Phyics p1 lainaku ms

1. $\frac{2.32+2.31+2.34+2.34+2.31;}{5}$

   = 2.324

   = 2.32 mm;

2. 8.23 ;+ 0.02 = 8.25 cm;

3. $P = \frac{F}{A;}$

   $20 = \frac{F;}{8}$

   = 8 x 20 = 160N;

4. Clockwise moments=Anticlockwise moments;

   30 x 20 = 30 x 5 + F x 30;

   600 = 160 + 30F

   450= 30F

   F=15N;

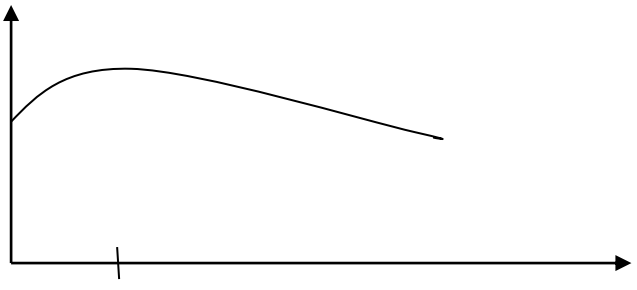
b) North pole;

b) 10N;

6. -The resultant force is zero, since acceleration is zero;
   - Total upward forces is equal to downward forces;

7. Increase in temperature increases the kinetic energy of the air molecules/particles; This increases the rate of collisions between the air molecules and the walls of the tyre; The rate of change of momentum increases which increases pressure

8. Molecules of gases are farther apart and the intermolecular force is weak compared to solids and gases

9. 

   4;

10. -Convection currents takes place upward, when heat is applied the density is expected to decrease but during anomalous expansion, density increases.

11. Q=MCDQ
Heat lost=Heat gained
5 x c x 40 =- m x 25 x 4

$M = \frac{5 \times 40}{25}$

= 8Kg

12. $V = \frac{2 \times 10^{-4}}{800} = 0.25cm$

1 drop = 0.0025cm3

$D = V/A = \frac{0.00025}{54}$
$= 5.0 \times 10\text{-}5cm$

13. F= 6 - 4
= 2N

F= Ma

A= F/m
= 2/2 = 1m/s2

14. V=2πrf;
$= 2 \times \frac{22}{7} \times 1.5 \times 3;$

= 28 . 286m/s;

ii) $T = \frac{Mr2}{r} - mg;$

$= \frac{0.45 \times 28.29^2}{1.5} - 0.45 \times 10;$

= 235 .60 N;

b) mark on the diagram- horizontal projection to the left

c) i) $\omega = \frac{\Delta\Theta}{\Delta t}$;

$= \frac{4/10}{0.01}$;

$= \frac{0 . 4}{0.01}$

= 40 rad/s;

ii) T=1/f;

$\omega = 2\pi f$

$40 = 2\pi f$; f=6.36Hz

T=0.1571s;

15.a i) automatically switching on and off of the heater element

ii) when the heat increases beyond the required temperature brass expands more than the iron; the strip curves downwards breaking the contact; when the temperature lowers the strip contracts completing the circuit and the process continues;

b)i heat capacity- quantity of heat required to raise the temperature of a substance by 1k

specific heat capacity- quantity of heat required to raise the temperature of a unit mass of a substance by 1k.

ii) Q= pt;

3 x 4200 x 50 = 2.5 x 1000 x t;

T= 252s;

16. a.i) area under the graph = displacement;

(1/2 x 6 x 20) + (6 x 20);

=180 m;

ii) $a = \frac{v-u;}{t}$

$= \frac{0 – 20;}{2}$

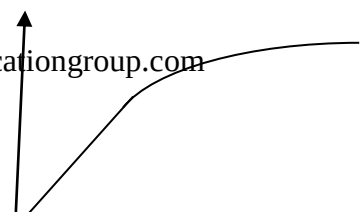
$= - 10 \text{ m/s}^2$

iii) F = ma;

= 5 x -10;

= 50N;

b)



17. a) i. the rate of change of momentum of a body is directly proportional to the resultant external force producing the change, and takes place in the direction of the force;

ii) to lower his position of centre of gravity/ increase the base area;

b) $v^2 = 2gs$

$v^2 = 2 \times 10 \times 1.25$;

$v = 5$ m/s;

ii) $F = \frac{m(v - u)}{t}$;

$\frac{0.1 \times 5}{0.1}$; $= 5$N;

d) i) elastic- both kinetic energy and momentum are conserved
inelastic – only momentum is conserved

ii) $m_1u_1 + m_2u_2 = (m1 + m2)v$;

$800 \times u1 - (5000 \times 40) = 5800 \times 10$;

$= 1.77.5$ m/s;

18 a) heat and light

b) i. copper is a good conductor of heat;

ii) this increases the length of the coil; increasing the surface area for the water to absorb heat energy.

iii) black is a better absorber of heat; this increases the rate of absorption of heat;

iv) minimize heat loss to the surrounding;

v) the heat energy from the sun penetrates through glass cover; after penetration the strength of the waves reduces; and heat is unable to move out of the box;

Lainaku2@2015

MARKING SCHEME

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.

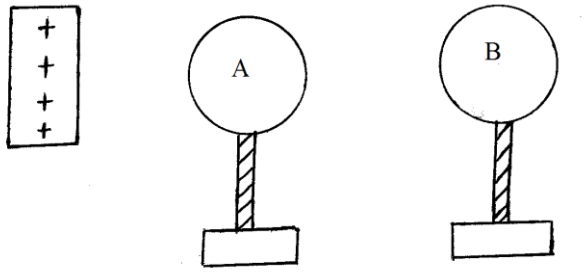
FOR OFFICIAL USE ONLY

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 11 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)

NUMBER OF OSCILLATIONS PER GIVEN TIME ;

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

$V_t = 2X$;

$340 \times 1.7 = 2 \times X$;

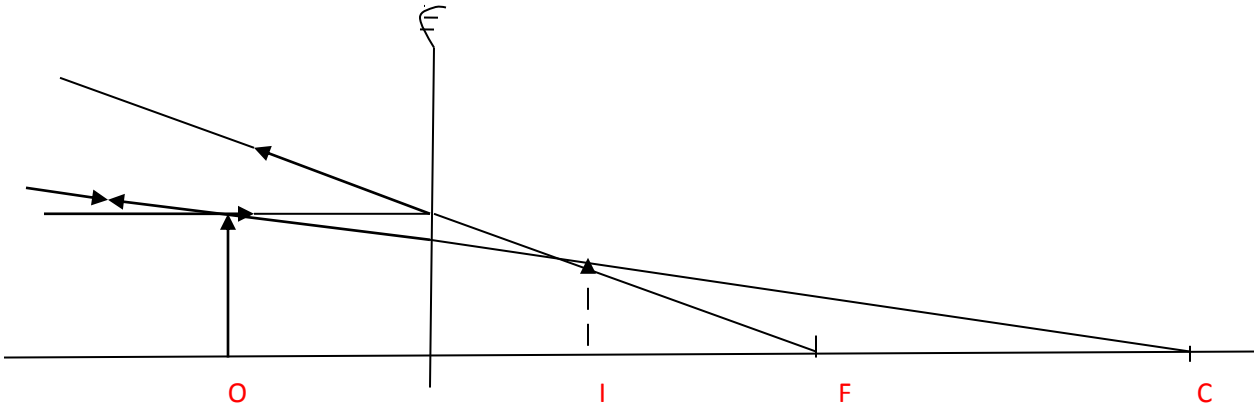
$X = 289\ M$;

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

- LOCAL ACTION ;
- OR POLARISATION

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

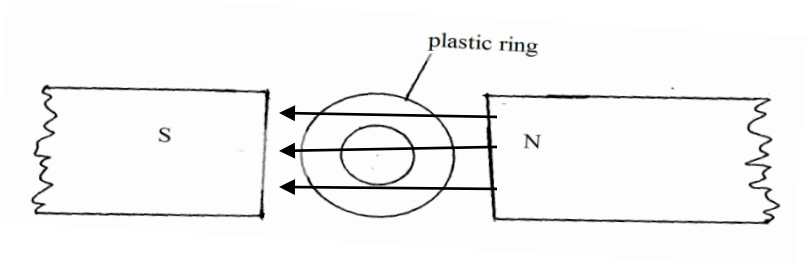
EACH CORRECT RAY ;
CORRECT OBJECT ;



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

ADVANTAGE	DISADVANTAGE
HAVE A WIDE RANGE OF VIEW ;	IMAGE IS DIMINISHED ; OR IMAGE IS LATERALLY INVERTED

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)



1 MARK FOR PARALLEL HORIZONTAL FIELD LINES OF FORCE

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

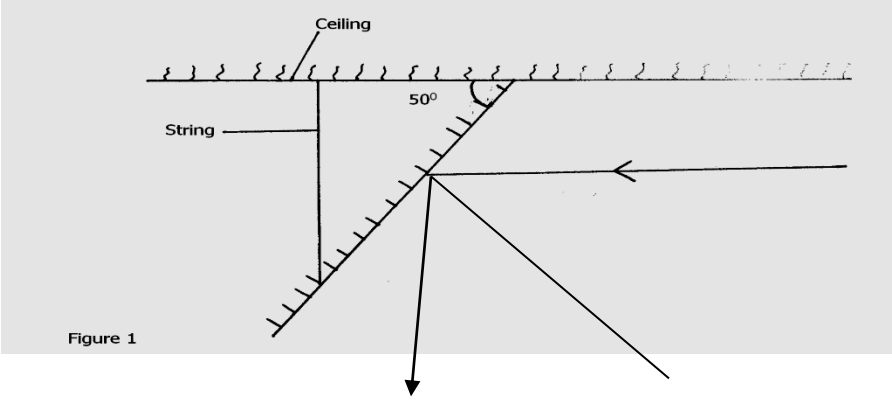


Figure 1

i= r=40^0 ;

CORRECT RAY ;

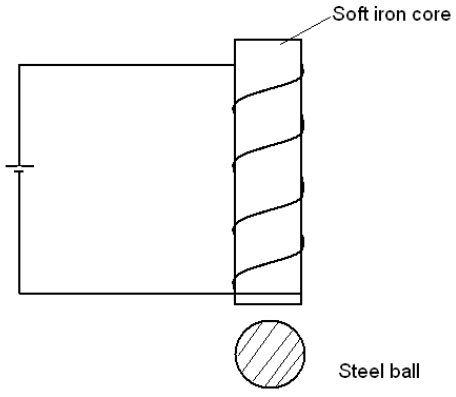
9. In the diagram below, two pins are attached to the end of a magnet as shown.
Explain the behaviour of the pins. (2 marks)

- PIN HEADS ACQUIRE SAME POLE(SOUTH) ;
- LIKE POLES REPEL ;

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

DECREASE CAPACITANCE ;

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



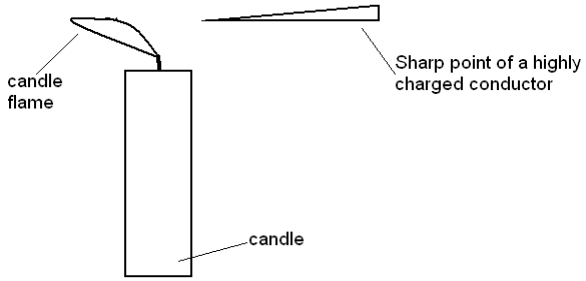
In order to lift a slightly heavier ball, it is necessary to make a stronger electromagnet. State two ways in which the electromagnet could be made to lift a heavier steel ball. (2 marks)

- INCREASE CURRENT ;
- INCREASE NUMBER OF TURNS ;

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)

P = VI
3000 = 250I ;
I = 12A ;
NOT SUITABLE ;

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

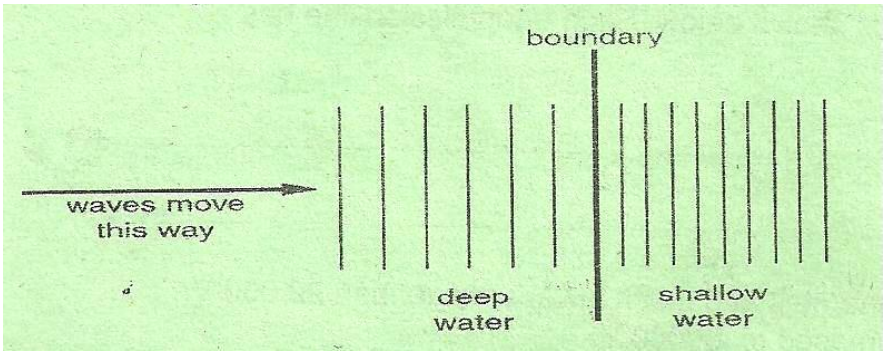


State with reason the charge on the conductor. (2 marks)

- POSITIVE ;
- MASSIVE (OR HEAVY) POSITIVE AIR IONS REPELLED FROM SHARP POINT BEND THE FLAME ;

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 below shows the top view of the tank..



(a) State what happens at the boundary to:

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

INCREASES ;

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

CONSTANT ;

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

DECREASES ;

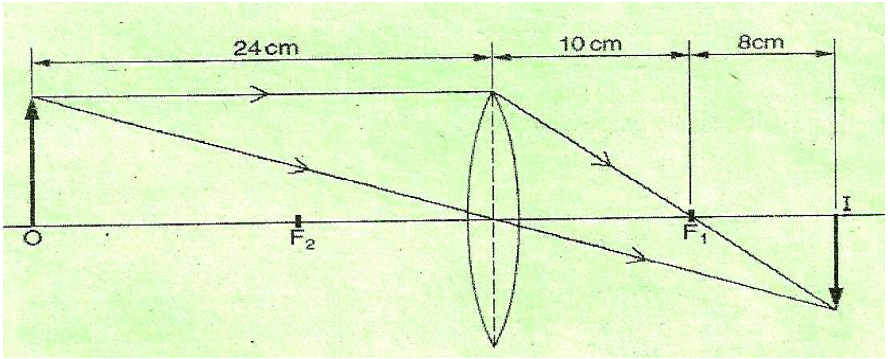
(b) The waves have a speed of 24cm/s in the deep water. Consecutive wave crests are 0.08m apart in the deep water. Calculate the frequency of the source producing the waves. (2 marks)

V = FΛ

24= FX 8 ;

F = 3HZ ;

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



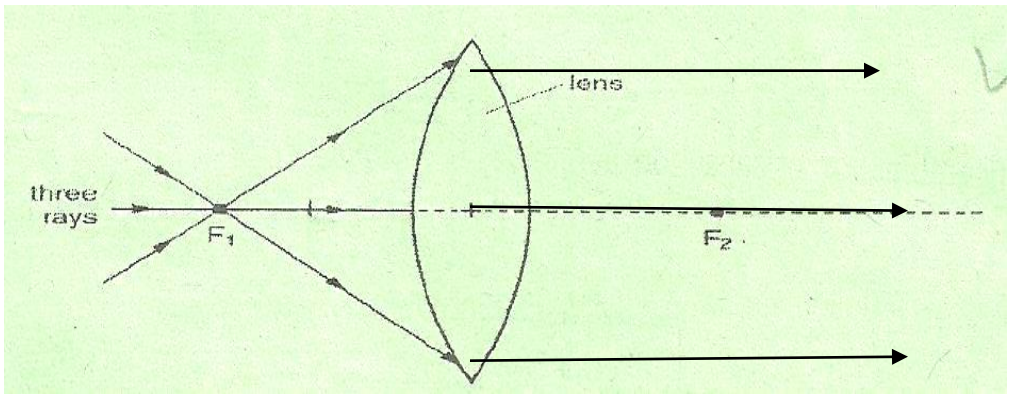
(i) State the value of the focal length of the lens. (1 mark)

8CM ;

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

M = 18/24 ;
M = 0.75 ;

(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)

1 MARK FOR THE 3 PARALLEL RAYS

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

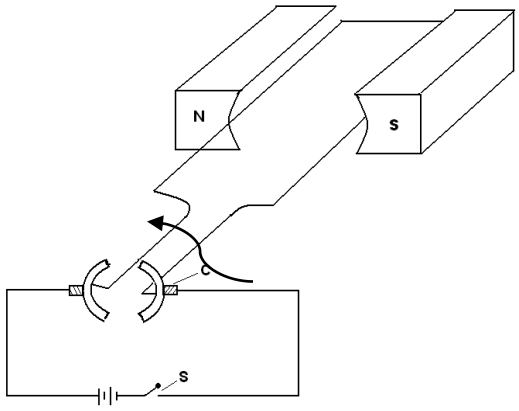
LONG EYEBALL ;

-

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

BI-CONCAVE ;

15. The diagram below shows a simple electric motor.



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

CARBON BRUSH ;

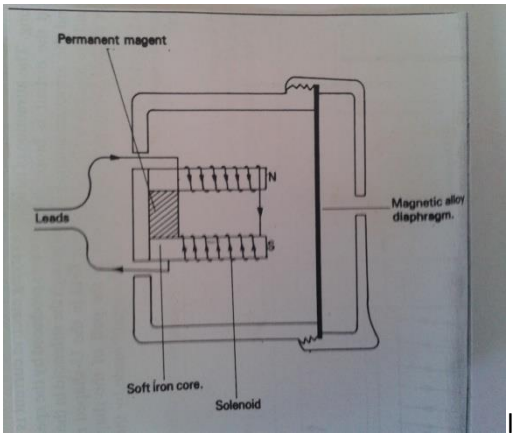
(b) (i) State one factor that will affect the speed of rotation of the motor. (1mark)

- STRENGH OF MAGNETIC FIELD ;
- OR NUMBER OF TURNS OF THE COIL
- OR WINDING THE COIL ROUND A SOFT IRON CORE

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

ANTICLOCKWISE DIRECTION SHOWN ON DIAGRAM , 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)

THE DIRECTION OF THE INDUCED E.M.F IS SUCH THAT THE INDUCED CURRENT WHICH IT CAUSES TO FLOW PRODUCES A MAGNETIC EFFECT THAT OPPOSES THE CHANGE PRODUCING IT ;

(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)

$\frac{power\ output}{power\ input}$ X 100% = 90% ;

I = 90/20 ;

I = 4.5 A ;

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 = MICROWAVES ;

B = VISIBLE LIGHT ;

C = X _ RAYS ;

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

- TRAVEL WITH THE SPEED OF LIGHT ;
- ARE TRANSVERSE IN NATURE ;
- OR ANY TWO CORRECT PROPERTIES

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

X- RAYS	GAMMA RAYS
PRODUCED AS A RESULT OF ENERGY CHANGES IN ELECRONS ;	PRODUCED AS A RESULT OF ENERGY CHANGES IN THE NUCLEUS ;

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

- THROUGH RADIO RECEIVER ;

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)

$C = F\lambda$;

$3X10^{8} = 4.5X10^{14}\ \lambda$;

$\lambda = 6.67 \times 10^{-7}M$;

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

THE POTENTIAL DIFFERENCE ACROSS A CONDUCTOR CARRYING CURRENT IS DIRECTLY PROPORTIONAL TO THE CURRENT PROVIDED TEMPERATURE AND OTHER PHYSICAL CONDITIONS REMAIN CONSTANT ;

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

EMF	PD
VOLTAGE ACROSS A CELL WHEN NOT SUPPLYING CURRENT ;	VOLTAGE ACROSS A CELL WHEN SUPPLYING CURRENT ;

c) Four resistors are connected as shown in figure below

Determine:

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

$R_P = 2\Omega$;

$R_T = 4 + 2$

$R_T = 6\Omega$;

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

$I = V/R$;

$I = 12/6$;

$I = 2A$;

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

$V = IR$;

$V = 2 \times 4$;

$V = 8V$;

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

V = 12 – 8 = 4V ;
I = V/R
I = 4/3 ;
I = 1.33 A ;

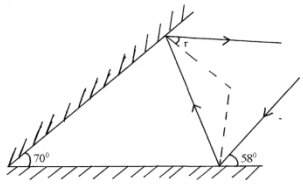
18. a) State one law of reflection . (1 mark)

- THE ANGLE OF INCIDENCE IS EQUAL TO THE ANGLE OF REFLECTION ;
-

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)

U + V = 4.8 + 4.8 ;
= 9.6 M ;

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)

38^0 ; ;

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

i) Decreasing object distance (1 mark)

IMAGE SIZE INCREASES ;

ii) Increasing image distance (1 mark)

IMAGE SIZE INCREASES ;

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

$N = \frac{360}{\theta} - 1$;
$\Theta = 9^0$;

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MARKING SCHEME

232/3

PHYSICS

PAPER 3

MARCH/APRIL 2015

TIME: 2 ½ HOURS

LAINAKU 2 JOINT EVALUATION EXAM

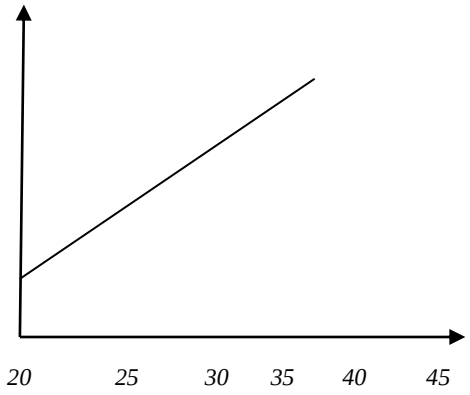
Kenya Certificate of Secondary Education (K.C.S.E.)

X_1 = …24.5….cm;
X_2 = …23.0…cm;

Table 1

Distance of marble in air X_0 (cm)	**15**	**17**	**19**	**21**	**23**	**24.5**
Distance of 20g metal mass, X_1 (cm)	**24.5**	**28.0**	**31.0**	**34.5**	**38.0**	**41.5**
Distance of 20g metal mass, X_2 (cm) When marble is in paraffin	**23.0**	**26.0**	**28.5**	**31.4**	**34.5**	**37.5**
X_1 - X_2 (cm)	**1.5**	**2.0**	**2.5**	**3.1**	**3.5**	**4.0**

Values of x1 - 2mks, x2 - 2mks, x1 – x2, 1mk



A1
P2
S1
L1

Slope = ***3 - 2 ;;*** ***= 0.0909;***

35-26

Part b

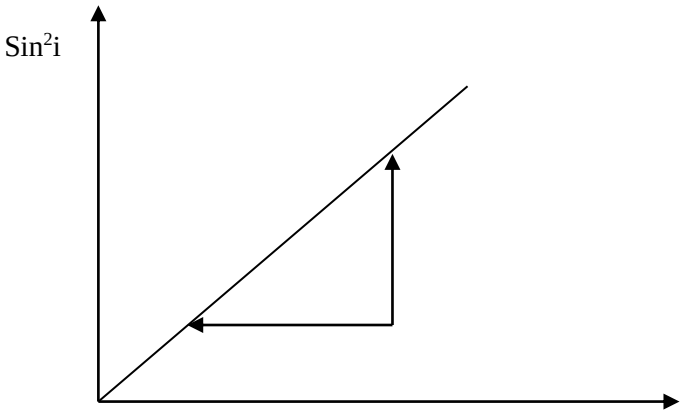
1.70 cm

2. PART A (15 MARKS)
m)

Angle of incidence i^o	10	20	30	40	50	60		
Distance d(cm)	1.8	3.4	6.6	8.9	11.2	15.6	**3marks** (1/2 mark each)	1dp ± 0.5
Sin i	0.1736	0.3420	0.5000	0.6428	0.7660	0.8660	**2marks** (1 mark for 3 correct values)	At least 3 dp
l Sin ^{2}i	0.0301	0.1170	0.2500	0.4132	0.5868	0.7500	**2marks** (1 mark for 3 correct values)	At least 3 dp

TOTAL 7 MARKS

(n) Graph of $\sin^2 i$ against d . .(5 marks)



A1
P2
S1
L1

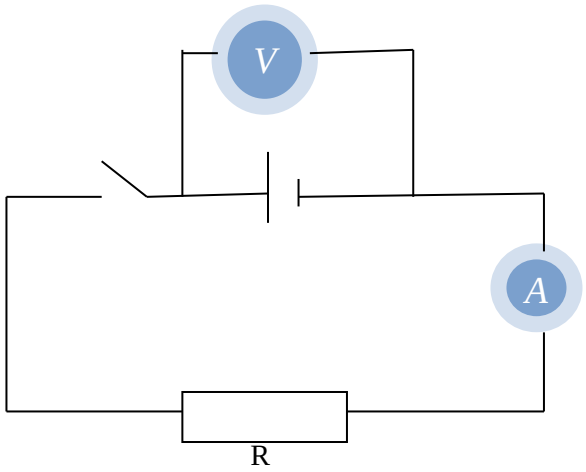
(ii) Slope ,S, of the graph . (3 marks)

1 mark for correct triangle

S = $\frac{\Delta Y}{\Delta X}$; (as per candidates graph)

S = 0.05 cm^{-1} (± 0.02) ;

PART B(5 MARKS)



ii) Reading E of the voltmeter.

$$E = 1.6V \quad ;$$

iii) Voltmeter and Ammeter readings .

$$V = 1,4\ V \quad ;$$

$$I = 0.1\ A \quad ;$$

q) Value of r.

$$E = V + IR$$
$$1.6 = 1.4 + 0.1R \ ;$$
$$R = 2\Omega \quad ;$$

NB : i) Award no mark for wrong units and half mark for no units in the final answer.
ii) Award marks for transfer of error