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1.

Aim: To investigate the relationship between image distance and object distance from the plane mirror.

Variables:

Independent Variables: i

Controlled Variables: Amount of light

Dependent Variables: d_1, d_2, r.

Hypothesis: Image distance from the plane mirror is equal to the object distance

List of materials

1 Soft board

1 tracing paper / white sheet of paper

3 optical pins

4 Thumb pins

1 plane mirror

Experimental Set up.

a) A tracing paper is fixed on a soft board and a horizontal line XY is drawn on it as below.

b) A perpendicular line CO is drawn such that $XA = 1.0cm$
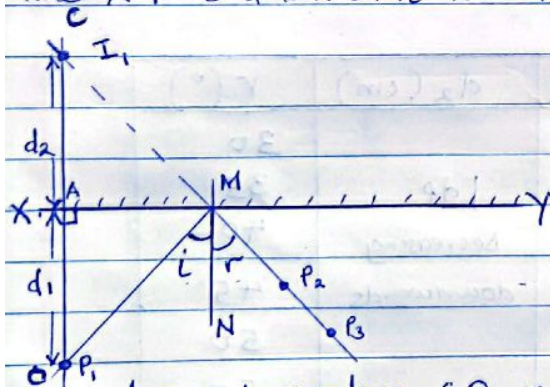
c) A normal line MN is drawn at point M such that $AM = 4.0cm$.

d) Starting with the angle of incidence, $i = 30°$, line MO is drawn to meet CO at O as above.

e) Pin P_1 is fixed at point O and the plane mirror is placed along XY facing the observer.

f) Looking through side MY, Pins P_2 and P_3 are fixed such that they appear to be in line with the image I of pin P_1.

g) The pins and the plane mirror are removed & a line thru P_2 & P_3 is drawn to meet XY at M & extended to meet CO at I.

h) Distances d_1 and d_2 are measured & recorded

i) The angle of reflection r is also measured & recorded.

j) The procedures d) to i) are repeated for $i = 35°, 40°, 45°, 50°, 55°$ and $60°$.

k) The results are recorded in a suitable table.

l) A graph of d_1 against d_2 is plotted.

m) The slope S of the graph is determined.

n) From the slope, a conclusion is made about the relationship btn image distance & object distance from the plane mirror.

Data Presentation

d) For $i = 30°$,

$d_1 =$

$d_2 =$

$r =$

i (°)	d_1 (cm)	d_2 (cm)	r (°)
30			30
35	1 dp	1 dp	35
40	Decreasing	Decreasing	40
45	downwards	downwards	45
50			50
55			55
60			60

* A graph of d_1 against d_2 starting at 0.0 for each axis.

* $S = 1.0$

Sources of Errors:

- Parallax errors (Innacurate measurement of angles of incidence
     & reflection)
  - Working surfaces not smooth.

Precautions:

• Ensuring that the working surface is flat and
  smooth enough.
  • Correct use of instruments to avoid parallax errors.
  • When measuring d_1 and d_2, the eyes must be
  exactly perpendicular to the point where the reading
  is to be taken to avoid parallax errors.

Conclusion:

Since $S = 1.0$, the object distance is directly
proportional to the image distance from the plane
    mirror. Also from the experiment, the angle
of incidence is equal to the angle of reflection.

2.

Aim: To investigate the effect of length ~~of a wire~~
        to resistance of a wire.

Variables

Independent: L

Controlled: Room temperature, Wire material of connecting wires
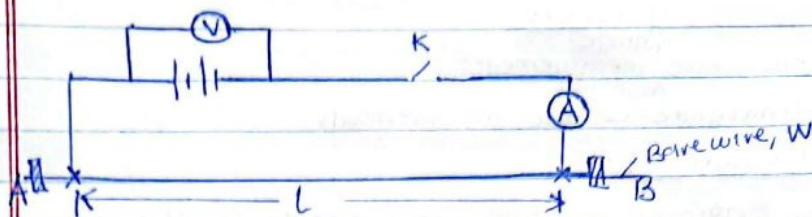
Dependent: I, V, $\frac{V}{I}$

Hypothesis: An increase in length of a wire results in
            an increase in resistance of a wire.

List of materials:

1 Voltmeter	8 connecting wires
1 Ammeter	1 switch
2 Dry cells in a holder	1 bare wire fixed on a metre rule.
2 crocodile clips	~~1 Jockey~~ 2 pieces of cellotape.

a) A bare wire, W is fixed on a metre rule AB and the circuit is connected as shown above.

b) The length l is adjusted to 0.900m. Switch K is closed.

c) The ammeter and voltmeter readings I and V are read & recorded. The switch K is opened.

d) The procedures b) and c) are repeated for values of l = 0.800, 0.700, 0.600, 0.500 and 0.400m.

e) The results are tabulated including values of $\dfrac{V}{I}$.

f) A graph of $\dfrac{V}{I}$ against l is plotted.

g) Slope β of the graph is calculated.

h) The value of the slope obtained (or the shape of the graph) shows the effect of length of the wire to the resistance of the wire.

Data Presentation.

For l = 0.900m, I =
V =

l (m)	I (A)	V (V)	$\frac{V}{I}$ (Ω)
0.900			
0.800			
0.700			
0.600			
0.500			
0.400			

* A graph of $\frac{V}{I}$ against l
* Slope, $\int$, units $\Omega\,m^{-1}$.

Sources of Errors:
- Innacurate voltage measurements.
- Innacurate current measurements.

Precautions:
- Ensuring accurate measurements of current
- Ensuring accurate measurements of voltage
- Ensuring the switch is open ~~whenever~~ after taking readings to stop the flow of current.

Conclusion:
From $R = \int l$, (i.e. $R = (Ans)l$) It shows that resistance of wire increases with the length of the wire.

END.