NAME…….....INDEX NO……

CANDIDATE'S SIGN……..…DATE…….

SCHOOL…….

232/1
PHYSICS
PAPER 1
THEORY
MARCH/APRIL 2015
TIME: 2 HOURS

LAINAKU 2 JOINT EVALUATION TEST.

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

INSTRUCTIONS TO CANDIDATES.

1) Write your name and index number in the spaces provided above.
2) Sign and write the date of examination in the spaces provided above.
3) This paper consists of section A and B.
4) Answer **ALL** questions in section A and B.
5) All your workings must be clearly shown as must be awarded for correct working even if the answer is wrong.
6) Non programmable silent scientific calculators and KNEC mathematical tables may be used.

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1 - 13	25	
B	14	13	
	15	9	
	16	11	
	17	12	
	18	10	
		80	

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

SECTION A: (25 MARKS)

1. A micrometer screw gauge was used to measure the diameter of a wire and the following readings Were recorded 2.32mm, 2.31mm, 2.34mm, 2.34mm, and 2.31mm? Determine the length the student Should record (2mks)

2. The figure below shows a vernier calliper scale.

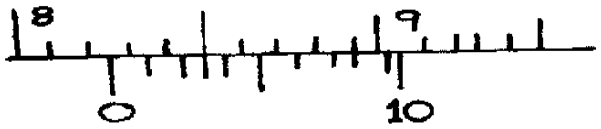
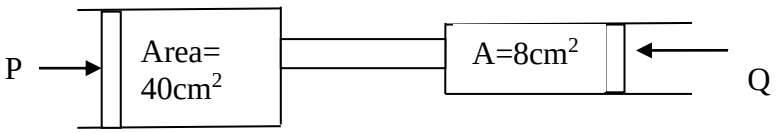


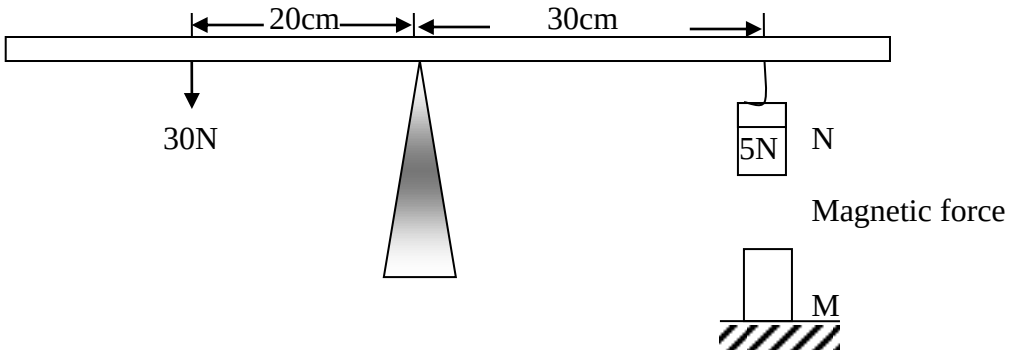
Fig. 1

If the vernier callipers used had a zero error of -0.02 what is the actual reading of the scale. (2mks)

3. The figure below shows two cylinders of different cross-sectional areas connected with a tube. Opposing forces P and Q are applied to the pistons such that the pistons do not move. If the Pressure on the larger piston is 20 N/cm^2. Determine force Q. (3 mks)



4. A uniform metre rule is balanced at its centre. It is balanced by the 30N, 5N and the magnetic force between **M** and **N**. **M** is fixed and **N** has a weight of 5N

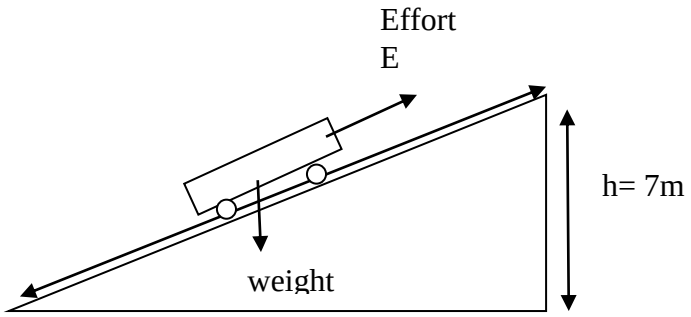


a) Ignoring the weight of the metre rule, calculate the value of the magnetic force between M and N (3 mks)

b) Given that the lower end of M is North Pole, state polarity of the end of N facing M.

(1 mk)

5. The figure below shows a trolley of weight 25N pulled by a force of 10N from the bottom to the top of an inclined plane at a **uniform speed**. The slant height is 40 m.



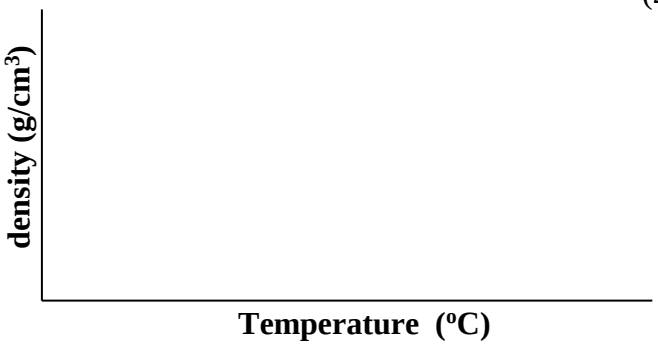
State the value of the force acting downwards along the inclined plane. (1mk)

6. Explain how the value in (5) is obtained. (2mks)

7. The pressure of the air inside a car tyre increases if the car stands out in sun for some time on a hot day. Explain the pressure increase in terms of the kinetic theory of gases. (3 mks)

8. Why it is possible to compress gases but not solids or liquids (1mk)

9. One the axis provided, sketch a graph of density against temperature of water from 0^o to 20^oC. (2mks)

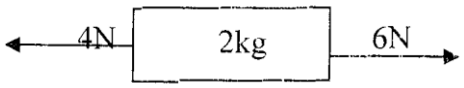


10. During anomalous expansion of water, heat transfer is limited to conduction and radiation only explain (1mk)

11. A girl heats 5kg of water to a temperature of 80^oC. When she adds m kg of water at 15^oC the mixture attains a temperature of 40^oC. Determine the value of m (2mks)

12. 100 drops of oil, of density $800kg/m^3$ are found to have a total mass of 2×10^{-4} kg. One of the drops is placed on a large clean water surface and it spreads to form a uniform film of diameter 50 cm^2. Determine; the diameter of the oil molecule. (2 mks)

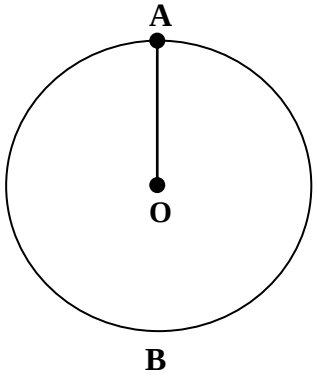
13. The forces act on a trolley as shown below.



Find the acceleration of the trolley. (2mks)

SECTION B (55MKS)

14. (a) The figure below shows a stone of mass 450g rotated in a vertical circle at 3 revolutions per second. If the string has a length of 1.5m, determine:



(i) The linear velocity (3mks)

(ii) The tension of the string at position **A** (3mks)

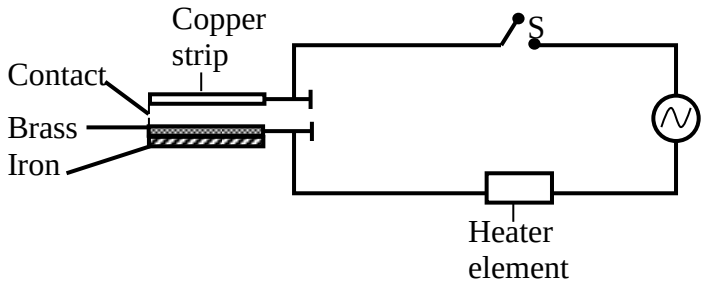
b) On the same diagram indicate the path that the stone will follow if the string snaps at point B (1 Mk)

(c) A stone is whirled with uniform speed in horizontal circle having radius of 10cm. It takes the stone 10 seconds to describe an arc of length 4cm. Determine:

(i) The angular velocity ω (3mks)

(ii) The period **T** (3mks)

15. (a) The figure below shows a circuit diagram for a device for controlling the temperature in a room.



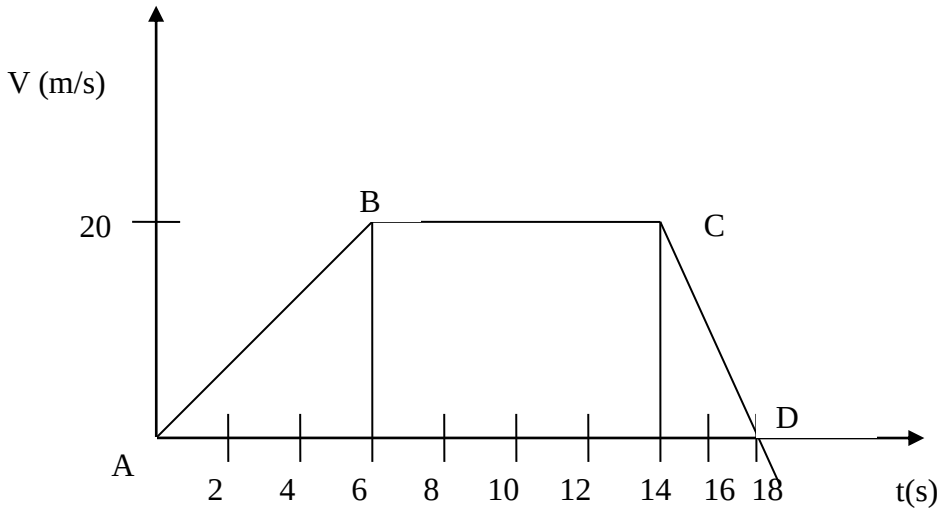
(i) State the purpose of the bimetallic strip. (2mks)

(ii) Describe how the circuit controls the temperature when the switch S is closed.
(3 Marks)

(b) (i) Differentiate between the term heat capacity and specific heat capacity of a substance (2Mks)

(ii) An electric kettle rated 2.5kW is used to raise the temperature of 3.0kg of water through 50^0C.
Calculate the time required to effect this (Specific heat capacity of water is 4200j/kgK) (3 Marks)

16. The figure below shows a velocity time graph for the motion of a body of mass 5Kg



a) Use the graph to determine the:

i) Displacement of the body after 12 seconds. (3mks)

ii) Acceleration after point C; (3mks)

iii) Force acting on the body in part (a) (ii) (3mks)

b) Sketch a displacement-time graph for the motion from point B to D. (2mks)

17. (a) (i) State 2nd Newton's law of motion. (1 Mark)

(ii) Explain why a high jumper flexes his knees when landing on the ground
(1 Mark)

(b) A ball of mass 100g is dropped from a height of 1.25m above the ground surface. It rebounds to a height of 1.1m. If the time of impact was 0.5 s. Calculate

(i) Velocity of ball before impact (2 Marks)

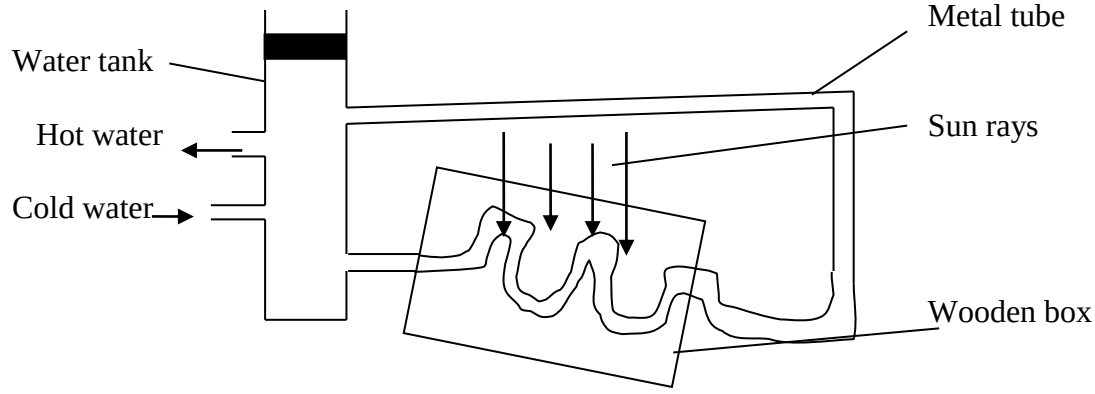
(ii) Force of impact (Take g = 10N/kg) (3 Marks)

(d) (i) Distinguish between elastic and inelastic collision (2Mks)

(ii) A car of mass 800kg collides heads with a truck of mass 5000kg travelling at 40m/s. The car is thrown on to bonnet of the truck which continues to move after impact at 10m/s in the original direction. How fast was the car moving (3Mks)

18. a) State two forms of energy received directly from the sun (2 marks)

b) The diagram below shows a simple solar heater for domestic use. The inside of the box and the metal tube are both painted black. The bent portion of the metal tube is placed on saw dust in a wooden box. The box is covered with a glass plate and arranged such that the rays from the sun fall on the plate.



i) The metal tube is made of copper. Why is copper preferred

ii) Why is the metal tube in the box coiled (1mk)

iii) Explain why the inside of the box is painted black. (2mks)

iv) What is the purpose of the saw dust in the set up? (1mk)

c) Explain briefly how the solar water heater works. (3mks)

Name……Adm no……..Class…….

232/2
PHYSICS PAPER 2
(THEORY)
MARCH/APRIL 2015
2 Hours

LAINAKU JOINT EXAMINATIONS
Kenya Certificate of Secondary Education
PHYSICS
Paper 2
2 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the space provided at the top of this page.
*This paper has two section **A** and section **B**.*
Answer all the questions in the two sections.
Working of numerical questions must be clearly shown.
Marks may be given for correct working even if the answer is wrong
Mathematical tables or scientific calculators may be used.

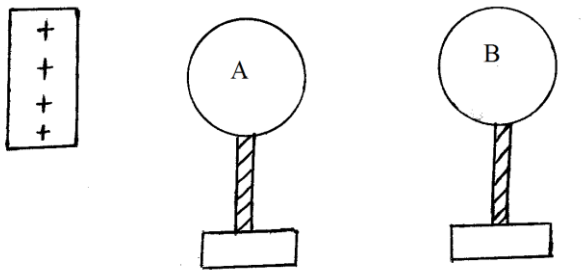
FOR OFFICIAL USE ONLY

SECTION	QUESTION	MAX SCORE	STUDENT'S SCORE
A	1 – 13	25	
B	14	11	
	15	10	
	16	11	
	17	14	
	18	09	
GRAND TOTAL		**80**	

This paper consists of 12 printed pages.

SECTION A (25 MARKS)

1. A positively charged rod is brought close to two spheres A and B, held by insulating handles as shown below.



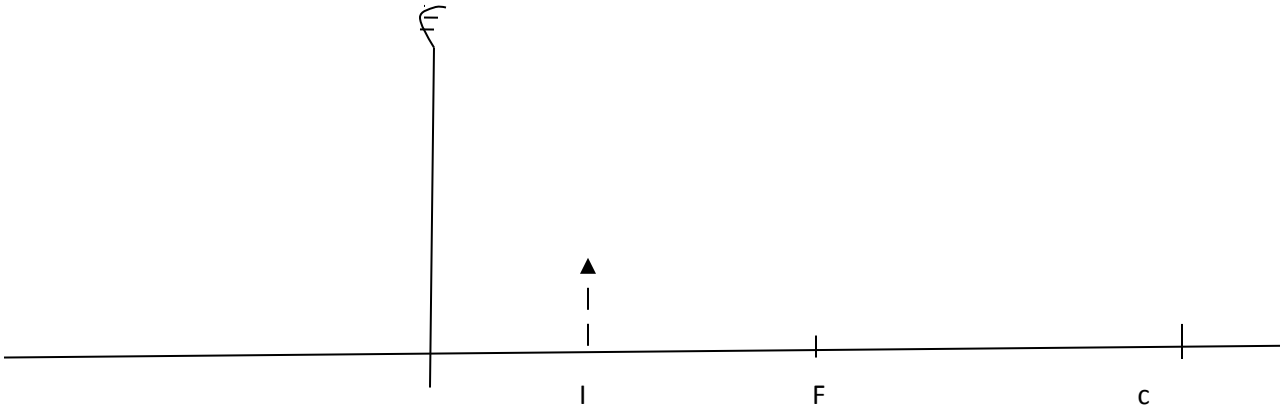
Sphere B is earthed and the positively charged rod withdrawn. The earth connection is then disconnected. In the space below draw a diagram to show the final charge distribution on Aand B. (2 marks)

2. Define the term frequency . (1mark)

3. A boy scout standing a distance ,X,from a tall building blows a whistle and hears its echo, 1.7seconds later. Determine the distance ,X,between the boy and the wall given that the speed of sound in air is 340m/s. (3marks

4. State one defect of a simple cell . (1mark)

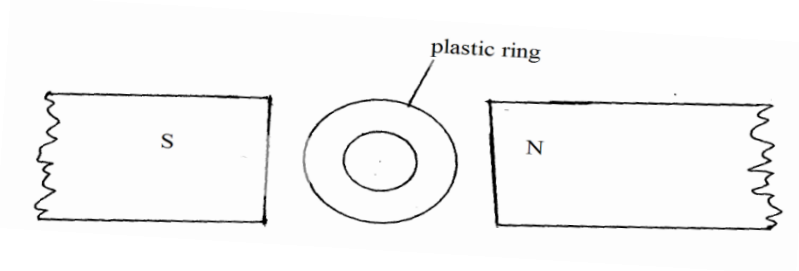
5. The diagram below shows the image formed by a convex mirror. Complete the diagram to show the position of the object (3marks)



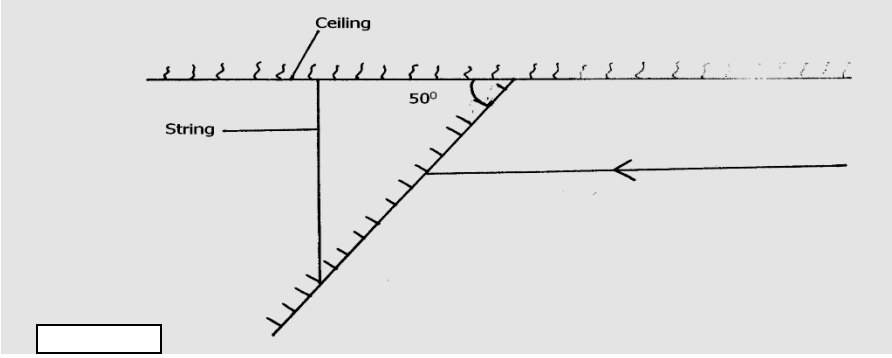
6. State one advantage and one disadvantage of using a convex mirror as a driving mirror. (2 marks)

ADVANTAGE	DISADVANTAGE

7. The figure below shows two poles of a magnet and ring of plastic placed between them. Show the magnetic lines of force between the two poles . (1 mark)

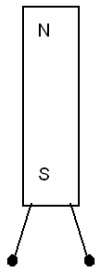


8. The figure below shows a plane mirror suspended using a string and makes an angle of 50^0 to the ceiling.



A ray of light strikes the mirror horizontally as shown above. Trace the path of reflected ray. Show all the angles. (2 marks)

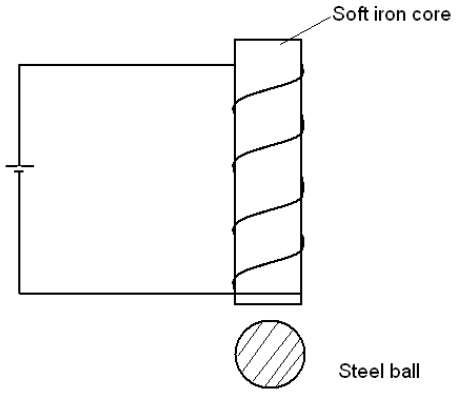
9. In the diagram below, two pins are attached to the end of a magnet as shown.



Explain the behaviour of the pins. (2 marks)

10. State the effect of increasing the separation distance between the plates of a capacitor on the capacitance . (1 mark)

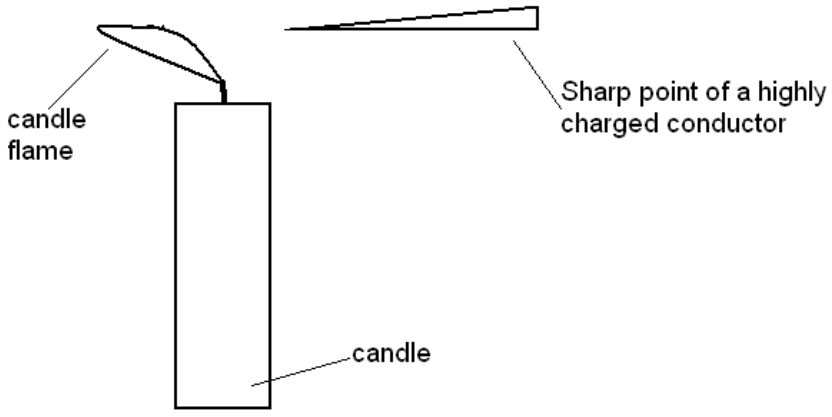
11. The figure below shows an electromagnet that may be used in a laboratory to lift and then release a small steel ball.



In order to lift a slightly heavier ball, it is necessary to make a stronger electromagnet. State two ways in which the electromagnet could be made to lift a heavier steel ball. (2 marks)

12. An electric iron rated 250V, 3000w is connected to a 250V mains supply through a 5A fuse. Determine whether the fuse is suitable or not. (3 marks)

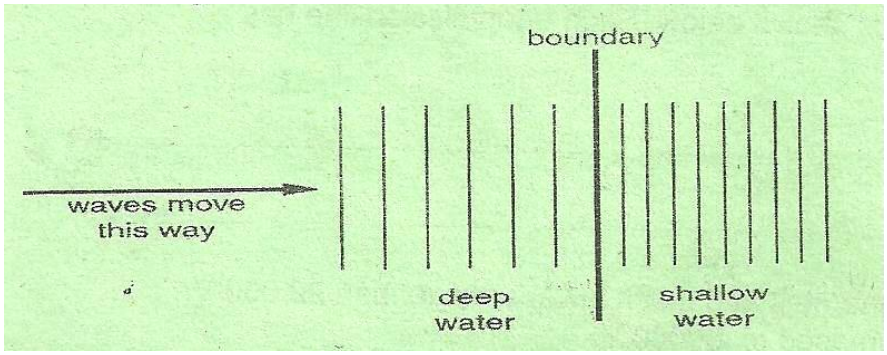
13. The diagram below shows a sharp pointed highly charged conductor. When brought very close to a candle, the flame bends as shown below.



State with reason the charge on the conductor. (2 marks)

SECTION B (55 MARKS)

14. Plane water waves produced in a ripple tank are passed from a region of deep water into a region of shallow water. The figure shows what the waves look like from the top of the tank..



(a) State what happens at the boundary to:

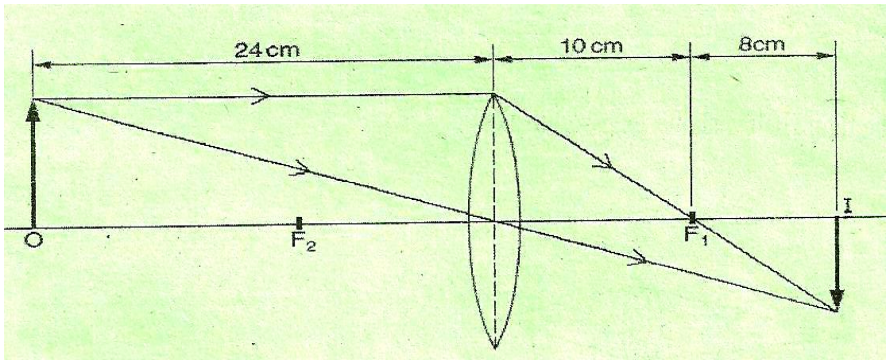
(i) The frequency of the waves. (1 mark)

(ii) The speed of the waves (1 mark)

(iii) The wavelength of the waves (1 mark)

(b) The waves have a speed of 24cm/s in the deep water. Consecutive wave crests are 0.08m apart in the deep water. Calculate the frequency of the source producing the waves. (2 marks)

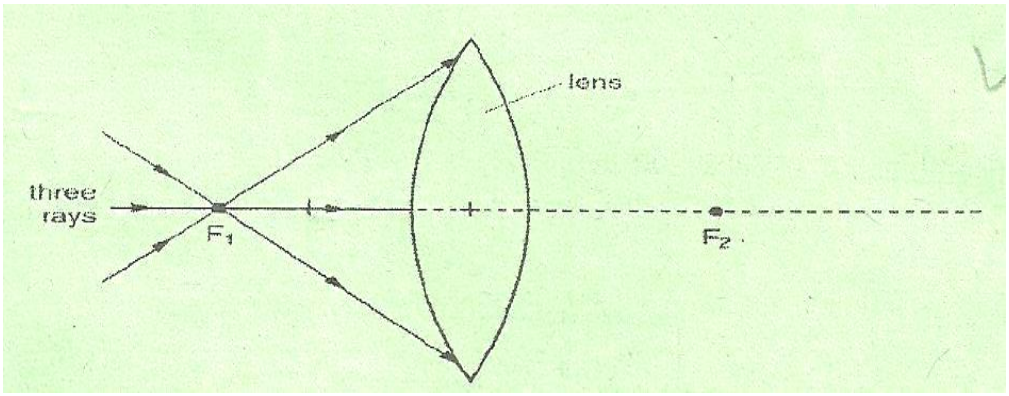
c) The figure below shows how an image is formed by a converging lens.



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

(ii) Determine the magnification of the image produced. (2 marks)

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



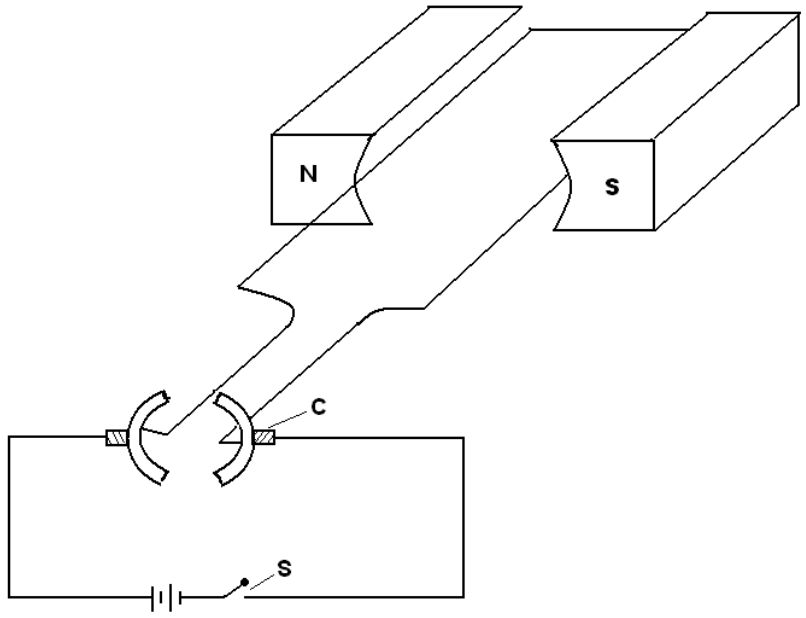
Three rays of light pass through F_1 to the lens.

(i) On the figure above show the path followed by the three rays through the lens and into the air. (1mark)

(ii) State one possible causes of myopia . (1 mark)

(iii) State the type of lens that is used to correct myopia. (1 mark)

15. The diagram below shows a simple electric motor.



(a) Name the part labeled C. (1 mark)

(b) (i) State one factor that will affect the speed of rotation of the motor. (1mark)

(ii) By use of an arrow, show the direction in which the coil will rotate when the switch s, is closed. (1 mark)

(c) With the aid of a diagram, illustrate how a telephone receiver operates. (3 marks)

(d) (i) State the Lenz's law. (1 mark)

(ii) A transformer is designed to operate a 100w, 20V lamp when connected to a 250Vmains supply . Calculate the current that would be drawn from the mains if it is 90% efficient.

(3 marks)

16. The table below is that of electromagnet spectrum with radiations arranged in order of decreasing wavelength.

RADIO WAVES	A	INFRA RED	B	ULTRA VIOLET	C	GAMMA RAYS

a) Identify radiations A,B and C. (3 marks)

A……

B……

C……

b) State two properties of electromagnetic waves (2 marks)

c) Distinguish between X-rays and Gamma rays in terms of their production. (2 marks)

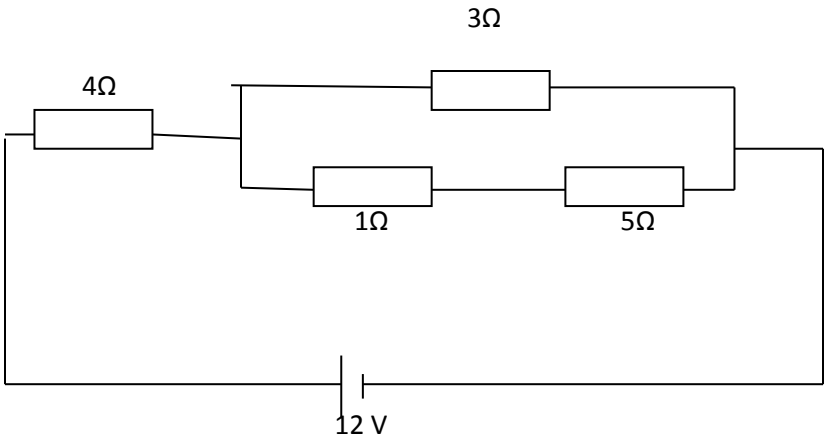
d) State one method of detecting radiowaves. (1 mark)

e) An electromagnetic wave has a frequency of 4.5×10^{14}Hz. Given that the speed of light is 3×10^{8}m/s, determine its wavelength. (3 marks)

17. a) State Ohm,s law (1 mark)

b) Differetiate between electromotive force and potential difference. (2marks)

c) Four resistors are connected as shown in figure below .



Determine:

(i) The total resistance in the circuit (2 marks)

(ii) The total current flowing through the circuit. (3 marks)

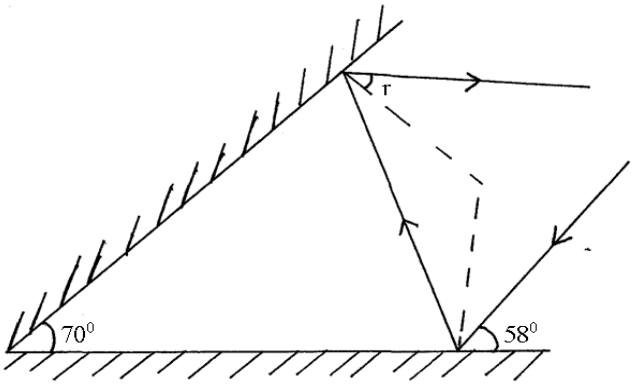
(iii) The potential difference across the 4Ω resistor. (3 marks)

(iv) The current through the 3Ω resistor . (3 marks)

18. a) State one law of reflection . (1 mark)

b) A pupil stands 3m in front of a plane mirror. She then moves 1.8m away from the mirror. Determine the distance between the pupil and her image. (2 marks)

c) The figure below shows the path followed by a ray of light on striking two mirrors inclined at an angle of 70^0 to each other.



Determine the angle labeled r. (2 marks)

d) State the effects of the following on the size of image formed by a pinhole camera:

i) Decreasing object distance (1 mark)

ii) Increasing image distance (1 mark)

e) Determine the angle at which two plane mirrors should be inclined to form 39 images. (2marks)

THIS IS THE LAST PRINTED PAGE

NAME: …… ……. INDEX NO. ……..…….

SCHOOL: ……..… DATE:……..

CANDIDATE'S SIGN. ……..

232/3

PHYSICS

PAPER 3

MARCH/APRIL 2015

TIME: 2 ½ HOURS

LAINAKU 2 JOINT EVALUATION EXAM

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

PHYSICS

PAPER 3

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** and **index number** in the spaces provided above.*
- *Sign and write the **date** of the examination in the spaces provided above.*
- *You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully.*
- *Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them.*

For Examiners' Use Only

Question 1

PART	**A**					**B**	
Marks Score	b	c	e	f	g	h	i
	1	1	5	5	3	2	3
Candidate's score							

Question 2

PART	**A**			**B**					
Marks Score	m	n	o	p	ii		iii	q	
	7	5	3		1		2	2	
Candidate's score									

This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. This question consists of two parts A and B attempt both parts

PART A

You are provided with the following:

- two pieces of wooden blocks
- a retort stand, boss and clamp
- a piece of cotton thread
- a metre rule
- a 30 and 50 grammes metal mass
- paraffin
- a 250 ml beaker
- some tissue paper

Proceed as follows:

(a) Cut three pieces of cotton thread measuring 30cm, 10cm and 10cm respectively. Suspend the metre rule freely at its centre of gravity, **P** using the longer thread.

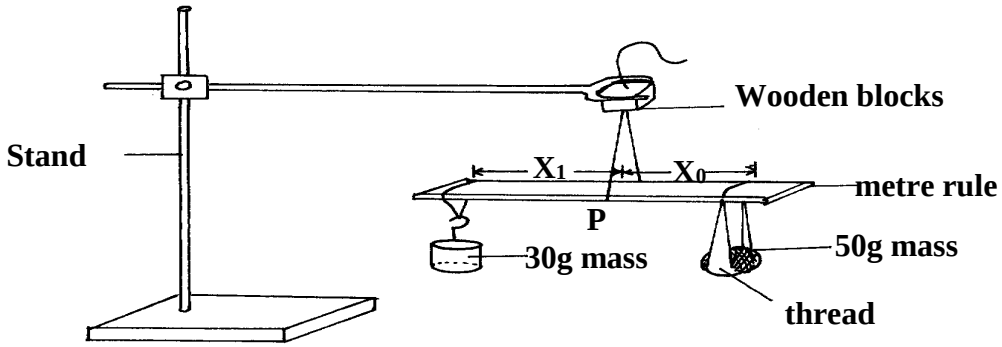


Fig. 1 (a)

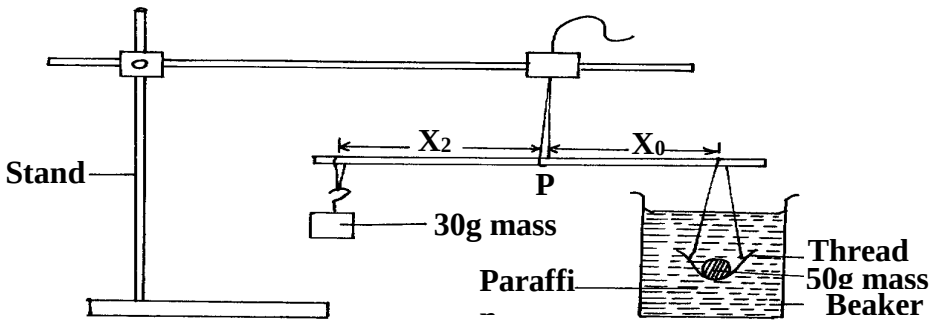


Fig. 1(b)

(b) Suspend the 50g mass using thread at a distance $\mathbf{X_0}$ = 15cm from the point of suspension, **P**. Also use the shorter thread to suspend the 30g mass on the opposite side and adjust its position till the metre rule is horizontal as in figure 1(a) above. Record the corresponding distance $\mathbf{X_1}$ of the 30g mass from **P**

$\mathbf{X_1}$ = ……cm
(1mk)

(c) Fill the beaker with parrafin up to about three quarters capacity. Maintain the distance $\mathbf{X_0}$ invariant as you immerse the 50g mass in paraffin and slide the thread holding the 30g metal mass, till the metre rule is horizontal again. Note the new corresponding distance $\mathbf{X_2}$
(i.e distance between point of suspension of 30g mass and **P**)

X_2 = …… cm (1mk)

(d) Repeat the procedure in **(b)** and **(c)** for increased values of X_0 as given in table 1 below.

NB:- **After every attempt, wipe the 50g mass with the tissue paper provided.**

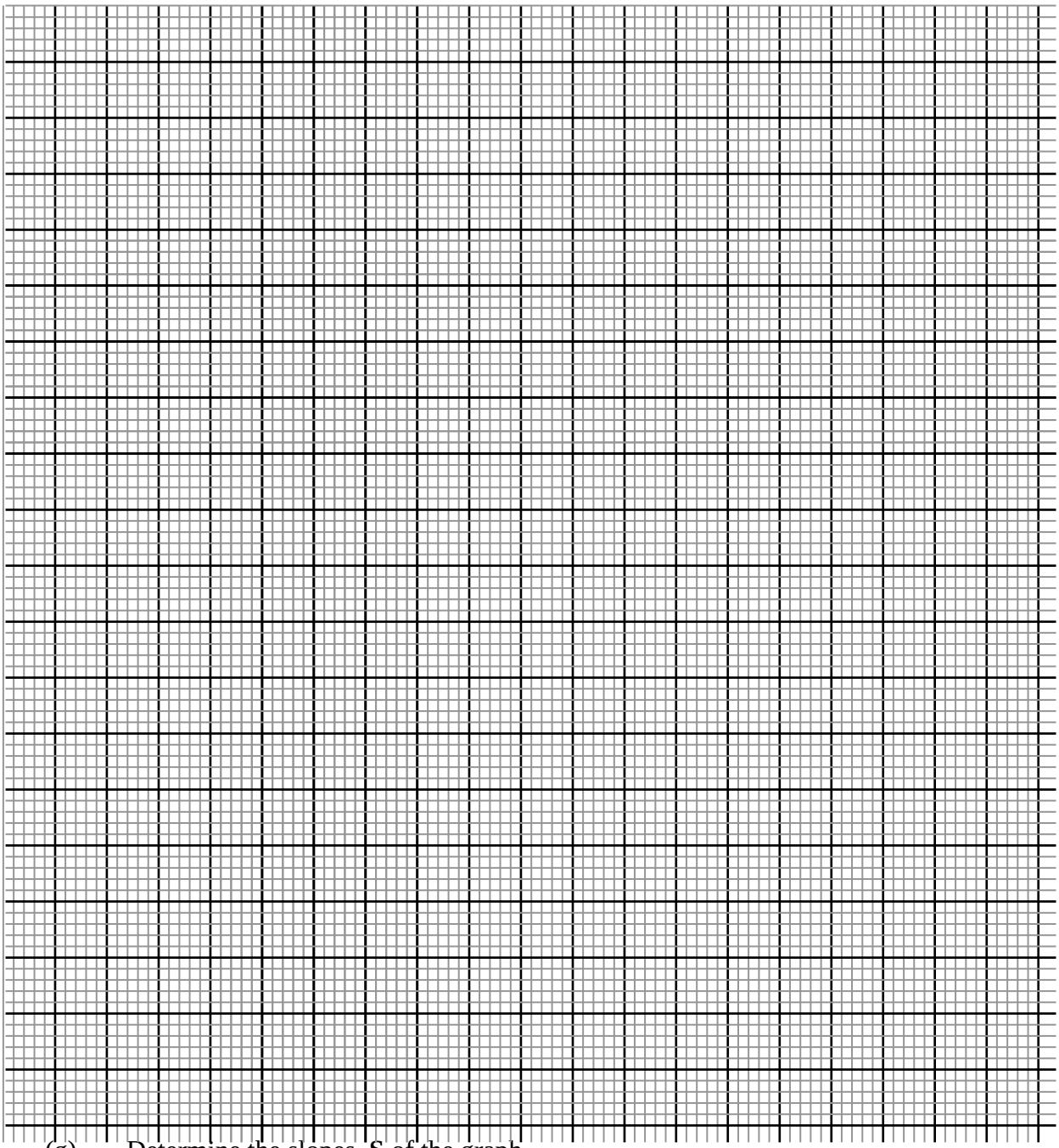
- **Ensure this experiment is done in a draught free area.**

(e) Complete the table 1 (5 mks)

Table 1

Distance of marble in air $\mathbf{X_0}$ (cm)	**15**	**17**	**19**	**21**	**23**	**24.5**
Distance of 20g metal mass, $\mathbf{X_1}$ (cm)						
Distance of 20g metal mass, $\mathbf{X_2}$ (cm) When marble is in paraffin						
$\mathbf{X_1}$ - $\mathbf{X_2}$ (cm)						

(f) On the grid provided, plot a graph of $\mathbf{X_1 - X_2}$ (y-axis) against $\mathbf{X_1}$ (5mks)



(g) Determine the slopes, **S** of the graph

(3mks)

PART B

You are provided with the following:

- vernier callipers
- glass marble

Proceed as follows

h) Using the vernier callipers, measure the diameter of the glass marble

1st attempt; diameter $\mathbf{D_1}$ = ……cm

2nd attempt ; Diameter $\mathbf{D_2}$ = …… cm

(1mk)

Determine the value of **D** in the expression:

$$\mathbf{D = \frac{D_1 + D_2}{2}}$$

= ……cm

(1mk)

(i) Find the volume of the glass marble in m^3

Volume = …….

(3mks)

2. PART A (15 MARKS)

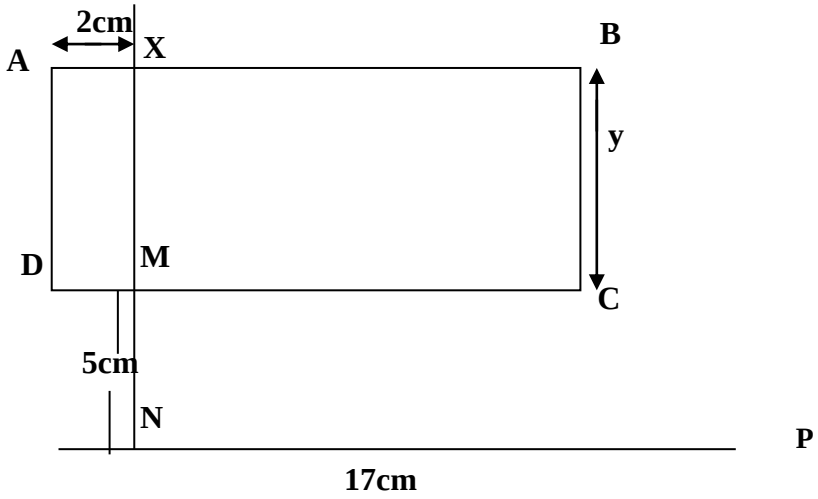
You are provided with the following apparatus;

- A rectangular glass block
- A rectangular Soft board
- Four optical pins
- Two thumb pins
- A half metre rule

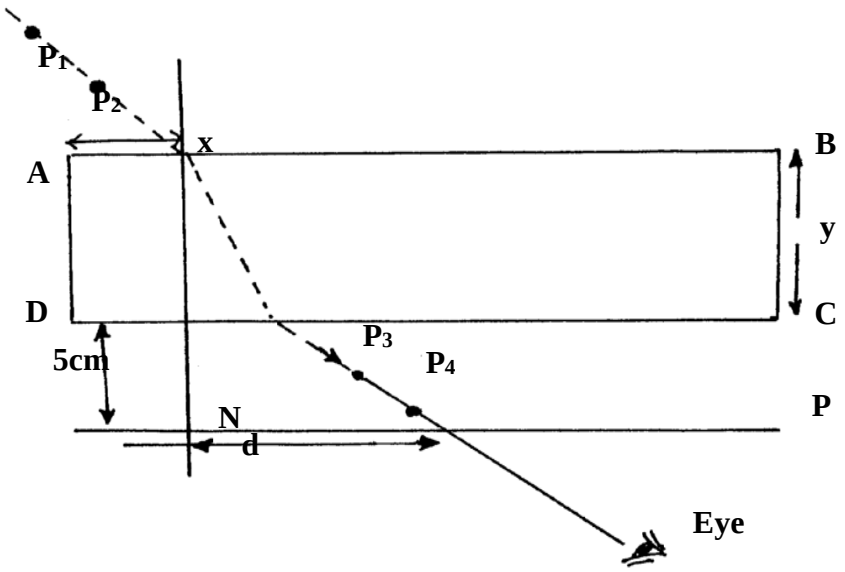
Proceed as follows;

a) Fix the plain paper on the soft board using the two thumb pins
b) Place the glass block on the plane paper (fixed on the soft board). Let the glass block rest on the paper from the broader face
c) Trace the glass block using a pencil
d) Remove the glass block
e) Mark point X on the one of the longer side of the traced glass block a shown below. Point X should be 2cm from edge A

(e) Construct a normal at **x** to emerge through line **DC**. Let this normal meet line **DC** at point **M.**



(f) Mark point **N** along the emergent normal ,5cm from **M.**
(g) Construct line **NP** to meet the normal at **N** at 90°. Line **NP** can be about 17cm
(h) Using a protractor, construct an incident ray RX at an angle of incidence c=10°.
Fix two pins **P1** and **P2** along **RX**.
(i) Replace the glass block to the traced figure.
(j) View the path of the incident ray **RX** through the glass block using the other two pins **P3** and **P4.** This can be done by ensuring that the images of pin **P1** and **P2** are in line with **P3** and **P4(ie, no parallax method).**
(k) Remove the glass block and draw the emergent ray through **P3** and **P4.**
(l)Measure the distance of the emergent ray from point **N** along line **NP** as shown below

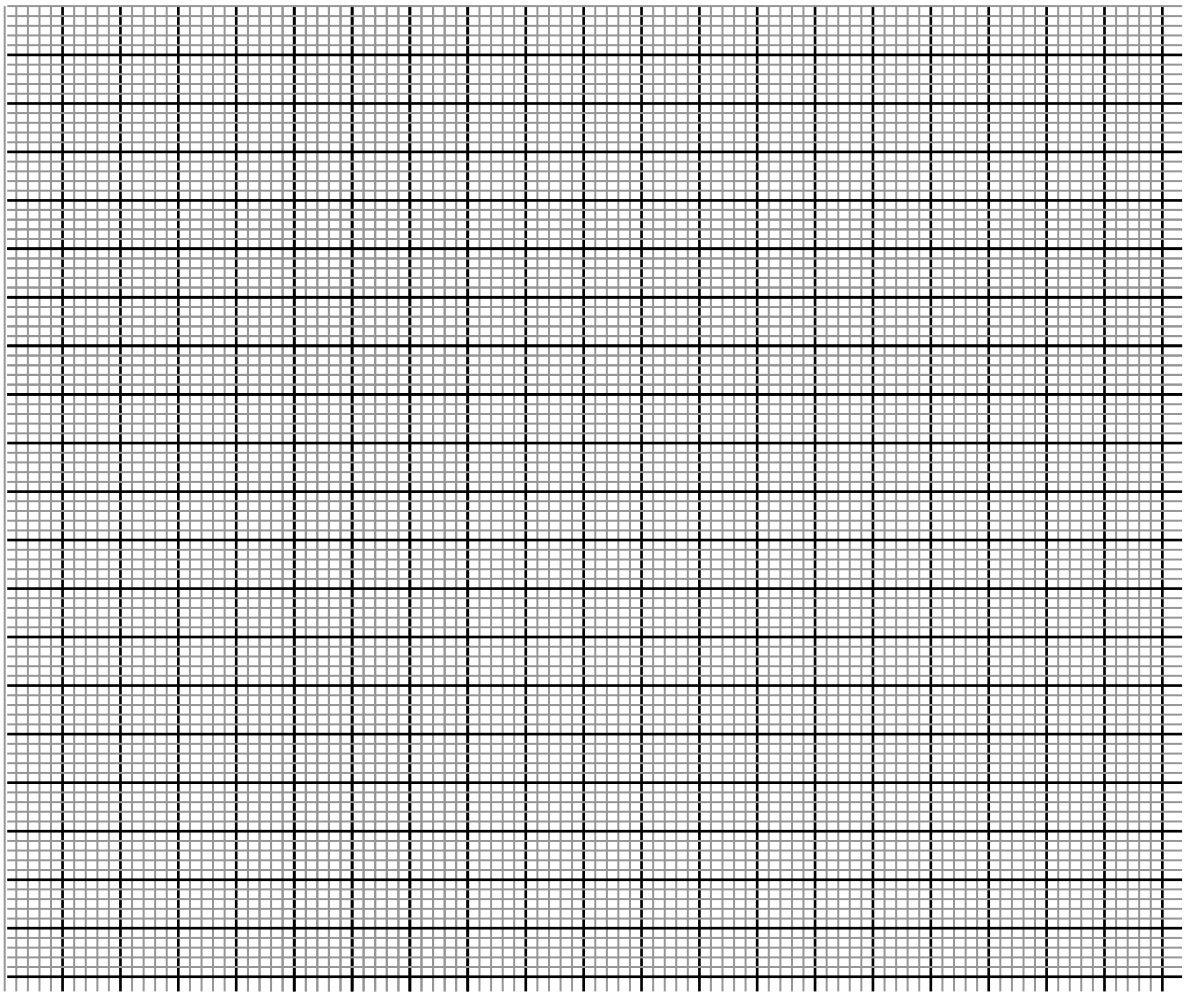


Record the corresponding values of d in the table below
(m) Repeat the procedure for other values of i = 20^0,30^0,40^0,50^0 and 60^0.

Angle of incidence i^o	10	20	30	40	50	60
Distance d(cm)						
Sin i						
Sin ^{2}i						

(7 marks

(n) Plot a graph of $\sin^2 i$ against d



o) Determine the slope ,S, of the graph . (3 marks)

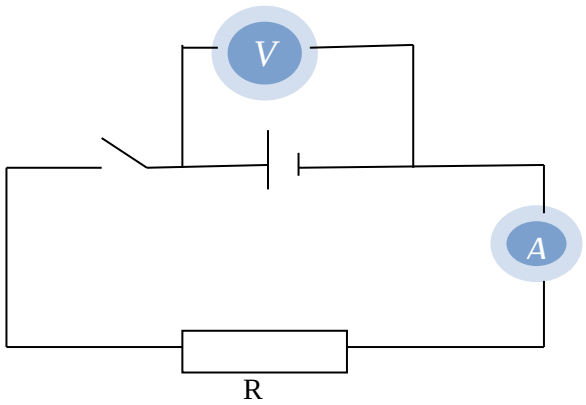
PART B(5 MARKS)

You are provided with the following apparatus:

- One cell and a cell holder
- Six connecting wires ,two with 3 with chrocodile clips
- A switch
- A 10Ω carbon resistor
- An Ammeter , Range (0-1)A
- A Voltmeter ,Range (0-5) V

p) Proceed as follows :

i) Set up the apparatus as shown in the diagram below



ii) Record the reading E of the voltmeter.

E = ……V (1 mark)

iii) Close the switch and record the reading ,V,of the voltmeter and ,I,the reading of the ammeter .

V…….....V (1 mark)

I……A (1 mark)

q) Given that E = V + Ir ,determine the value of r. (2marks)

THIS IS THE LAST PRINTED PAGE