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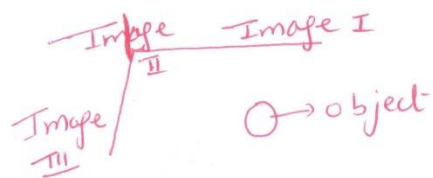
CLASS 8
LIGHT - REFLECTION

MULTIPLE IMAGES -

When 2 mirrors are inclined to each other at an angle, many images of the object are seen.

This is because the image formed in one ~~the~~ mirror acts as the object for the other. Many images formed in this manner is called multiple images.

eg: 1) When an object is kept in between two mirrors placed perpendicular to each other, 3 images are formed.



2) When a pair of mirror is placed \parallel (Parallel) to each other, an infinite number of images are formed.

The actual number of images (n) depends upon angle (θ) between the mirrors. It can be calculated by \rightarrow

$$\text{Number of images (n)} = \frac{360^\circ}{\text{Angle b/w the mirrors } (\theta)} - 1$$

$$n = \frac{360^\circ}{\theta} - 1$$

NOTE - Here, 1 is subtracted because of loss of one image due to overlapping of 2 images.

Applications of Multiple images -

1) Kaleidoscope -

It is a device based on the principle of multiple reflections.

It consists of mirrors inclined to each other at an angle of 60° .

This creates beautiful patterns which change when the Kaleidoscope is rotated or shaken.

2) Periscope -

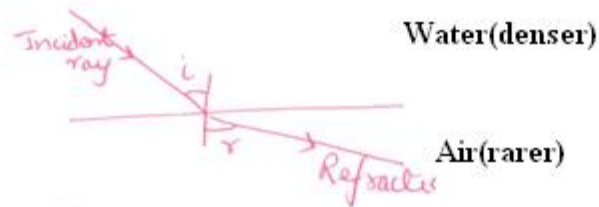
(2)

REFRACTION -

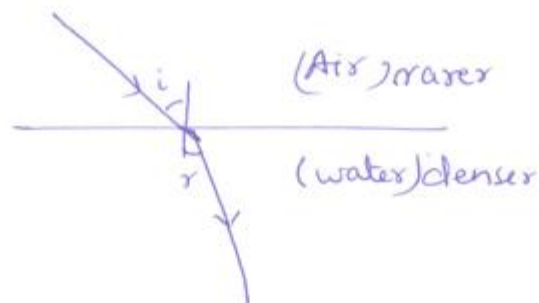
When a ray of light moves from one medium to another, bending or change in direction of light takes place. This process is called Refraction.

NOTE -

When a ray light goes from a denser medium to a rarer medium, it bends away from normal.

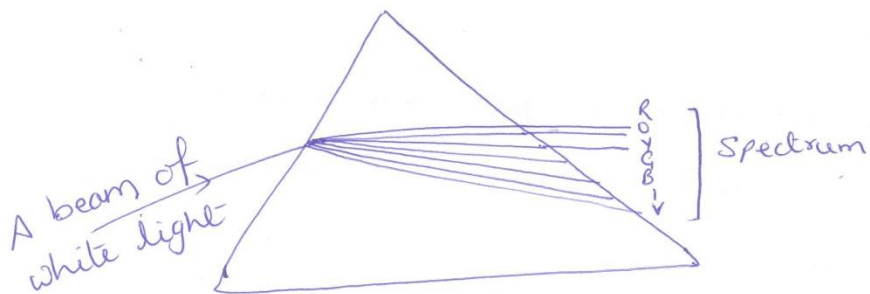


When a ray of light goes from rarer to denser it bends towards the normal.



DISPERSION OF LIGHT -

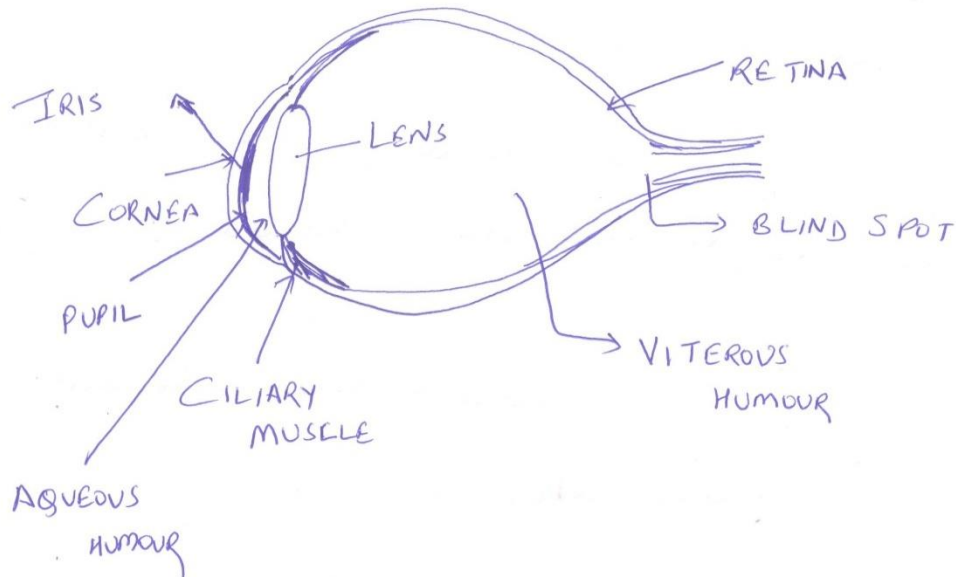
The phenomenon of splitting of white light into its component colours on passing through transparent medium like prism is called Dispersion.



A band of seven colours formed on a white screen when white light passes through a prism is called SPECTRUM of white light.

The Human Eye -

(3)



FUNCTION OF EACH PART -

1) CORNEA - Outermost covering of eye. It allows light to enter.

2) PUPIL & IRIS -

Behind cornea is the IRIS. It gives colour to eye.

IRIS has central aperture called

Pupil.

Iris regulates the amount of light entering the eye by adjusting the size of pupil.

(a) If light is dim, iris expands the pupil in order to allow more light to enter.

(b) If light is bright, iris contracts in order to decrease the amount of light.

3) LENS - It is a convex lens situated just behind the iris.

4) CILIARY MUSCLES - These muscles hold eye lens in proper place.

5) OPTIC NERVE - They carry optical messages in the form of electrical signals to the brain.

6) RETINA - It consists of rods and cones. Rods are sensitive to bright light (can detect colours) and cones are sensitive to dim light. It acts as screen of eye.

7) BLIND SPOT -

At the junction of optic nerve and retina, there are no sensory cells so, no vision is possible at that spot.

WORKING OF HUMAN EYE

The light coming from an object enters the eye through the Cornea and the pupil



The lens focuses the light rays to form a real, inverted and highly diminished image on the retina.



The sensory cells (rods and cones) of the retina get activated and generate electric signals.



Optic nerves send electric signals to the brain.



The brain interprets these signals and renders the erect image of the object.

PERSISTENCE OF VISION

When light coming from an object falls on the retina of eye, the impression of an image does not vanish immediately from the retina. The impression of image lasts for $\frac{1}{16}$ th of a second.

POWER OF ACCOMODATION

The ability of the eye lens to adjust its focal length, so as to

see the objects located anywhere is called Power of accommodation.

NEAR POINT - Minimum distance at which eye can see objects very clearly without strain. Near pt. is 25cm.

FAR POINT - Maximum distance upto which eye can see without strain.

Far point is infinity.

DEFECTS OF VISION & THEIR CORRECTION (5)

① NEAR SIGHTEDNESS (MYOPIA)

Person can see nearby but cannot see far off objects distinctly.

Here, image of distant object is formed in front of retina.

To correct a myopic eye, person should use spectacles with a concave lens.

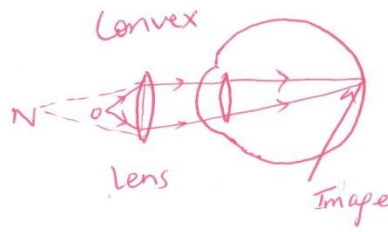
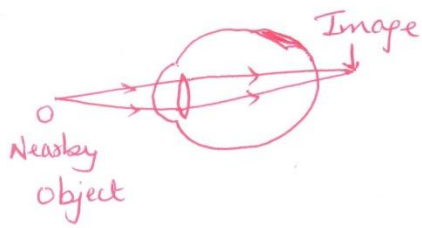


② Far Sightedness (HYPERMETROPIA) -

Person can see far off but cannot see nearby objects.

Here, image of nearby object is formed behind the retina.

To correct a hypermetropic eye, person should use spectacles with a convex lens.



3) CATARACT -

The eye lens becomes hazy (cloudy). Because, of this cloudiness light rays don't pass easily through the lens to focus on the retina. Hence, things look foggy.

VISUALLY CHALLENGED (BLIND) PEOPLE -

People who cannot see are called blind.

Blindness is of 2 types

Curable

↓
Either cornea or eye lens becomes opaque due to defects or disease.

Incurable

↓
Complete and total loss of vision by birth or in later life due to diseases.

VARIOUS TECHNOLOGICAL AIDS FOR BLIND PEOPLE (6)

① BRaille SYSTEM -

Visually challenged people can read books printed in Braille.

Braille is system of representing characters by raised dots.

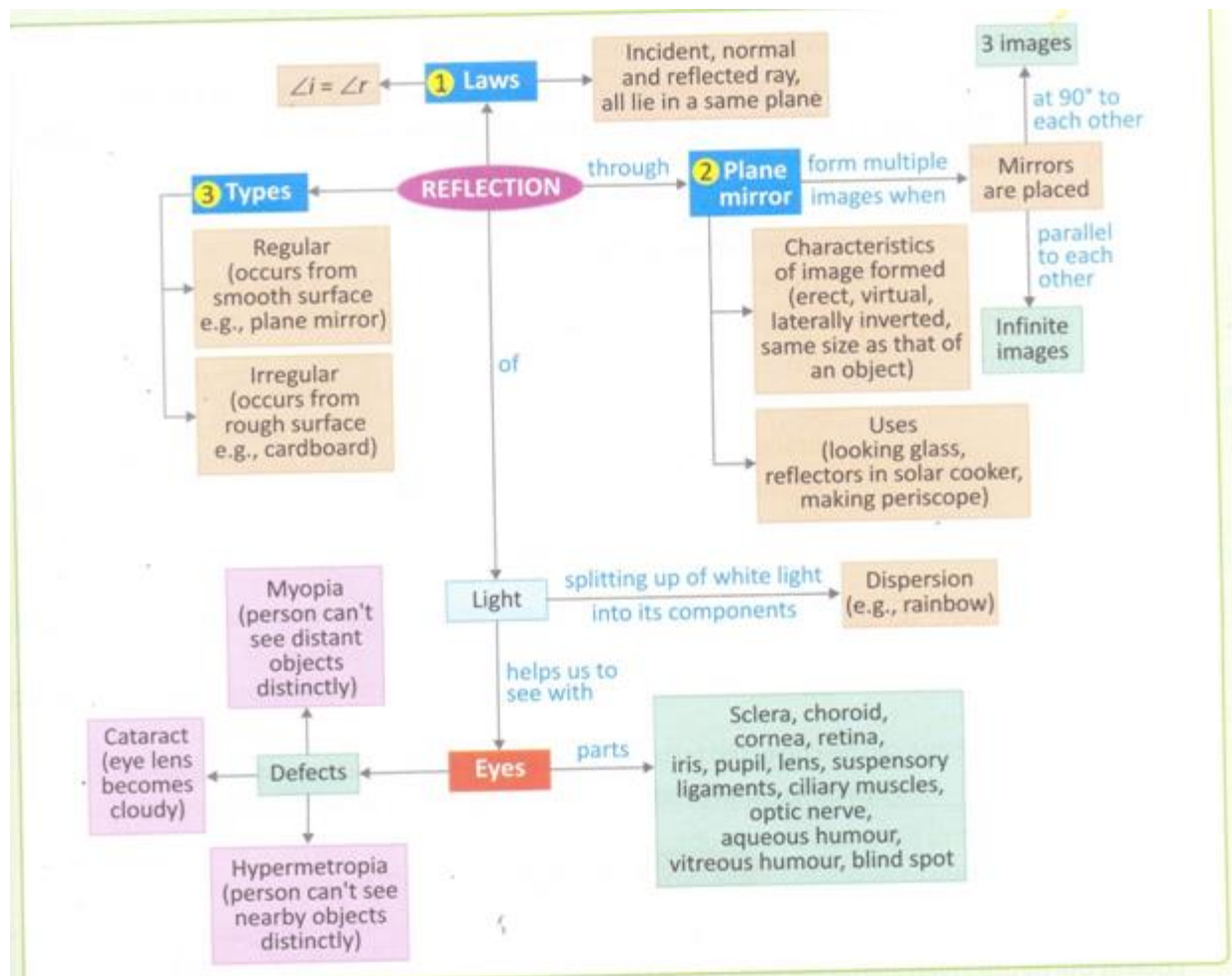
Characters are read by touching them with fingers.

This system was invented by

Louis Braille.

② WHITE CANE -

Blind people use white cane with a red tip to improve mobility.



$\angle i = \angle r$

1 Laws

Incident, normal and reflected ray, all lie in a same plane

REFLECTION

through

2 Plane mirror

form multiple images when

3 images

at 90° to each other

Mirrors are placed

parallel to each other

Infinite images

3 Types

Regular (occurs from smooth surface e.g., plane mirror)

Irregular (occurs from rough surface e.g., cardboard)

Characteristics of image formed (erect, virtual, laterally inverted, same size as that of an object)

Uses (looking glass, reflectors in solar cooker, making periscope)

Light

splitting up of white light into its components

Dispersion (e.g., rainbow)

helps us to see with

Eyes

parts

Sclera, choroid, cornea, retina, iris, pupil, lens, suspensory ligaments, ciliary muscles, optic nerve, aqueous humour, vitreous humour, blind spot

Myopia (person can't see distant objects distinctly)

Cataract (eye lens becomes cloudy)

Defects

Hypermetropia (person can't see nearby objects distinctly)