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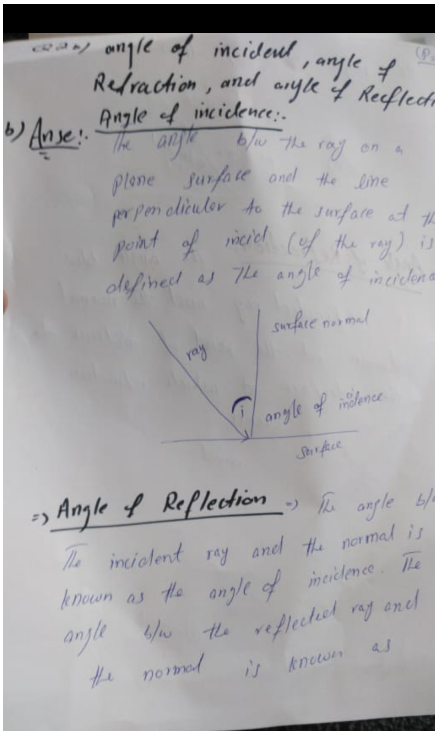
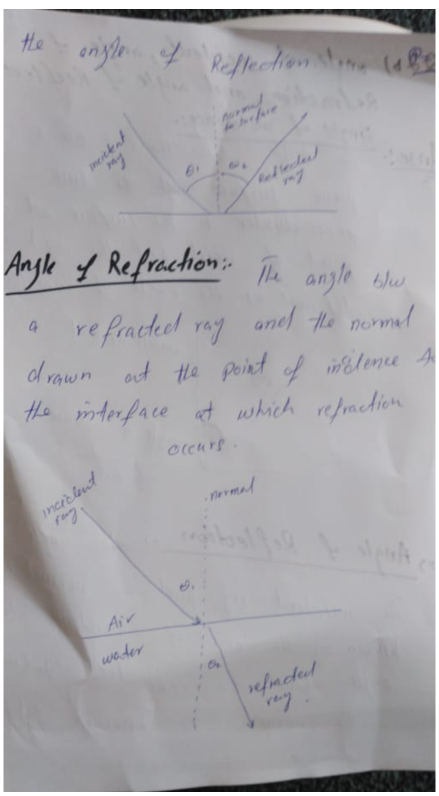

a) angle of incident, angle of Refraction, and angle of Reflecti

b) Anse:- **Angle of incidence:-** The angle b/w the ray on a plane surface and the line perpendicular to the surface at the point of incid (of the ray) is defined as the angle of incidence



=> **Angle of Reflection** -> The angle b/w the incident ray and the normal is known as the angle of incidence. The angle b/w the reflected ray and the normal is known as


the angle of Reflection



**Angle of Refraction:-** The angle b/w a refracted ray and the normal drawn at the point of incidence to the interface at which refraction occurs.



Question 1:-

A slit of width a is illuminated by white light.

(a) For what value of a will the first minimum for red light of $\lambda = 650$ nm be at $\theta = 15°$?

(b) What is the wavelength λ' of the light whose first side diffraction maximum is at 15°, thus coinciding with the first minimum for the red light?

Solution:-

(a) At the first minimum, m = 1 in equation [ a sinθ = mλ, for m = 1,2,3,...]. Solving for a, we then find

$a = m\lambda / \sin\theta$

$= (1)\,(650\text{ nm}) / (\sin 15°)$

$= 2511\text{ nm}$

$\approx 2.5\ \mu m$

Therefore, the value of a  the first minimum for red light of λ  = 650 nm be at θ = 15° would be 2.5 μm. For the incident light to flare out that much (±15°) the slit has to be very fine indeed, amounting to about four times the wavelength. Note that a fine human hair may be about 100 μm in diameter.

(b) This maximum is about halfway between the first and second minima produced with wavelength λ'. we can find it without too much error by putting  m = 1.5 in equation [a sinθ = mλ, for m = 1,2,3,...], obtaining

$a \sin\theta = 1.5\,\lambda'$

Solving for λ' and substituting known data give

$\lambda' = a \sin\theta/1.5$

$= (2511\text{ nm})\,(\sin 15°)/1.5$

$= 430\text{ nm}$

From the above observation we conclude that, the wavelength λ' of the light whose first side diffraction maximum is at 15° would be 430 nm. Light of this wavelength is violet. the first side maximum for light of wavelength 430 nm will always coincide with the first minimum for light of wavelength 650 nm, no matter what the slit width. If the slit is relatively narrow, the angle θ at which this overlap occurs will be relatively large, and conversely.

Q 1

Ans (a) At the first minimum, $m = 1$ in
$[a \sin\theta = m\lambda$ for $m = \{1, 2, 3 \ldots\}$ s
a, we then find $a = m\lambda / \sin\theta$

$= (1)\ (650\ nm) / (\sin 15^\circ)$

$= 2511 nm$
$= 2.5 \mu m$

Therefore The value of a the first
for red light of $\lambda = 650$ nm be
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to flare out that much

Subject: Q5 (b)

Date:

(i) Sol:-

cross-sectional area of rectangular block is square.

$S = 1.2 \times 1.2 \ cm^3 = 1.44 \times 10^{-4} \ m^2$

$l$ is 15 cm so $l = 0.15 m$

So $R = (9.6 \times 10^{-8}) \left( 0.15 / 1.44 \times 10^{-4} \right)$

$R = 1 \times 10^{-4} \ \Omega$

(ii) Sol:-

Cross-sectional area for rectangular bbck is rectangulars.

$S = 1.2 \times 15 \ cm^2 = 1.8 \times 10^{-3} \ m^2$

$l = 1.2 cm = 0.012 m.$

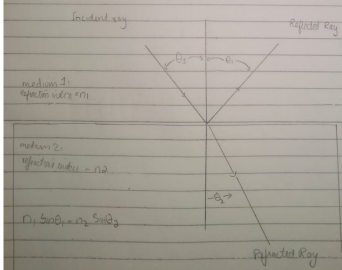
$R = (9.6 \times 10^{-8}) \left( 0.012 / 1.8 \times 10^{-3} \right)$

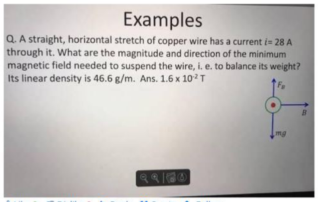
$R = 6.4 \times 10^{-7} \ \Omega$

All questions Done.

Q2B

At the point incidence when the ray strikes the mirror, a line can be drawn perpendicular to the surface of the mirror. The angle between the incident ray and normal is known the ~~incident~~ angle of incidence. The angle between the reflected ray and the normal is known as the angle of reflection.
Also the relationship between the Angle of incidence and angle of refraction is explained by Snell's law. which states that ratio of the sin of angle of refraction and sin of the angle of incidence is always constant and equivalent to the ratio of phase velocities of two mediums.
So law of reflection is equal to angle of incidence through this law.



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Nifeke: What are the magnitude and direction of the minimum magnetic field B needed to suspend the wire – that is, to balance the gravitational force on it(look at the image)

At equilibrium

FB = Fg

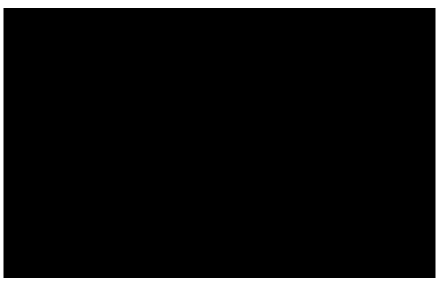
At equilibrium

FB = Fg

ILB sin θ = mg

B = 1.6 × 10−2 T(this is the answer)

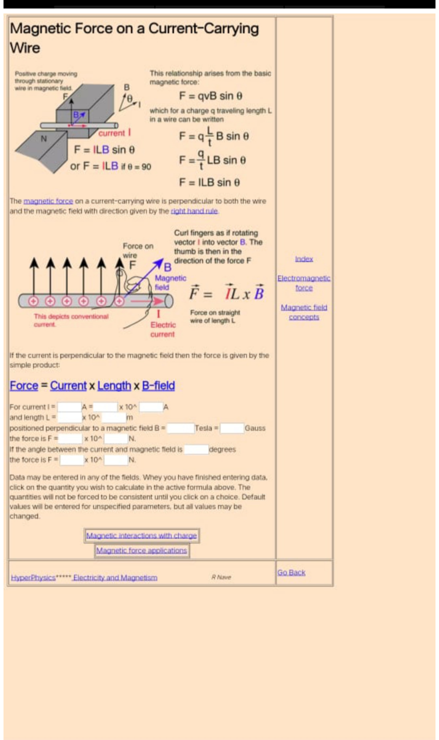
I THINK I HAVE GIVEN YOU THE SOLUTION TO THE ANSWER



**Difference Between Resistance and Resistivity**

| Sl. No. | Differentiating Property | Resistance | Resistivity |
|---|---|---|---|
| 1 | Definition | Resistance is the physical property of a substance because of which it opposes the flow of current i.e. electrons. | Resistivity is the physical property of a particular substance which is having particular dimensions. |
| 2 | Proportionality | Resistance is directly proportional to the length and temperature while it is inversely proportional to the cross-sectional area of the material. | Resistivity is only proportional to the nature and temperature of the particular material. |
| 3 | Symbol | $R$ | $\rho$ |
| 4 | Formula | $R = V/I$ or,<br>$R = \rho(L/A)$<br>$V$ = Voltage, $I$ = Current, $\rho$ = Resistivity | $\rho = (R \times A)/L$<br><br>$R$ = Resistance, $L$= Length, $A$ = Cross-sectional area |
| 5 | SI Units | The SI unit of resistance is Ohms | The SI unit of resistivity is Ohms-meter. |
| 6 | Applications | The property of resistance is used in several places like heaters, fuses, sensors, etc. | Electrical resistivity measurement is used as a quality control test for calcareous soil. |

| Difference between Reflection and Refraction | |
|---|---|
| Reflection | Refraction |
| This phenomenon usually occurs in mirrors. | This phenomenon usually occurs in Lenses. |
| Reflection can simply be defined as the reflection of light when it strikes the medium on a plane. | Refraction can be defined as the process of shift of light when it passes through a medium leading to the bending of light. |
| The light entering the medium returns back in the same direction. | The light entering the medium travels from one medium to another. |
| Considering the light waves, they bounce from the plane and change direction. | The light waves pass through the surface while simultaneously change from medium to medium. |
| The angle of incidence of the light is equal to the angle of reflection. | The angle of incidence is not equal to the angle of reflection. |



# Magnetic Force on a Current-Carrying Wire



This relationship arises from the basic magnetic force:

$$F = qvB \sin \theta$$

which for a charge q traveling length L in a wire can be written

$$F = q\frac{L}{t}B \sin \theta$$

$$F = \frac{q}{t}LB \sin \theta$$

$$F = ILB \sin \theta$$

The magnetic force on a current-carrying wire is perpendicular to both the wire and the magnetic field with direction given by the right hand rule.



Curl fingers as if rotating vector I into vector B. The thumb is then in the direction of the force F

$$\vec{F} = \vec{I}L \times \vec{B}$$

Force on straight wire of length L

Index

Electromagnetic force

Magnetic field concepts

If the current is perpendicular to the magnetic field then the force is given by the simple product:

**Force = Current x Length x B-field**

For current I = A = x 10^ A
and length L = x 10^ m
positioned perpendicular to a magnetic field B = Tesla = Gauss
the force is F = x 10^ N.
If the angle between the current and magnetic field is degrees
the force is F = x 10^ N.

Data may be entered in any of the fields. Whey you have finished entering data, click on the quantity you wish to calculate in the active formula above. The quantities will not be forced to be consistent until you click on a choice. Default values will be entered for unspecified parameters, but all values may be changed.

Magnetic interactions with charge

Magnetic force applications

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