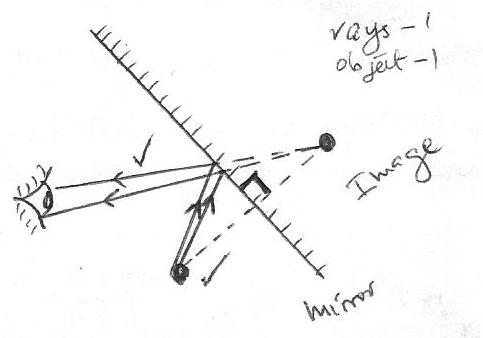
**SAMIA SUB-COUNTY JOINT EXAMINATIONS – 2021**

**PHYSICS PAPER 2**

**Marking Scheme**

**SECTION A: (25 Marks)**



1.

1. - *Moving the object towards the pinhole (Reducing the object distance)*

* *Moving the screen away from the pinhole (increasing the image distance)*

1. *- Leaf divergence of A decreases while the leaf divergence of B increases*

* *Due to the repulsion of charges in electroscope A, some charges move to electroscope B*

1. *Formation of hydrogen gas around the copper plate* ***insulates*** *the electrode.*

1. *Hammering causes the dipoles to vibrate, making them lose their alignment*

*Ray // to principal axis*

*Ray directed towards C*

*Erect object located*

**O**

**I**

**F**

**C**

1. *- The rider moves to the left.*

* *The rider experiences a force when placed to a magnetic field according to Fleming’s left hand rule*

*= 2 Hz*

1. *- the charges in the plates induces opposite charges at ends of the mica sheet*

* *the induced charges produce electric field that opposes the electric field due to the plates hence reducing the resultant electric field and since V = , V reduces*

*=*

= *12.5 A*  *The fuse is* ***not*** *suitable*

1. *a) - the galvanometer deflects*

* *magnetic field in P builds up from zero to a maximum, cutting coil Q and inducing an e.m.f in it, hence current flows*

1. *The deflection is also halved*

*Accept alternative method*

*t = 16 days*

**SECTION B (55 MARKS)**

1. a) *light is an electromagnetic/ transverse wave while sound is a mechanical/longitudinal*

*wave*

1. *– it penetrates deepest*

*– it is easily reflected by tiny grains of sand*

1. *- An increase in temperature* ***increases the kinetic energy*** *of the air particles*

* *This leads to an* ***increase in the speed*** *of sound.*

*d) (i) Sound becomes less audible until it cannot be heard any more.*

1. *Steam condenses, creating a (partial) vacuum in the jar.*

*Sound, which requires material media for transmission, will not be heard.*

1. *(i) - the* ***distance*** *between the boy and the wall*

* *the* ***time*** *taken to hear the echo*

1. time for 1 clap =

= 165 m

1. *a) the amount of current flowing through a conductor is directly proportional to the*

*potentialdifference across its ends, provided that temperature and other physical*

*conditions arekept constant.*

Wire

S

* *Close the switch and adjust the rheostat to obtain the value of current, I and the corresponding value of voltage, V. Record the values in a table.*
* *Repeat the experiment for other values of I and the corresponding values of V.*
* *Plot a graph of V against I. The graph should be* ***a straight line through the origin***

1. *(i)*

*Ω*

1. *Ω*

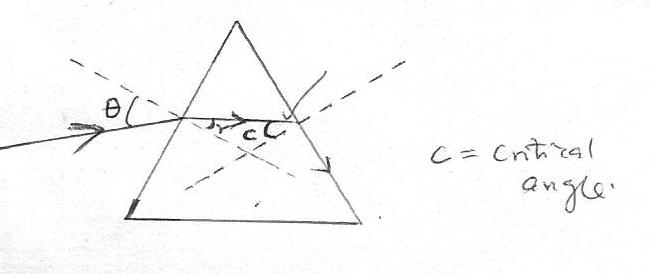
*= 2.133 A*

1. a*)- the angle of incidence in the optically dense medium is greater than the critical angle*

* *the ray must be travelling from optically dense medium to optically less dense medium*

*b) i) n =*

*= 1.5957*



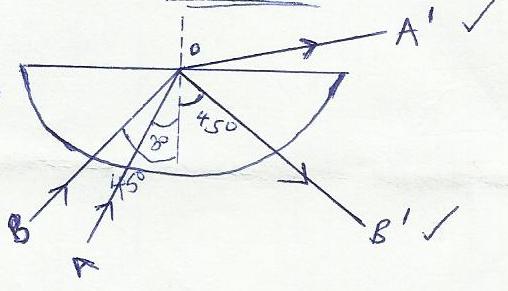
ii)

C = critical angle

c = sin-1 = 38.81o

iii) = 1.5957

= sin-1 (1.5957 sin 21.2o) = 35.24°

c) i)

ii) *n =*

*= 1.4945*

1. a)i.)

-To travel at the speed of light in a vacuum 

- Cause some substances to fluoresce 

- Undergoes diffraction, Refraction, interference 

- Penetrates matters 

- Obeys the wave equation 

ii.) K.E = eV = hf

f = eV/h x 5 % = 1.6 x 10-19 x 10000x5/60620x 10-34 x 100

f = 1.208 x 1017 Hz

b.)- Dope a group 3 element with a pure semiconductor

- 3 outermost electrons from the group 3 element form bonds with their neighbours leaving a hole

which acts as a positive charge.

- This creates P type (positive charge) semiconductor

c) (i)*Sound wave – cannot travel in a vacuum*

1. *Cathode rays – are deflected by both magnetic and electric fields*
2. *=h *

*λ =*

*= m*

1. *a)the direction of induced current is such that it opposes the change causing it*

*b) (i) North (N)*

*(ii) Change of flux linkage*

c) i) NP = 800, NS = 40

VP = 240v, IP = 0.2A

VS = 12 V

ii)

= 38.4N