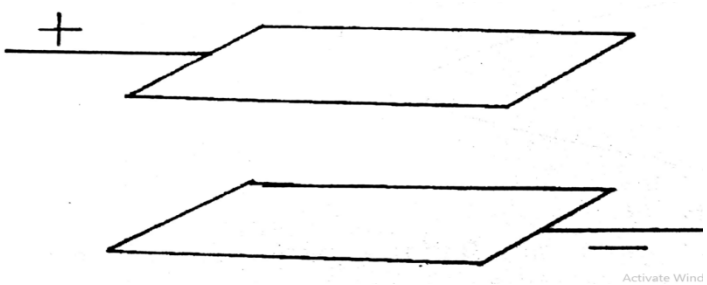
12. An object is placed 8cm from a concave mirror whose radius of curvature is 20cm. Determine the position of the image. (3marks)

……

……

……

13. The figure below shows a pair of parallel plates of a capacitor connected to battery. The upper plate is displaced slight to the left.



State with a reason the effect of this movement on the capacitance. (2marks)

……

SECTION B (55 MARKS)

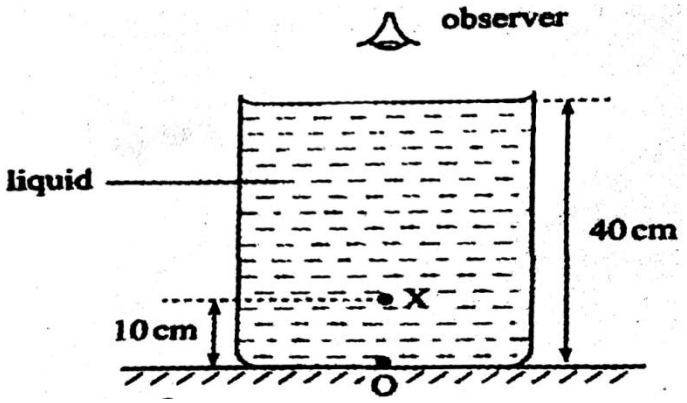
14a) Define the term critical angle. (1mark)

……

……

……

b)The figure below shows an object O at the bottom of a beaker full of a liquid. An observer above the beaker sees its image at point X inside a liquid



Determine the refractive index of the liquid (3marks)

……

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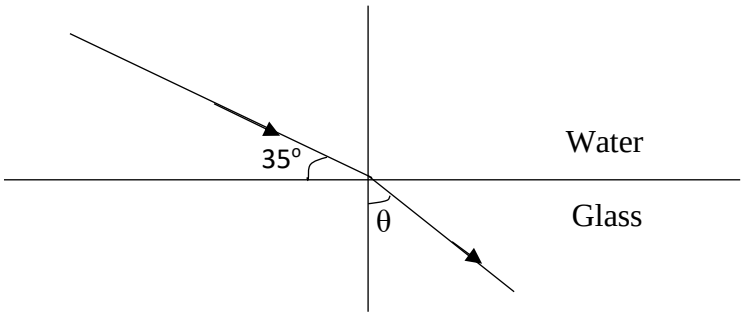
c) The diagram below shows a ray of light travelling from water to glass. Given that the refractive index of water and glass are 1.33 and 1.5 respectively. Find the angle of refraction r in the glass (3marks)



……

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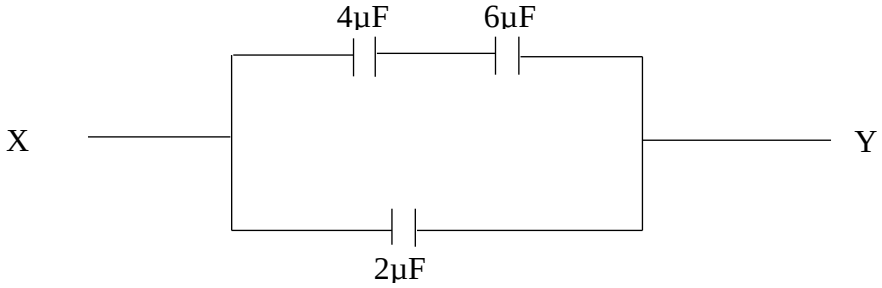
d) The diagram below shows a simple network of capacitor.



If the potential difference between X and Y is 6V, calculate the total charge stored by the capacitors. (3marks)

……

……

15a) Define the term principal focus of a convex lens (1mark)

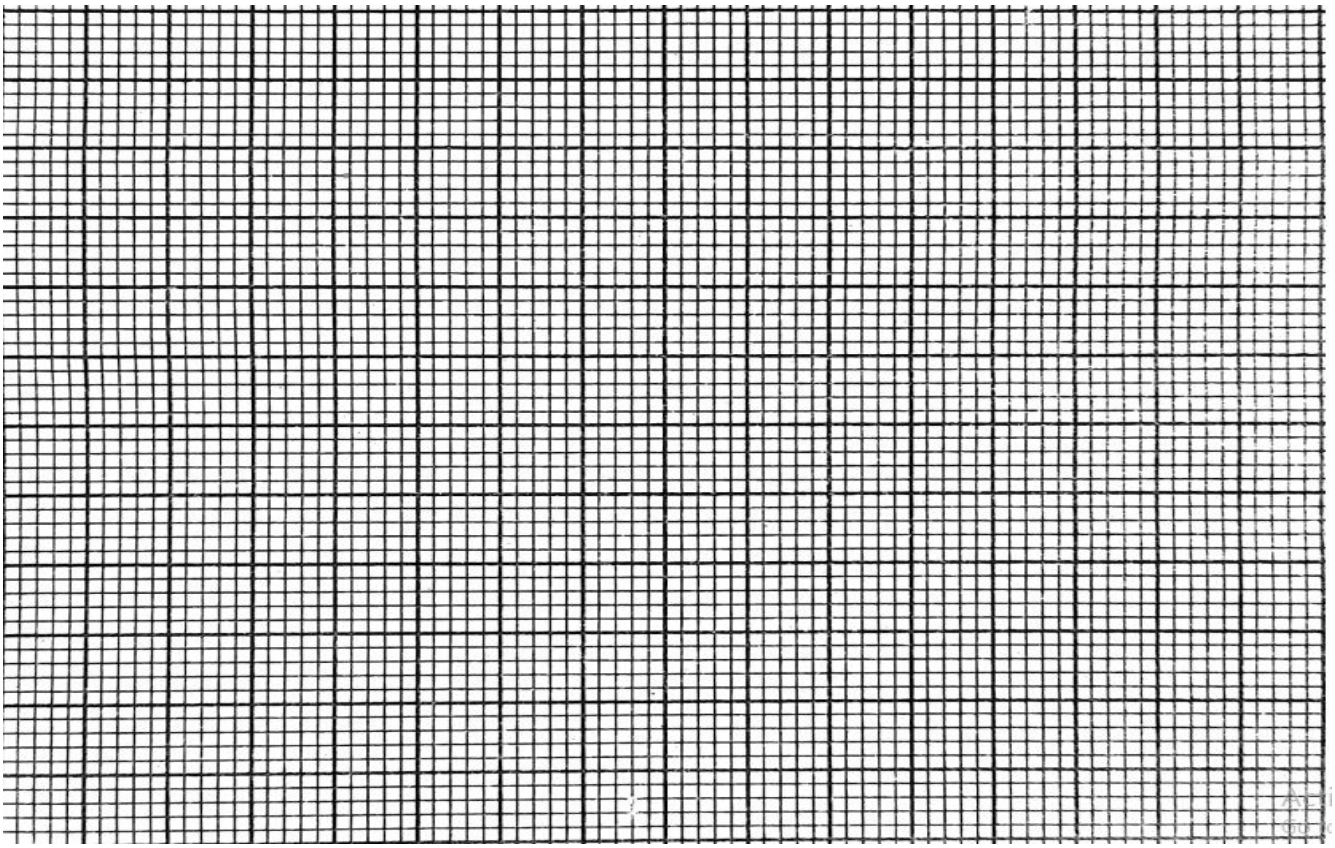
……

……

b) State two characteristics of image formed by the diverging lens. (2marks)

……

c) An object of height 10cm is placed 25cm from a converging lens of focal length 15cm.
i) On the grid provided draw a ray diagram to locate the position of the image. (3marks)



ii) From the graph determine the;
a) Image height (2marks)

……

……
b) Image distance (2marks)

……

……

c) Magnification (2marks)

16a) what is meant by electromotive force E.m.f of a cell (1mark)

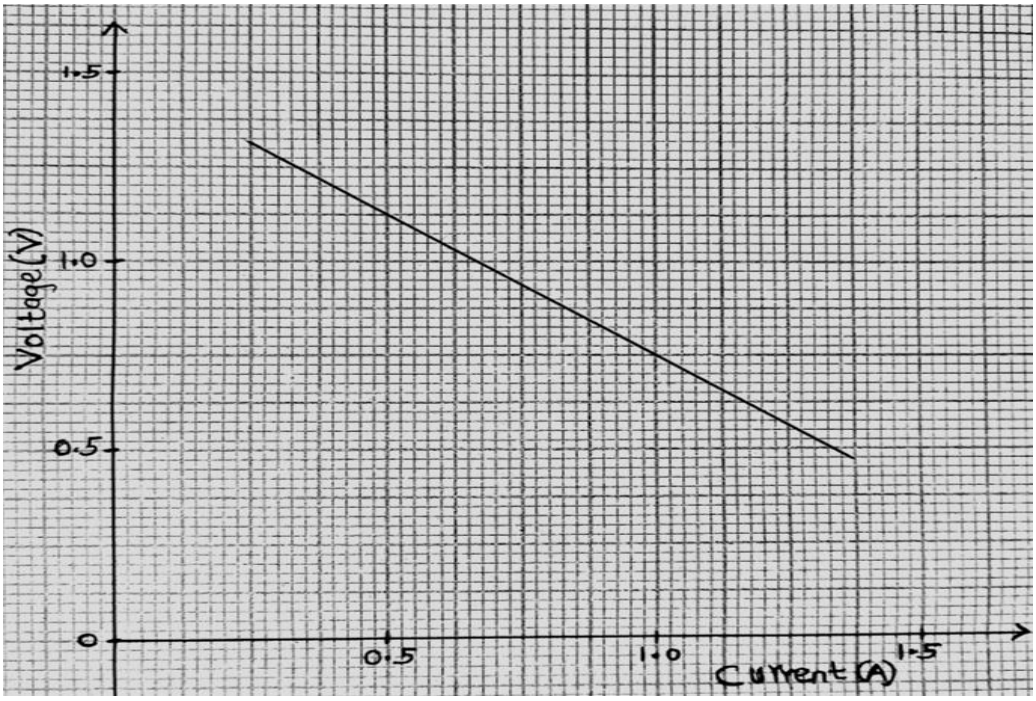
……

……

b) Name one factor that affect resistance of a metallic conductor. (1mark)

……...

c) In an experiment to determine E.m.f ,E and the internal resistance r of a cell, a student obtained the values of voltage V and current I . He then plotted the graph of voltage V against current below.



i) Sketch the circuit that could be used to obtained the plotted results. (2marks)

ii) Given that **V=E – Ir** determine

I) E.m.f, E of the battery (2marks)

……

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……

II) Internal resistance r of the battery (2marks)

d) What causes electrical resistance in conductors (1mark)

……

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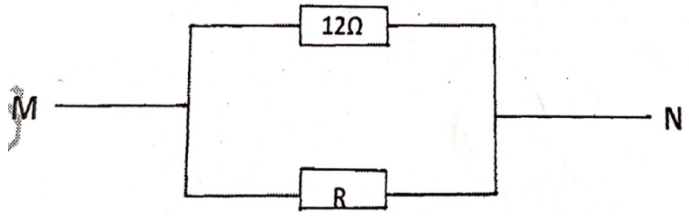
e) The combined resistance of the resistors in the circuit below is 8Ω.



Find the value of R (2marks)

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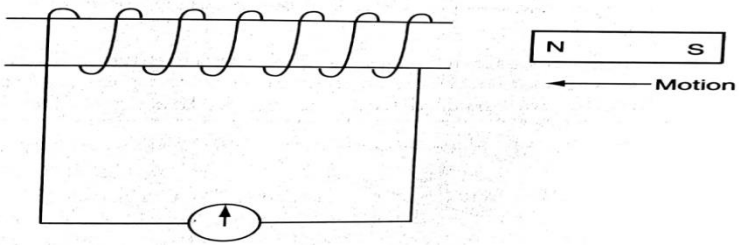
17a)State the Lenz's law of electromagnetic induction (1mark)

……

……

b) In the figure below show the direction of the induced current in the circuit (1mk)



c) Give two factors that determine the magnitude of emf induced in a coil. (2marks)

……

……..

d) A transformer has 1200 turns in the primary circuit and 120 turns in the secondary circuit has its primary circuit connected to a 400V a.c source.

i) Name the type of the transformer. (1mark)

……

ii) Determine the secondary voltage (2marks)

……

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iii) Determine the efficiency of the transformer given that the current in the primary coil is 0.10A and in the secondary coil is 0.80A (3marks)

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iv) One of the primary ways in which power is lost in a transformer is through eddy currents. State how eddy currents can be minimized (1mark)

……

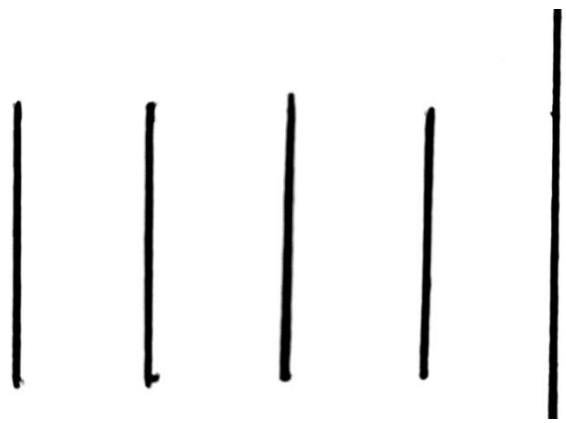
v) State one property of soft iron that makes it suitable for use as a transformer core. (1mark)

……

18a)Give two conditions neccessary for the formation of stationary waves (2marks)

……

b)The figure below shows progressive wave crossing from a deep to shallow region.



Deep **Shallow**

i)On the diagram show how the waves proceed in the shallow region. (1mk)

ii)State the property of the waves illustrated in the diagram you have drawn above in b(i) (1mark)

……..

iii) Calculate the wavelength of a radio wave of frequency 100 kHz (Take C=3.0 x10^8 m/s). (2marks)

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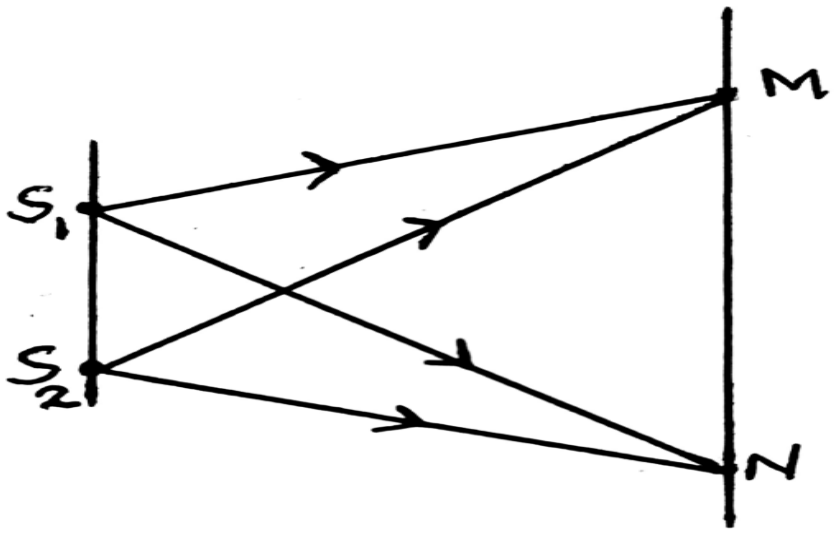
c)The diagram below shows light rays from two coherent sources S_1 and S_2 falling on the screen. Dark and bright fridges are observed between M and N.



Explain how

I) Bright fridges are formed (1mark)

……..

II) Dark fridges are formed (1mark)

……..

ii)State and explain what is observed when light of a higher frequency is used (2marks)

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Candidate's Signature……**Date**……

MERU SCHOOL TRIAL 1

232/2

PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page.*

b) *This paper consists of two sections; A and B.*

c) *Answer ALL the questions in the spaces provided.*

d) *Mathematical tables and electronic calculator may be used.*

e) *Candidates should answer the questions in* ***English.***

FOR EXAMINERS USE ONLY

Section	Question	Maximum score	Candidate's score
A	1 – 12	25	
B	13	09	
	14	15	
	15	15	
	16	9	
	17	07	
	TOTAL SCORE	80	

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SECTION A (25 MARKS)

Answer All the questions in this section in the spaces provided

1. **Figure 1** shows the path of a ray of light after striking two mirrors at an angle. Determine the angle between the two mirrors. (**Show your working**) **(1 mark)**

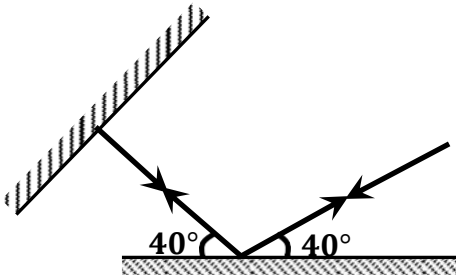

Figure 1

……

2. Polarization is a defect of a primary cell.

(a) Define polarization **(1 mark)**

……

……

(b) State the other defect. **(1 mark)**

……

3. Determine the time it will take a ray of light to traverse a transparent glass block of length 20 cm given that the velocity of light in air is $3.0 \times 10^8\, ms^{-1}$. (Take the absolute refractive index of glass as 1.5) **(3 marks)**

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4. State one other factor that increases the speed of sound in solid a part from increase in temperature. **(1 mark)**

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5. **Figure 2** shows an object placed at the center of curvature of a concave mirror. Draw a ray diagram to show how the image of the object is formed by the mirror. **(2 marks)**

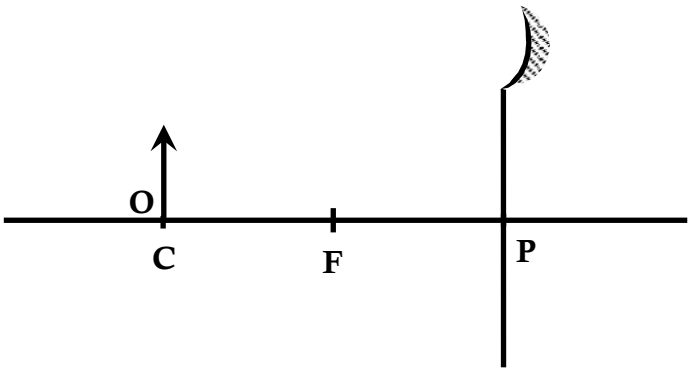

Figure 2

6. A charge of 240 μC flows through a conductor of resistance 4 $k\Omega$ in 2 $minutes$. Determine the work done to move the charge through the conductor. **(3 marks)**

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7. State the reason why radio signals have clear reception than television signals in area that is surrounded by hills. **(1 mark)**

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8. A physics student dipped a bar magnet into iron fillings during an experiment in the lab. When the student lifted the bar magnet, the distribution of iron fillings around the bar magnet was as shown in **Figure 4**.

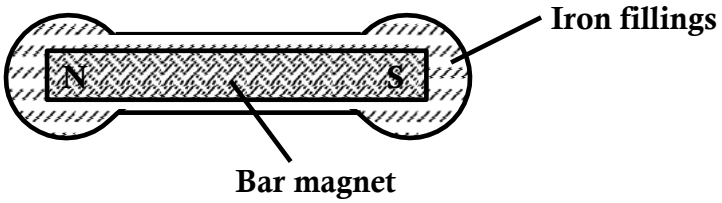

Figure 4

State the conclusion the student made. **(1 mark)**

……

……

9. **Figure 3** shows a copper rod AB lying across two metal rods L and M which are fixed onto a plastic support and also connected to a battery.

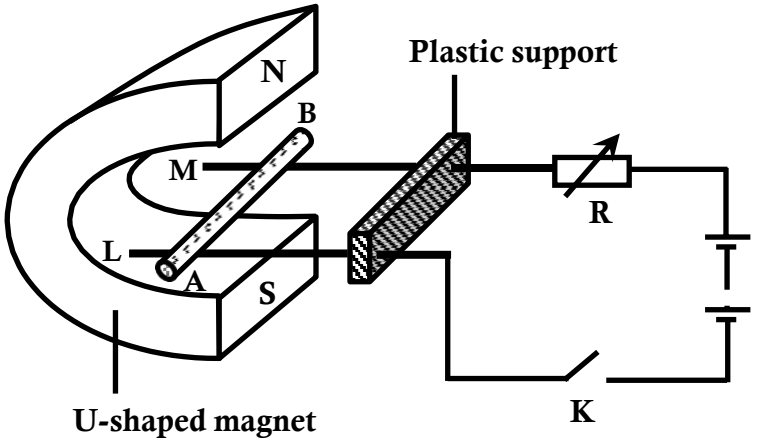

Figure 3

(i) Indicate on the diagram the direction of force experienced on the copper rod AB. **(1 mark)**

(iii)State the direction of force on copper rod AB if the direction of both current and magnetic field are reversed simultaneously. **(1 mark)**

……

(iv)State one way of increasing the force on the copper rod AB. **(1 mark)**

……

……

10. State one advantage and one disadvantage of using a convex mirror as a driving mirror. **(2 marks)**

Advantage:

……

……

……

Disadvantage:

……

……

……

11. Give a reason why a pinhole camera forms a blurred image of an object in front of it if the diameter of the pinhole is reduced to less than 1.00 *mm*. **(1 mark)**

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12. Figure 5 below shows a ferromagnetic material PQ being magnetized.

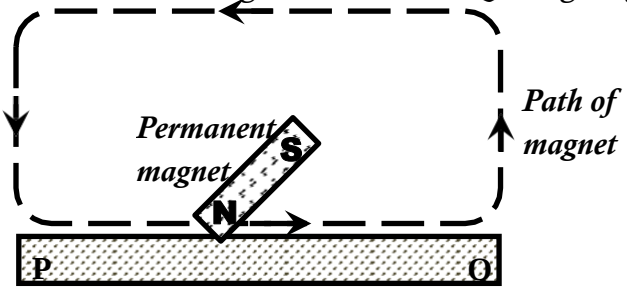


Figure 5

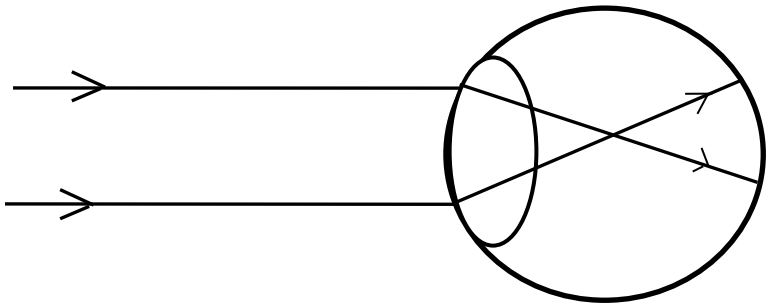
(a) (I)State the method of magnetization being used. **(1 mark)**

……

(II)State the pole acquired at P. **(1 mark)**

……

(b) The figure below shows how a distant object is focused in a defective eye.



i) State the nature of the defect. (1mark)

……

……

ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. (2 marks)

SECTION B (55 MARKS)

Answer All the questions in this section in the spaces provided.

13. (a) When current flows through a coil of nichrome wire in an electrical circuit, the wire becomes very hot.

(i) Give a reason why the nichrome wire becomes very hot. **(1 mark)**

……

……

……

(ii) Give a reason why heat is produced only across nichrome wire and not across other devices in the circuit. **(1 mark)**

……

……

(iii) State one factor that determines the amount of electrical energy converted to heat energy by nichrome wire. **(1 mark)**

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(b) **Figure 6** shows a workman using a cordless electric drill.

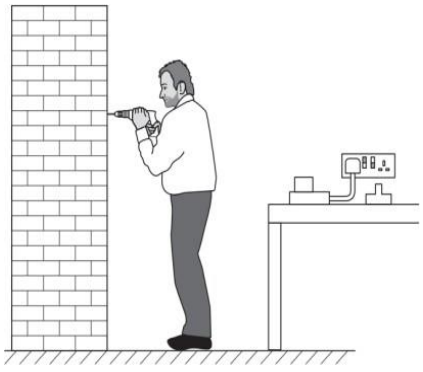

Figure 6

The motor of the drill is powered by a rechargeable battery with an e.m.f. of 23 V. When the drill is used, the power supplied to the motor is 550 W. The workman uses the drill for 1 hour and 30 minutes. Calculate;

(i) The electrical energy supplied to the motor. **(3 marks)**

……

……

(ii) The charge that the battery supplies. **(3 marks)**

……

……

14. (a) (i) Distinguish between a transverse wave and a longitudinal wave. **(1 mark)**

……

……

……

……

(ii) State one example of a transverse wave and a longitudinal wave. **(2 marks)**

Transverse wave: ……

Longitudinal wave: ……

(b) **Figure 7 (a)** shows a wave profile for a pendulum bob X released from point P and allowed to swing through Q to R and back a number of times as shown in **Figure 7 (b)**.

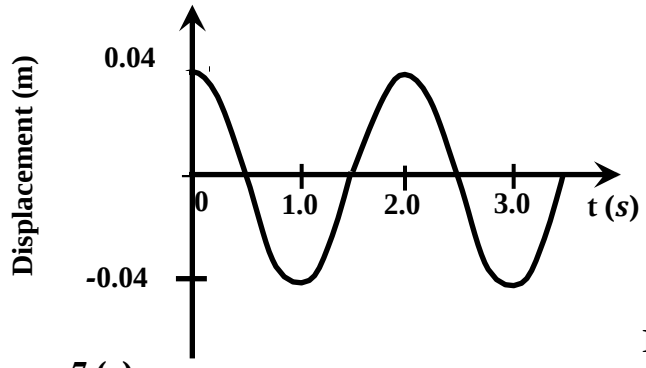

Figure 7 (a)

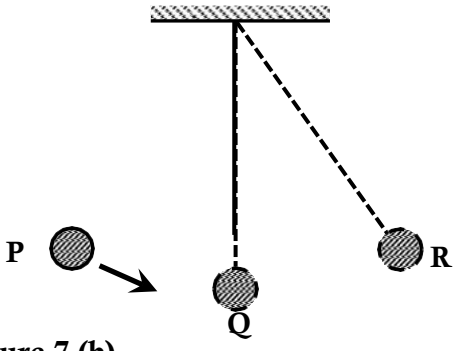

Figure 7 (b)

(i) Determine the amplitude of the wave. **(1 mark)**

……

(ii) Calculate the frequency of the wave. **(3 marks)**

……

……

(iii) Sketch a wave profile on the same axes for a similar pendulum bob Y released from point R and oscillating on its own path through Q to P and back a number of times at the same frequency but with half-amplitude as the pendulum bob X. **(2 marks)**

(c) In an experiment to observe the interference of light waves, a double slit was placed close to the source of monochromatic light as shown in **Figure 8**.

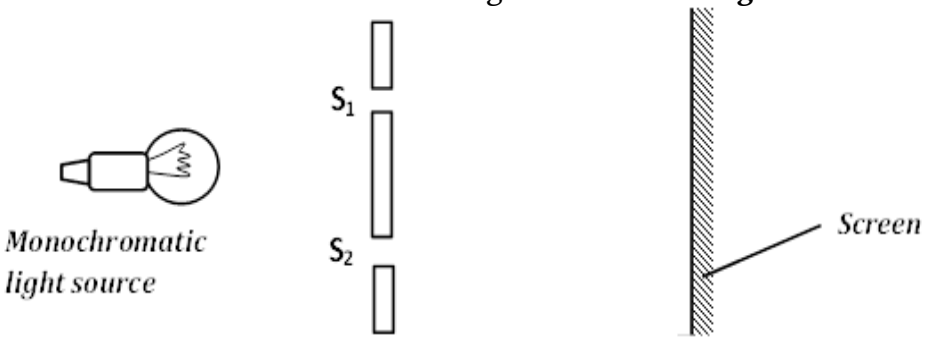

Figure 8

(i) State one condition for interference to occur. **(1 mark)**

……...

(ii) State the function of the double slit. **(1 mark)**

……

(iii) State the observation made on the screen. **(1 mark)**

……

……

(iv) Explain the observation made on the screen. **(2 marks)**

……

……

……

……

(v) State what would happen if the monochromatic light source was replaced with white light source. **(1 mark)**

……

……

……

15. (a) Define critical angle. **(1 mark)**

……

……

……

(b) There are two conditions necessary for total internal reflection to occur. One is that the ray of light must be moving from an optically denser medium to a rarer medium. State the other condition. **(1 mark)**

……

……

……

(c) **Figure 9** shows the interface between water and diamond.

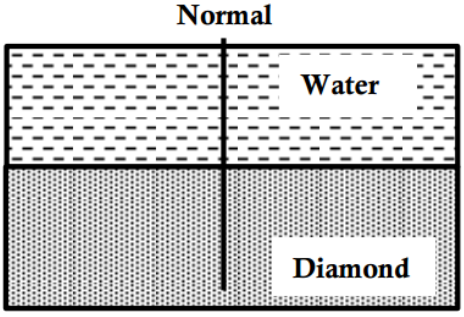

Figure 9

(i) Draw on the figure a ray diagram to illustrate the critical angle C. **(2 marks)**

(ii) Calculate the critical angle C given that $n_{aw} = \frac{4}{3}$ and $n_{ad} = 2.42$. **(3 marks)**

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(d) **Figure 10** shows a small piece of an optical fibre cable.

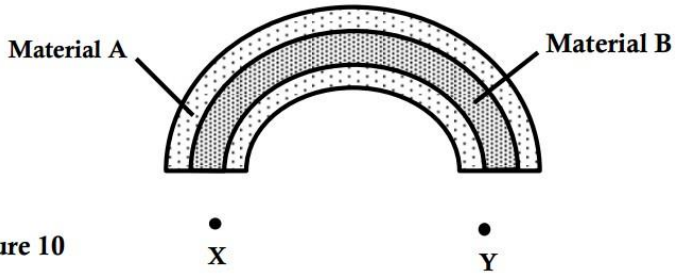

Figure 10

(i)State which material has a higher refractive index. **(1 mark)**

……

(ii)A ray of light enters the optical fibre at X and emerges from Y.

I. Sketch the path of the ray through the optical fibre. **(1 mark)**

II. State the reason why light travels through the fibre as in (i) above. **(1 mark)**

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(iii) State one advantage of optical fibre over conventional copper cables as used in telecommunication. **(1 mark)**

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(iv)Apart from its use in telecommunication, state any other application of optical fibre cable. **(1 mark)**

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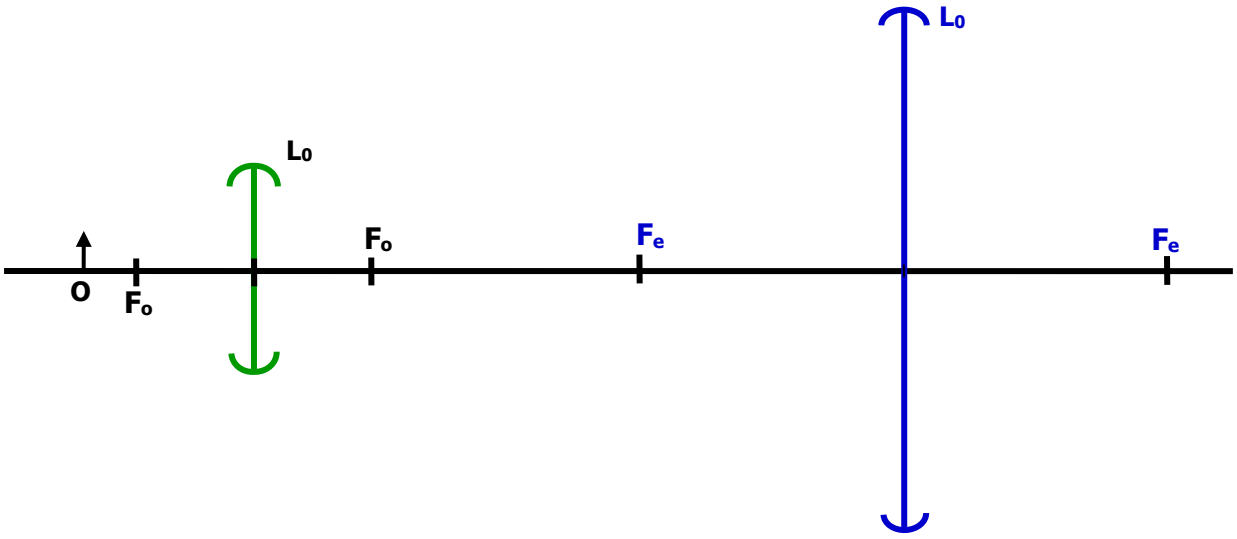
(e) The diagram shows an arrangement of lenses; L_o and L_e used in a compound microscope F_0 and F_e are principal foci of L_0 and L_e respectively. Draw the rays to show how the final image is formed in the microscope. **(3 marks)**



16.(a) Define electromotive force (e.m.f) of a cell. **(1 mark)**

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(b) **Figure 11** shows ammeters, resistors and a voltmeter connected to a battery of e.m.f E and internal resistance r of 0.25 Ω. The reading of ammeter A_2 is 2.0 A.

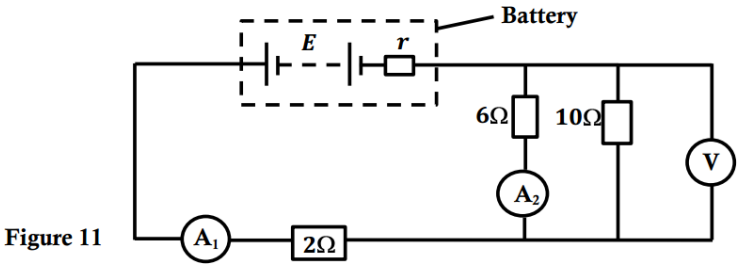

Figure 11

Calculate the;

(i) Total resistance of the circuit. **(2 marks)**

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(ii) Voltmeter reading. **(3 marks)**

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(iii) Reading of ammeter A_1. **(1 mark)**

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(iv)e.m.f, E of the battery. **(2 marks)**

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17 (a) Define capacitance of a capacitor. **(1 mark)**

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(b) **Figure 12** shows three capacitors connected to a battery of voltage $12\,V$.

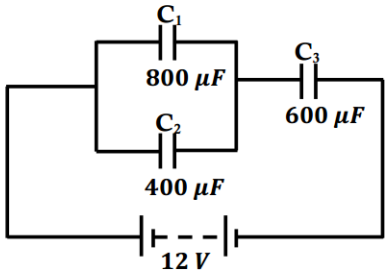

Figure 12

(i) Calculate the effective capacitance of the arrangement. **(2 marks)**

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(ii) Calculate the charge on the 6 μF capacitor. **(3 marks)**

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(c) The conductors A and B in **Figure 13** are positively charged and each placed on insulating stands. Show the distribution of charges on conductors A and B. **(2 marks)**

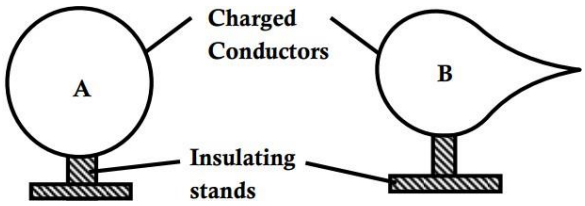

Figure 13

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KCSE TOP NATIONAL SCHOOLS TRIAL SERIES 2025

Name …… **Admission number** ……

Candidate's Signature……**Date**……

MOI GIRLS ELDORET SCHOOL TRIAL 1

232/2

PHYSICS

PAPER 2

Instructions to Candidates

- *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections: **A** and **B.***
- *Answer **ALL** the questions in the spaces provided.*
- *Mathematical tables and electronic calculator may be used.*
- *All working MUST be clearly shown.*
- *This paper consists of **13** printed pages.*
- *Candidates should answer the questions in English and check to ensure that no question(s) is missing.*

FOR EXAMINER'S USE ONLY

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 12	25	
B	13	11	
	14	15	
	15	11	
	16	8	
	17	10	
TOTAL SCORE		**80**	

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SECTION A: 25 MARKS

Answer all questions in this section

1. **Figure 1** shows two mirrors inclined at an angle of 30^o to each other. A ray of light is incident on one mirror as shown

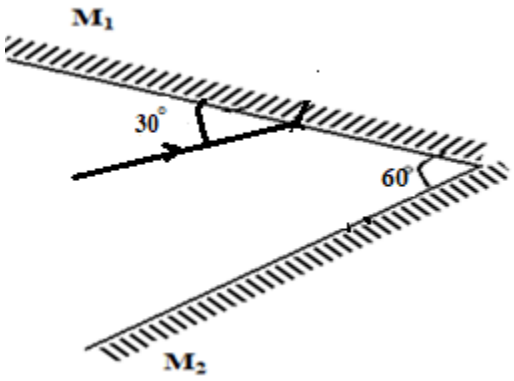

Figure 1

Sketch the path of the ray to show its reflection on the two mirrors (2mks)

2. **Figure 2** shows the path of a ray of light CB passing from glass to air.

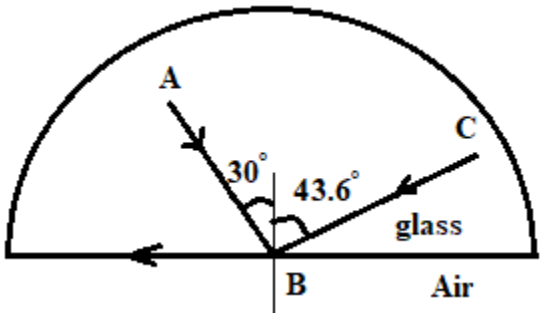

Figure 2

Complete the diagram to show the path of the ray of light AB after it emerges from the glass showing the angle calculated. (3mks)

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3. **Figure 3** shows water waves moving towards barrier.

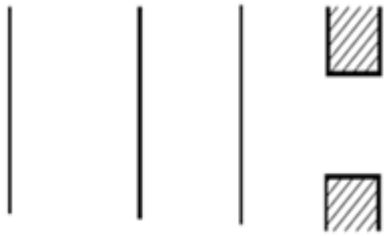

Figure 3

i) State the property of wave under investigation. (1mk)

……

ii) Show the emergence of the reflected wave after passing the opening (1mk)

iii) State why passing of light through narrow opening is a very rare phenomenon (1mk)

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4. **Figure 4** shows an object in front of a concave mirror and its image.

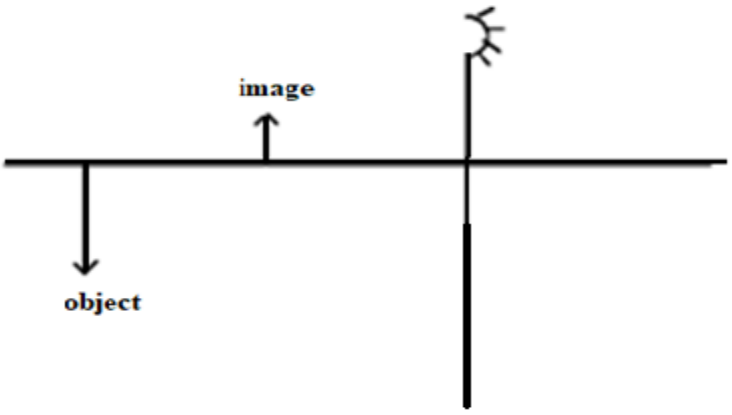

Figure 4

Locate position of its principal focus and label it as F (2mks)

5. **Figure 5** shows a wave profile.

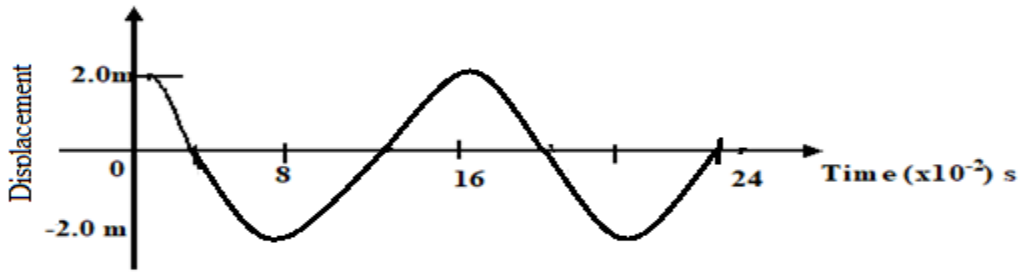

Figure 5

Determine the frequency of the wave (3mks)

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6. **Figure 6** shows a bar of soft iron placed near a magnet.

Figure 6

On the same diagram, sketch the magnetic field pattern due to the set up (2mks)

7. State two uses of a charged gold leaf electroscope. (2mks)

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8. State two physical quantities that can be measured to determine whether a secondary chemical accumulator requires to be charged. (2 mks)

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9. Explain why the walls of studios are padded with woolen materials. (1 mk)

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10. State one similarity between the working of the human eye and the lens of a camera. (1 mk)

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11. Give any two ways of increasing the capacitance of a parallel plate capacitor (2 mks)

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12. Three resistors of 3 Ω, 6 Ω and 9 Ω are connected in parallel. Determine the total resistance. (2 mks)

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SECTION B. (55 MARKS)

Answer all questions in this section

13. a) **Figure 7** shows an object, a screen and light sources X, Y and Z.

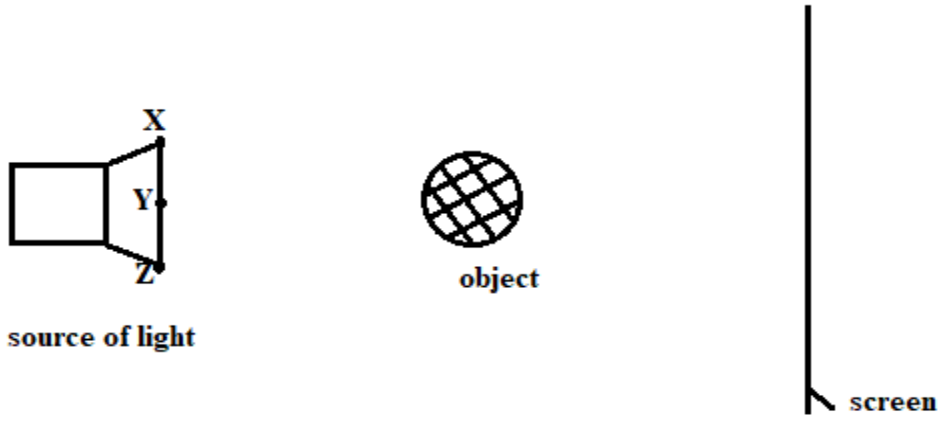

Figure 7

i) Complete the diagram to show the formation of a shadow (2mks)

ii) Explain why it is impossible to obtain a sharp-edged shadow of the object (1mk)

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iii) State one property of the object that makes it possible for its shadow to be formed (1mk)

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b) (i) The length of a pinhole camera is 20cm. Determine the height of a sloppy building 300m away from a pinhole camera which forms an image 2.5cm high on the screen of the camera. (3mks)

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(ii) A student decided to use a nail to make the hole of the camera mentioned above. State two possible characteristics of the image formed (2mks)

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c) Give two differences between the images formed by the pin-hole camera and the plane mirror (2 mks)

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14. a) What is meant by the term electromotive force of a cell? (1mk)

b) Battery of e.m.f. 12 V supplies a current of 10 A flows through it for 5 minutes. Determine the amount of electrical energy produced. (2mks)

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c) **Figure 8** shows a graph of resistance against reciprocal of current. Use it to answer the questions that follow.

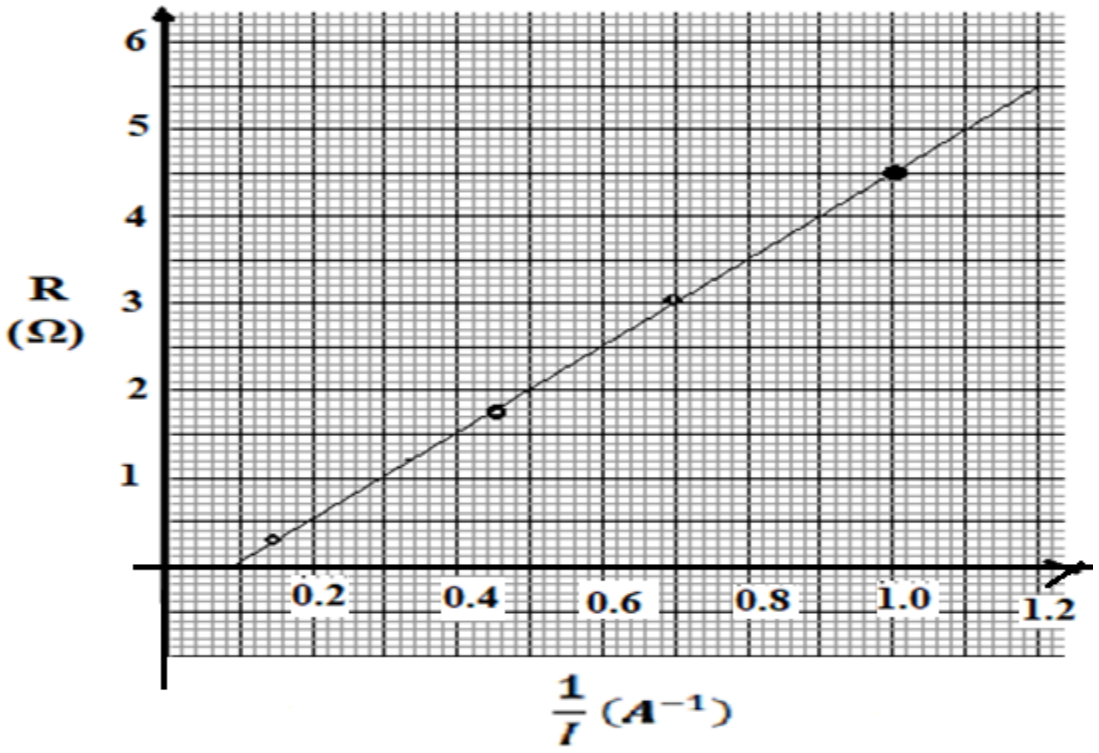

Figure 8

i) Find the internal resistance, r. (2mks)

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ii) Determine the e.m.f, E of the cell. (2mks)

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iii) Draw a circuit diagram to show the set-up used to generate the above graph (2mks)

d) i) Draw a circuit diagram to show how a 12V battery may be used to operate efficiently 3 headlamp bulbs each marked 6V, 24W. (2mks)

ii) Calculate the current supplied by the battery in (d) above. (2mks)

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iii) Calculate the total effective resistance of the bulbs in (i) above. (2mks)

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15. a) State the meaning of the term principal focus as applied in lenses (1 mk)

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b) A real object of height 1 cm placed 50mm from a converging lens forms a virtual image 100mm from the lens. Determine the following;

I. Focal length of the lens (3 mks)

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II. The magnification (2 marks)

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c) State two optical instruments that produce a magnified real image using a convex lens

(2 mks)

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d) The diagram below shows a compound microscope with objective and eyepiece of principal foci Fo and Fe respectively. Complete the ray diagram to illustrate how the eye sees the final image. (3 mks)

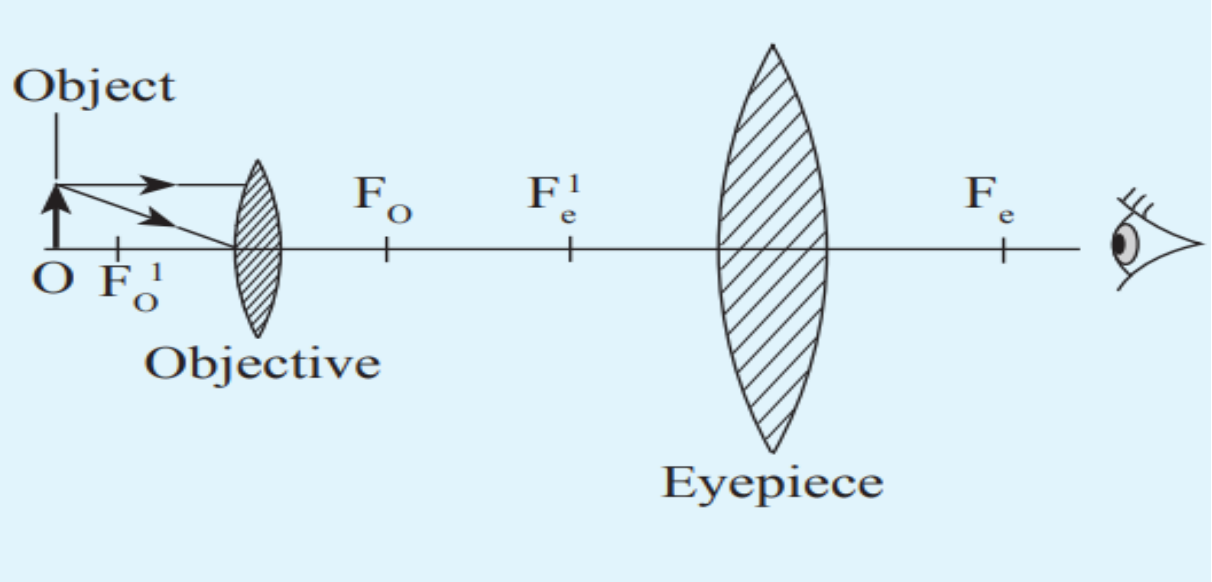

Figure 9

16. a) State Flemings left hand rule (1 mark)

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b) A small electromagnet for lifting and releasing a small steel ball is made in the laboratory as shown in figure 10 below

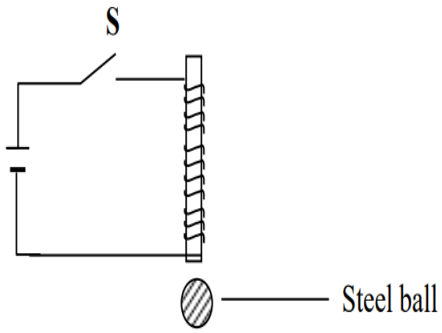

Figure 10

i) Explain why soft iron is better material to be used for the core than steel. (1 mk)

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ii) In order to lift a slightly larger ball, it is necessary to make a stronger electromagnet. State two ways in which electromagnet can be made more powerful. (2 mks)

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c) The figure 11 below illustrates a circuit diagram of an electric bell.

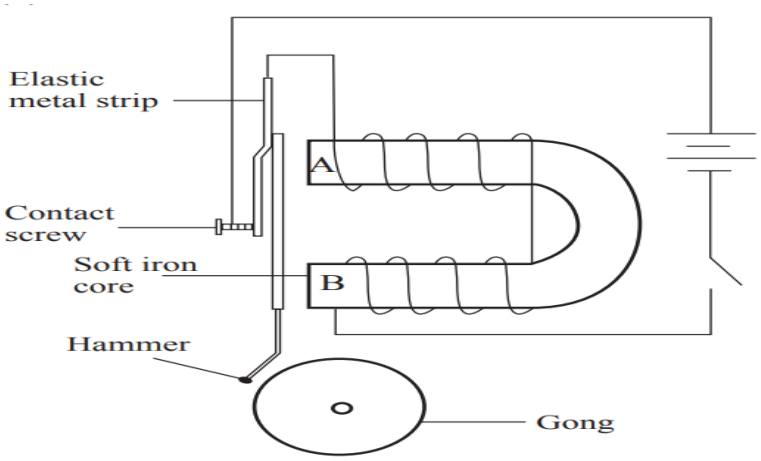

Figure 11

Explain how the bell works. (4 marks)

17. a) A spoon partly submerged in a glass of water appears bent. Explain. (1 mk)

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b) A coin is placed at the bottom of a tall gas jar. When the jar is filled with paraffin to a depth of 32.4 cm, the coin is apparently seen displaced 9.9 cm from the bottom. What is the refractive index of paraffin? (3mks)

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c)State two conditions necessary for total internal reflection (2 mks)

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d) The speed of light in air is 3.0 x 108 m/s. What is the speed of light in glass? Take refractive index of glass = 1.5 (3 mks)

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e) State the laws of refraction (1 mk)

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KCSE TOP NATIONAL SCHOOLS TRIAL SERIES 2025

Name …… **Admission number** ……

Candidate's Signature……**Date**……

NAIROBI SCHOOL TRIAL 1

232/2

PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

For Examiner's Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-11	25	
B	12	12	
	13	10	
	14	09	
	15	13	
	16	11	
TOTAL SCORE		80	

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SECTION A: 25marks

1. The chart below shows an arrangement of different parts of the electromagnetic spectrum.

Radio wave	A	Infrared rays	B	Ultra-violet	χ-Rays

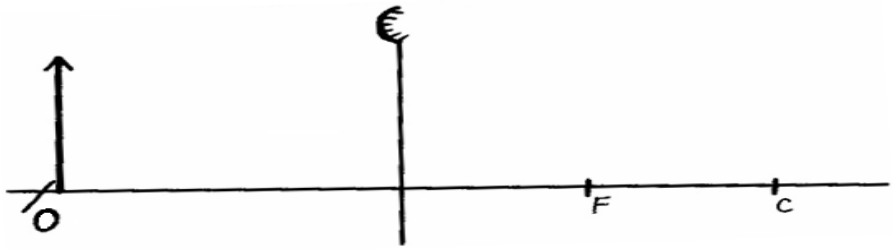
Name the radiation represented by

A …….. (1mark)

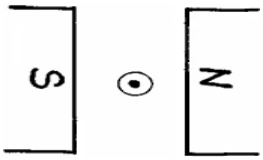
State one use of radiation represented by B (1mark)

……

An object O is placed in front of convex mirror as shown in the diagram below. Complete the diagram to locate the position of the image, 1. (3 marks)



2. The figure below shows a wire carrying current whose direction is out of the paper. The wire is placed in a magnetic field.



(a)Indicate on the figure the direction of the force F, acting on the wire. (1mark)

(b)State what would be observed on the wire if the direction of the current is reversed.

(1 mark)

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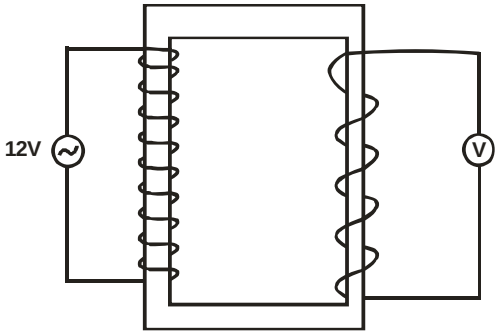
3. Figure 5 below shows a simple transformer connected to a 12v a.c source and an a.c voltmeter.



Determine the reading on the voltmeter. (3marks)

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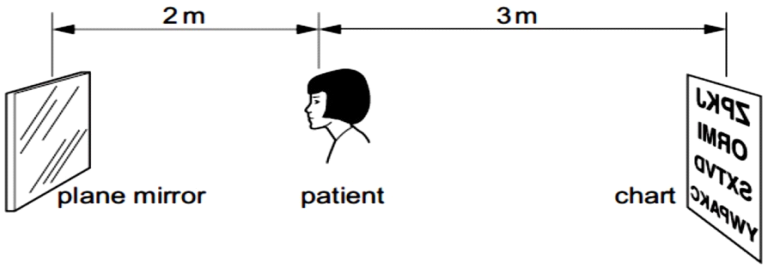
4. The diagram shows a patient having her eyes tested. A chart with letters on it is placed behind her and she sees the chart reflected in a plane mirror.



Determine how far away from the patient, the image of the chart is seen.

(2marks)

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5. State Snell's law. (2mark)

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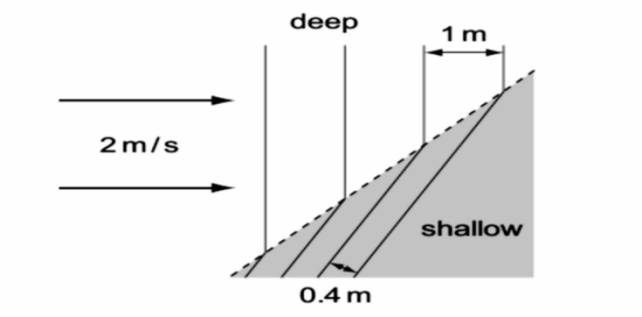
6. Waves pass from deep water to shallow water and refraction occurs.



Calculate the speed of the waves in the shallow water. (3marks)

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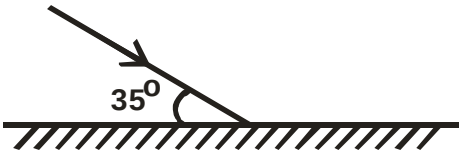
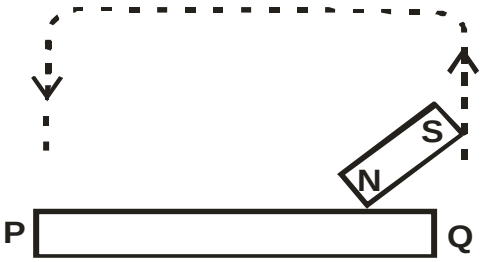
7. The diagram below shows a ray of light striking the plane at 35^o as shown below.

State the angle of reflection. (1 mark)



8. a) The figure below shows an iron bar being magnetized by stroking it with a magnet.



Indicate on the iron bar the polarity of resulting magnet. (1mark)

b) State two uses of soft magnetic materials. (2marks)

……

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9. An echo sounder of a ship transmits sound waves to the depth of the sea and receives the echo after 2.4 seconds. If the speed of sound in water is $1600ms^{-1}$, determine the depth of the sea.

(3 marks)

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10. It is observed that when a charged body is brought near the cup of a positively charged electroscope, the divergence of the leaf increases. State the type of charge on the body.

(1mark)

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Section B: 55 Marks

11. a) A student stands some distance from a high wall and claps his hands

i) What two measurements would need to be made in order to determine the speed of sound? (2marks)

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……

ii) Describe how you would make use of these measurements (2marks)

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iii) The speed of sound in air is 330m/s. How far from the wall would you stand? Choose an answer from the following distances 10m, 200m,500m. Give reasons why you did not choose each of the other two distances.

(3marks)

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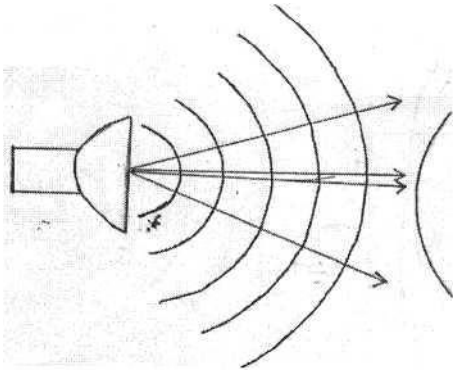
b) The balloon filled with carbon dioxide can act like a lens and focus sound from a loud speaker. On to the microphone, Figure 6 show waves produced by loud speaker moving toward the balloon.



i) Complete the diagram to show what happens to the sound waves when they have passed through the balloon and moves towards the microphone.

(2marks)

ii) The loud speaker is now moved toward the balloon. This results in less sound at the microphone. Explain why there is less sound at the microphone

(1mark)

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iii) The frequency of the sound emitted by the loud speaker is 1020Hz. Calculate the wavelength of the sound wave in air where its velocity is 340m/s (2marks)

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12. (a) State the meaning of the term critical angle as applied in refraction of light. (2marks)

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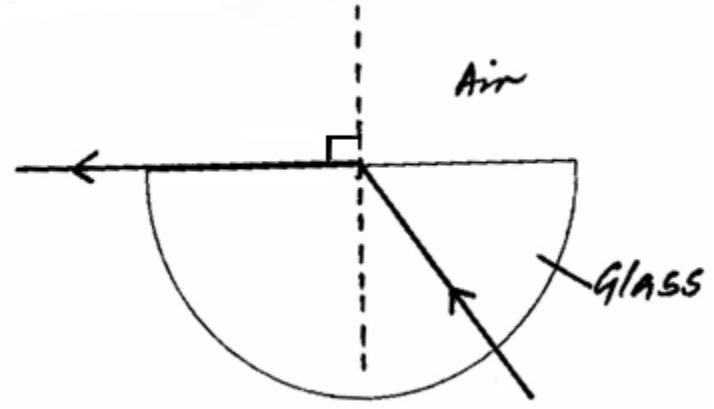
(b) The figure shows a ray of light incident on a glass-air interface.



(i) Show on the diagram the critical angle, **c**. (1mark)

(ii) Given that the refractive index of the glass is ${}_a\eta_g$, and that the critical angle **c** = 42^o, determine the value of is ${}_a\eta_g$. (3 marks)

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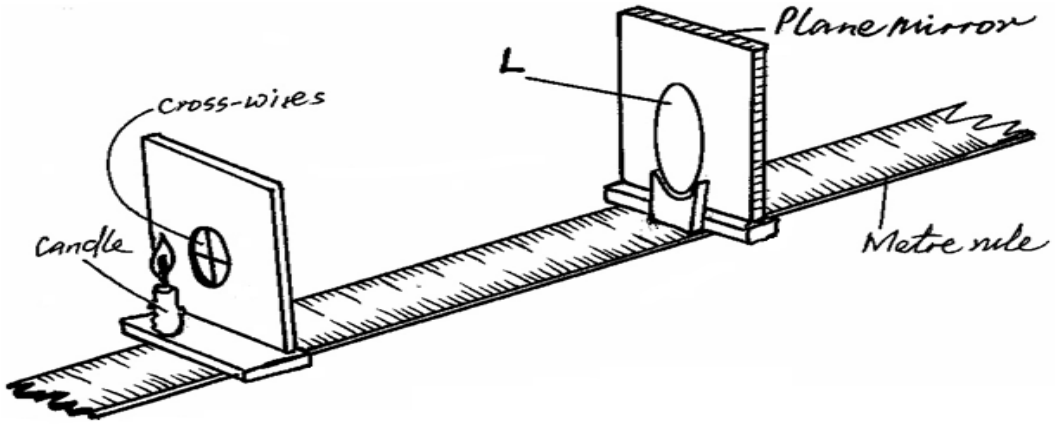
(c) The figure shows an experimental set up consisting of a mounted convex lens **L**, cardboard screen with cross-wires at the centre, a plane mirror, a metre rule and a candle.



Describe how the set-up may be used to determine the focal length, f, of the lens.

(4 marks)

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13. (a) State **two** properties of electric field lines. (2marks)

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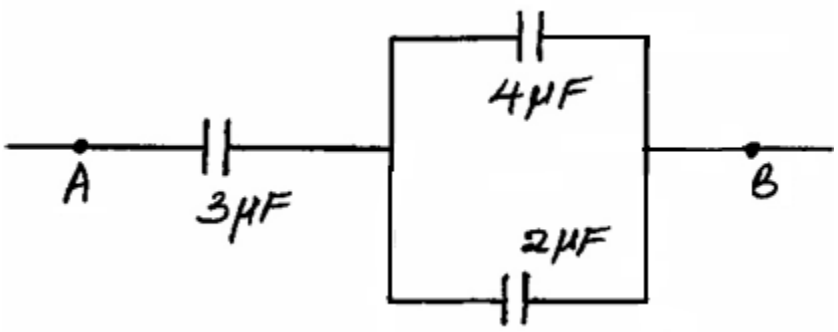
(b) The figure below shows part of a circuit containing three capacitors.



(i) Calculate the effective capacitance between **A** and **B**. (3marks)

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(ii).Given that the potential difference (p.d.) across AB is 10V, determine the total charge flowing through the circuit. (2marks)

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(c) State how an increase in thickness affects electrical resistance of a conductor.

(2marks)

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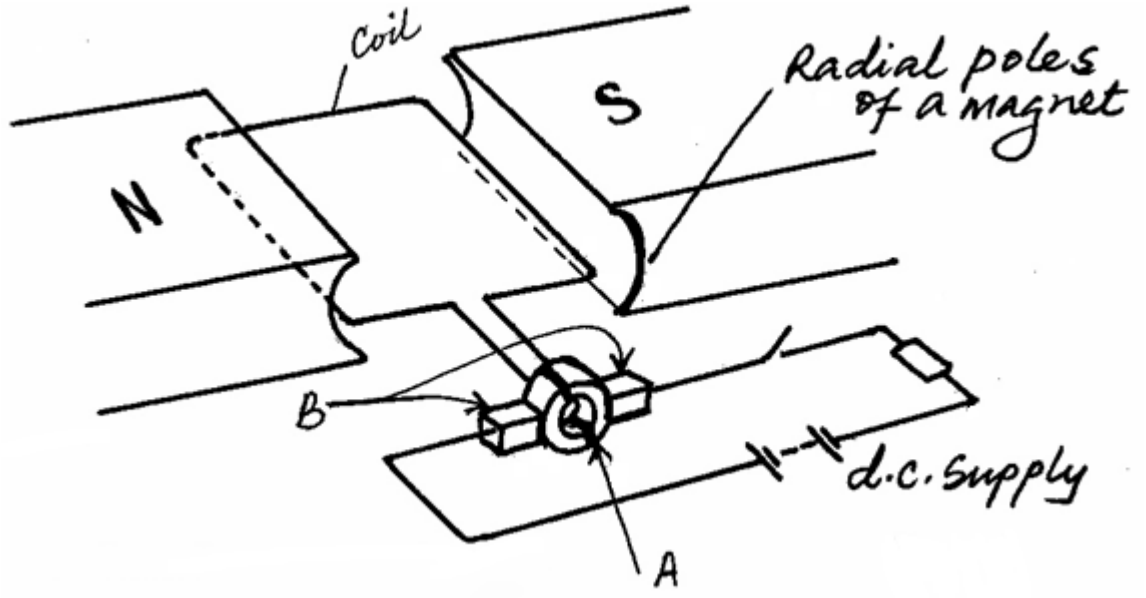
14. (a) The figure below shows parts of a simple electric motor.



(i) Name the parts labeled **A** and **B**. (2marks)

A

B

(ii) State the function of each of the parts named in part (i) above. (2marks)

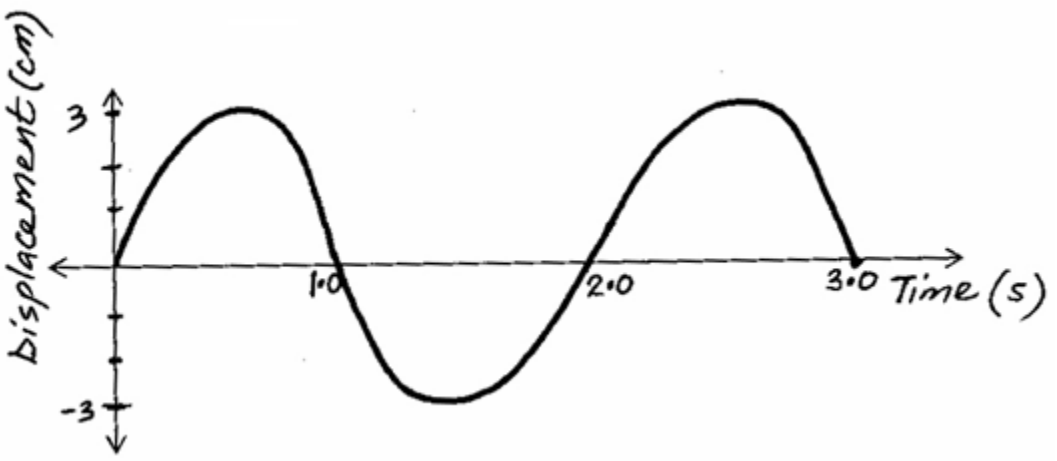
A

B

(iii) State the advantage of using curved poles of a magnet over plane poles. (1mark)

(iv) Explain the significance of copper coil as part of an electric motor. (2marks)

b).The graph in the figure below shows the displacement of a pendulum bob from its rest position as it varies with time.



(i) Determine the amplitude of the oscillation. (1mark)

……

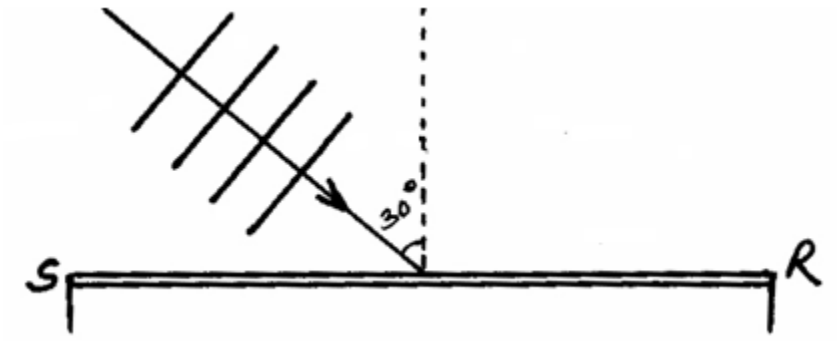
(ii) Determine the time for one complete oscillation. (1mark)

……

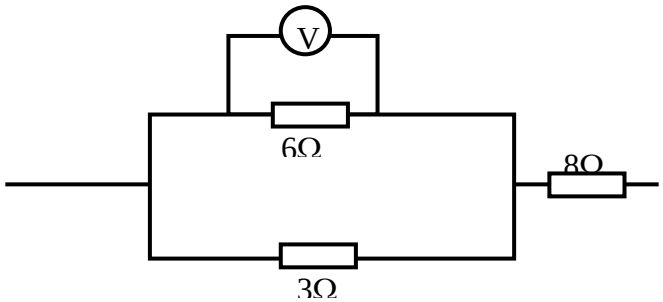
(ii) On the same graph, draw a sketch graph which represents a pendulum swinging with half the amplitude and twice the frequency. (2marks)

c) Plane water wave fronts are incident onto reflector **SR** as shown in the figure below. Show on the diagram the nature and direction of the reflected wave fronts.

(2marks)



15. (a) The figure below shows three resistors as shown.



If the voltmeter reads 4V, find the

(i) Effective resistance (3marks)

……

……

……

(ii) Current through the 3Ω resistor. (2marks)

……

……

(iii) Potential difference across the 8Ω resistor if the voltage total voltage in the circuit is 10V

(1 mark)

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(c) (i) What is meant by the term "terminal voltage" as used in current electricity?

(1mark)

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……...

(ii) A cell supplies a current of 2.0A when connected to a 0.6Ω resistor and 1.5A when the same cell is connected to a 0.9Ω resistor. Find the e.m.f and the internal resistance of the cell. (4marks)

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STAREHE BOYS CENTER SCHOOL TRIAL 1

PHYSICS

PAPER 2

INSTRUCTIONS TO CANDIDATES;

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; A and B.*

b) *Answer ALL the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *Candidates should answer the questions in* ***English.***

FOR EXAMINER'S USE ONLY

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
A	01 – 08	25	
B	09	07	
	10	08	
	11	09	
	12	10	
	13	11	
	14	10	
	TOTAL SCORE	80	

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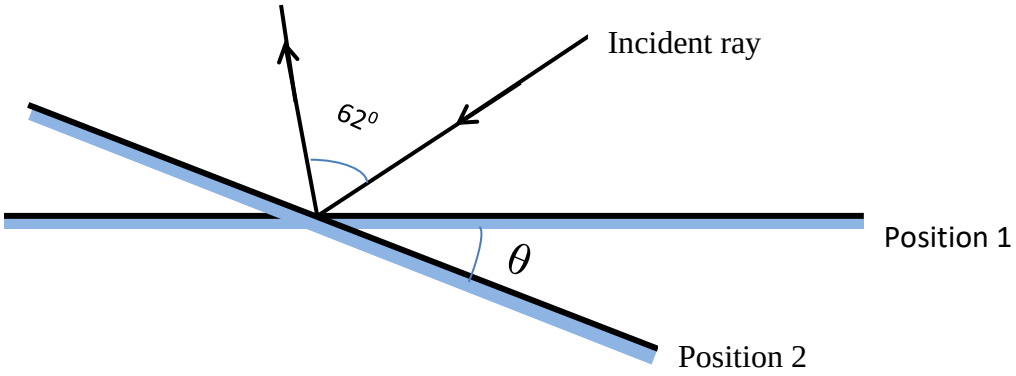
Section A; 25 Marks

1. The diagram below shows a ray of light initially incident at an angle of 25^0 to the horizontal mirror at position one. While the ray is maintained in the same position, the mirror is then turned clockwise through an angle θ to position 2, where the angle between the incident and the reflected ray becomes 62^0. Using the diagram, determine:



a) The angle through which the reflected ray is rotated through. *(2marks)*

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……

b) Find the angle of rotation of the mirror θ *(1mark)*

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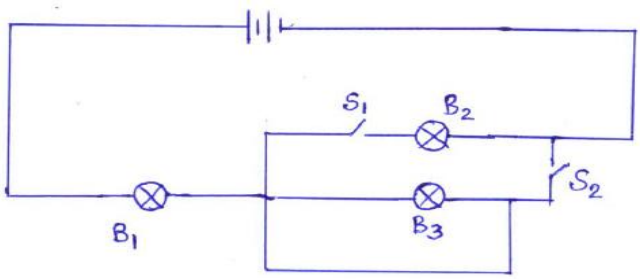
2. The diagram below shows a simple circuit.



(a) State the observation made on B_1, B_2 and B_3 when both switches S_1 and S_2 are closed *(1 mark)*

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……

(b) Give reason for the above observation *(1 mark)*

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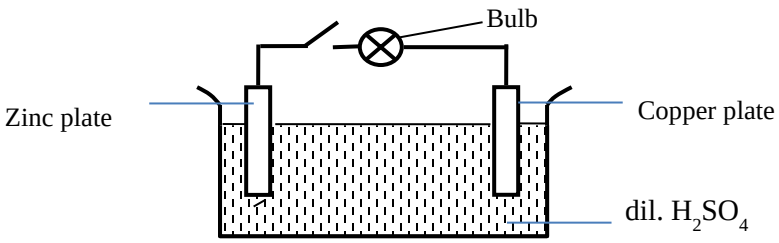
3. The figure below shows a simple cell made of copper and zinc electrodes dipped in dilute sulphuric acid.



(a) Write the ionic equation for the reaction at

(i) The Zinc plate *(1 mark)*

……

……..……

(ii) The Copper plate *(1 mark)*

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(b) State the colour of the positive plate of a lead acid accumulator when it is fully charged *(1 mark)*

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4. (a) A charged glass rod is brought close but not touching the cap of a lightly charged electroscope. It is observed that the leaf initially falls then rises again.

(i) State the type of charge in the electroscope *(1mark)*

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(ii) Give the explanation for the observation made *(2 marks)*

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(b) State two uses of an electroscope *(2 marks)*

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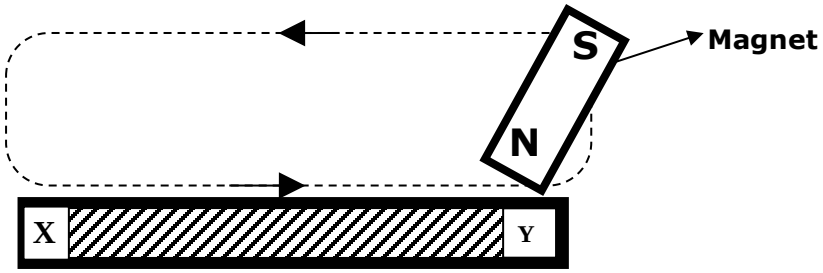
5. The figure below shows one method of making a magnet.



(a) Name the method of magnetization shown above *(1 mark)*

…..…….. …..…….. …..…….. ……..

(b) Identify the resulting magnetic pole formed at X;

…….. …….. …….. …..…… *(1 mark)*

6. (a) Using Domain theory, explain how the above process is achieved *(3 marks)*

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…….

(b) Give the reason why the strength of a magnet is greatest at the poles *(1 mark)*

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7. A student stands between two high walls at a distance 1600m from the nearest wall. Each time the student claps the hands, two echoes are heard; the first after 10s while the second follows 5 seconds later. Calculate the distance between the two high walls. *(3 marks)*

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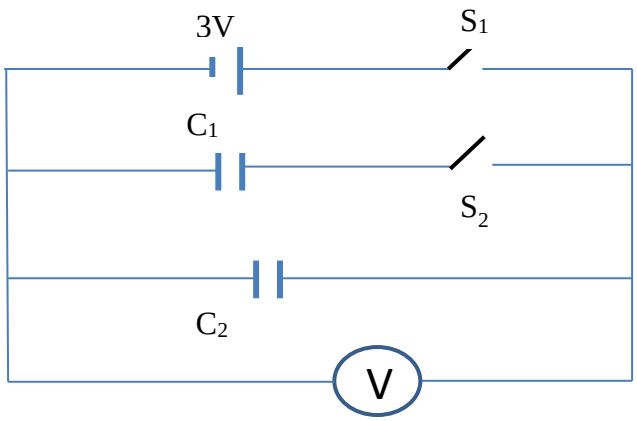
8. The capacitors in the circuit below are identical and initially uncharged.



When switch S_1 is closed and switch S_2 left open, the voltmeter shows a reading. Explain the observation made *(3marks)*

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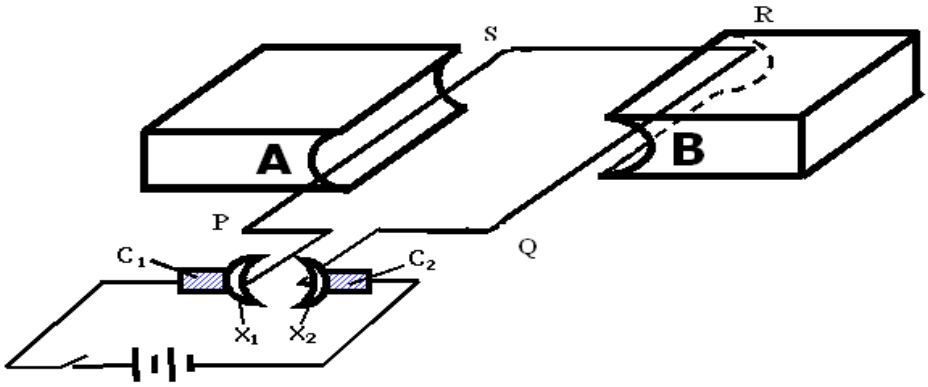
Section B (55 Marks)

9. The diagram below shows a coil PQRS lying between two unlike magnetic poles A and B of an electric motor.



Identify the parts labeled; *(2marks)*

X_1X_2 ……..

C_1C_2……

(b) State the role of parts A and B. *(1mark)*

……

……

(c) Given that the coil rotates in the direction shown, state the polarity of; *(1mark)*

A ……..

B ……..

(d) State the observation made when the terminals of the batteries were reversed *(1mark)*

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(e) State two ways in which the speed of rotation of the coil PQRS can be increased. *(2marks)*

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10. (a) Define the Principal focus of a convex mirror *(1 mark)*

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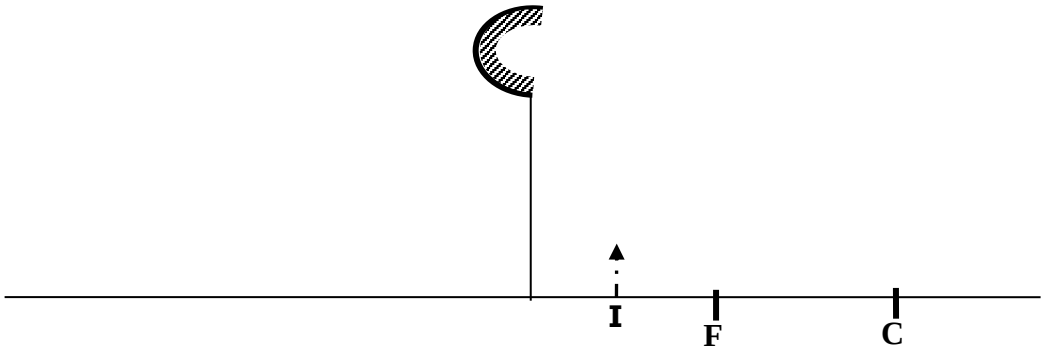
(a) The Figure below (drawn to scale) shows an image; I formed by an object placed in front of a ***convex mirror***.



(i) On the diagram draw appropriate rays and locate the position of the object. *(3marks)*

(ii) From your drawing determine the magnification produced *(2marks)*

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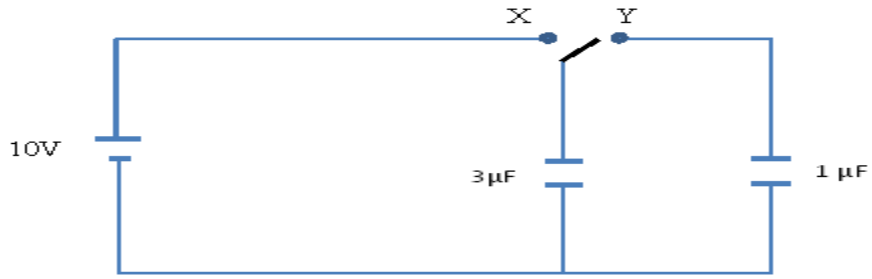
(b) Using a well labeled diagram, show how a parabolic mirror produces a parallel beam *(2marks)*

11. In the circuit shown below a 3µF capacitor is charged from a 10V battery by connecting the switch to terminal X.



(a) The switch is then connected to terminal Y to charge the 1μF capacitor from the 3μF capacitor. Calculate:

I. The energy stored initially in the 3μF capacitor (*2 marks*)

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II. The final potential difference across the parallel arrangement (*2 marks*)

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III. The total energy stored in the parallel arrangement. (*2 marks*)

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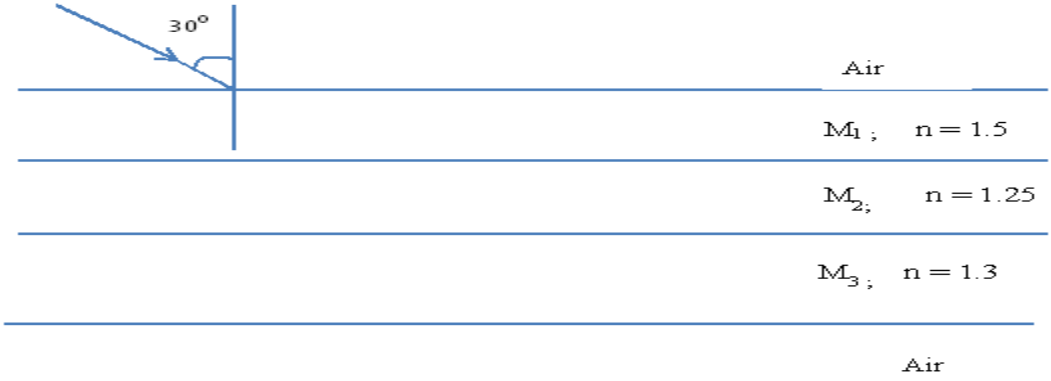
(b) With the aid of a diagram explain how a lightning arrestor works. *(3 marks)*

12. The diagram below shows a ray of light from air through a series of media.



Sketch the path of the refracted ray from air through all the media till it emerges in air. *(2 marks)*

(i) Determine the angle of incidence at the $M_2 – M_3$ interface *(3 marks)*

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(ii) Determine the refractive index of M_3 with respect to M_1 *(2 marks)*

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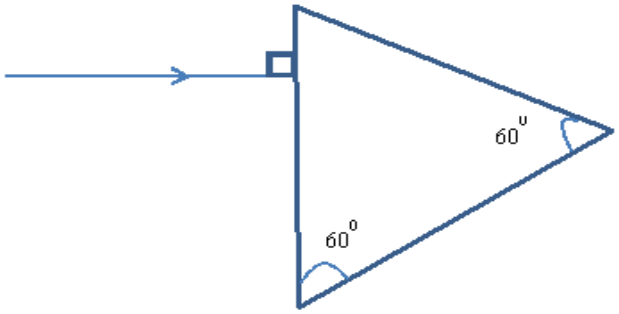
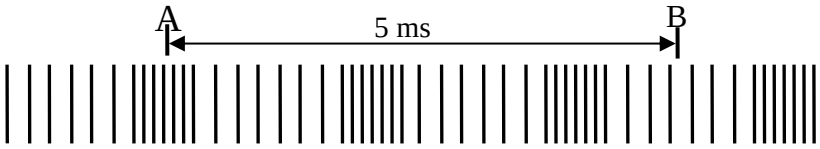
(iii) (b) The diagram below shows a ray of light meeting the surface of a glass prism of refractive index $^3/_2$ at 90^0. Complete the path of light through the prism till it emerges (show all your working) *(3 marks)*



13. (a) The figure below shows a longitudinal wave that takes 5 ms to move from point A to B and at a speed of 320 m/s.



Calculate; (i) The frequency of the wave *(2 marks)*

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(ii) The wavelength of the wave *(2 marks)*

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(b) Define the term interference as used in waves *(1 mark)*

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(c) In an experiment to observe interference patterns of light waves, a double slit is placed close to the source as shown below.

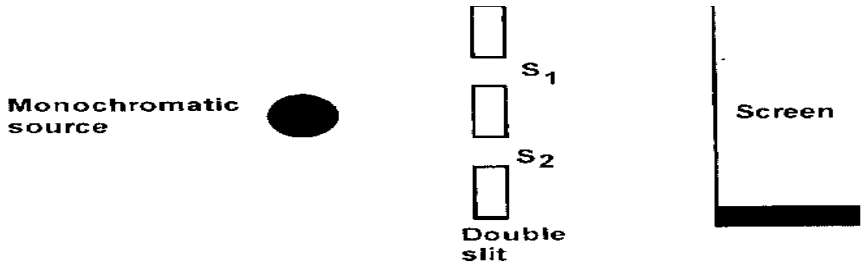

Fig 8

(i) State the function of the double slit. *(1mark)*

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(ii) State and explain what is observed on the screen. *(2 marks)*

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(iii) State the observation on the screen when the slit separation S_1 –S_2 is reduced. *(1mark)*

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(iv) Explain the mirage; the phenomenon which is experienced in cold polar regions during winter. *(2 marks)*

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14. (a) Distinguish between electromotive force and potential difference *(2 marks)*

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(b) Explain the function of a fuse as used in electrical appliances *(2 marks)*

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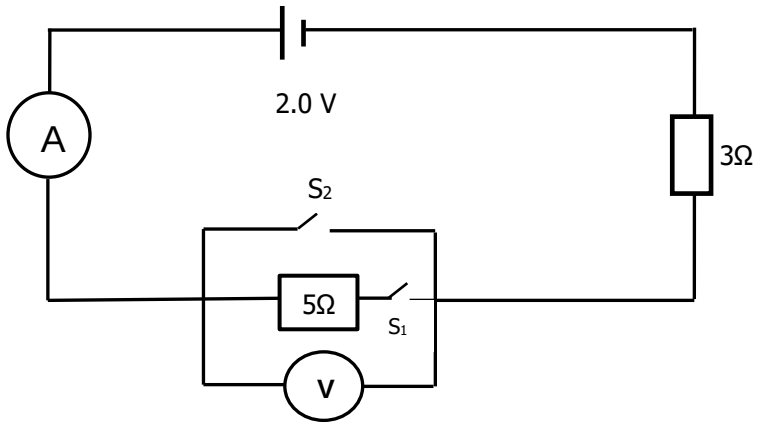
(c) The diagram below shows a circuit with some electrical appliances connected as shown.



(a) Switch S_1 is closed while S_2 is open. Determine the;

(i) The ammeter reading *(2 marks)*

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(ii) The voltmeter reading *(2 marks)*

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(b) Determine the voltmeter reading when both S_1 and S_2 are closed. Give a reason for your answer. *(2 marks)*

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