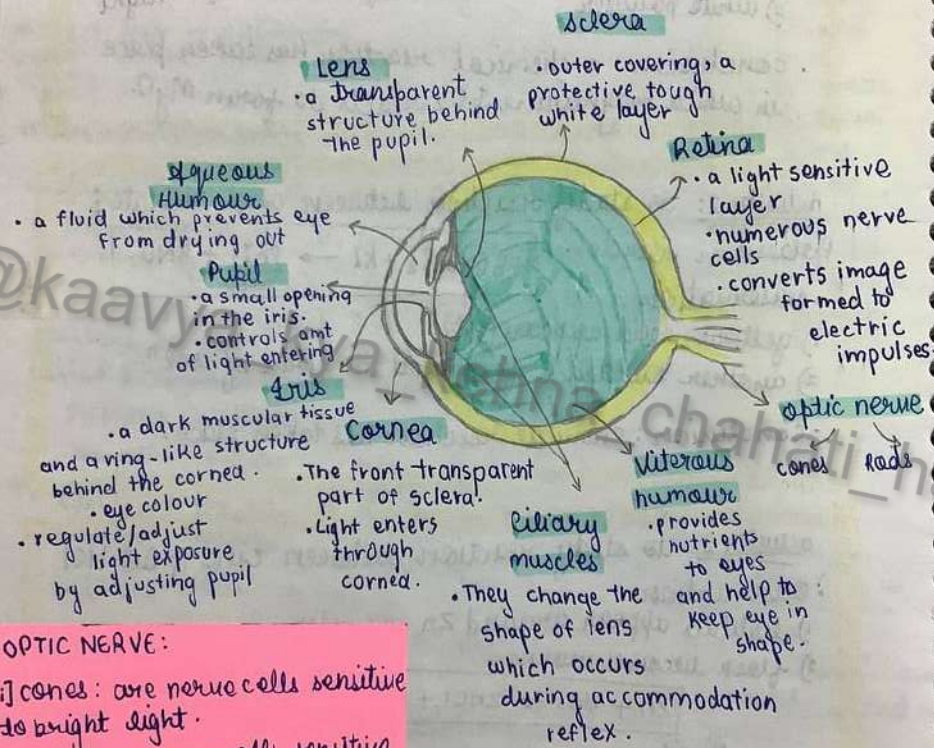


HUMAN EYE and COLOURFUL WORLD



OPTIC NERVE:

- i] cones: are nerve cells sensitive to bright light.
- ii] Rods: are nerve cells sensitive to dim light. [Peripheral vision]

* at a junction of optic ~~nerve~~ nerve and Retina, there are no sensory nerve cells → BLIND SPOT.

POWER OF ACCOMMODATION

*** The ability of the eye lens to adjust its focal length is called power of accommodation of eye.

* Near point is the minimum distance at which object can be seen properly without strain.

25cm

* Far point is the farthest point upto which eye can see objects clearly without any strain.

$u = \infty$ $v = \text{in question}$ ∞ $u = 25\text{cm}$ $v = \text{in question}$ $\frac{1}{\infty} = 0$

MYOPIA	HYPERMETROPIA	PRESBYOPIA
1] near objects can be seen clearly but not distant ones	1] near objects can't be seen clearly but distant ones can be.	1] both far and near objects cannot be seen clearly. [Ageing]
2] Causes: ① excessive curvature of eye ② elongated eye ball	2] Causes: ① focal length increases ② eye ball is too small in size.	2] Causes: ① decrease in flexibility of eye lens. ② gradual weakening of ciliary muscles.
3] image is formed in front of Retina	3] image is formed behind the retina	3] image is formed behind the retina.
4] correction: concave lens of proper focal length	4] correction: convex lens of proper focal length.	5] correction: Bi-focal lens
5] Far point becomes lesser than the normal value.	5] near point becomes greater than normal value.	-

* sometimes at old age the lens of people become milky & foggy. This condition is called cataract.

* a rainbow is a natural spectrum appearing in the sky after rain shower, caused by dispersion of sunlight by water droplets.

* rainbow is always formed in direction opposite to sun.

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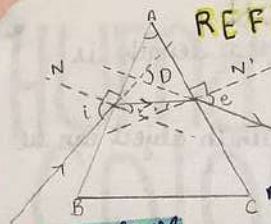
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REFRACTION OF LIGHT THROUGH A PRISM



* any light that produces a spectrum similar to sunlight \rightarrow white light.

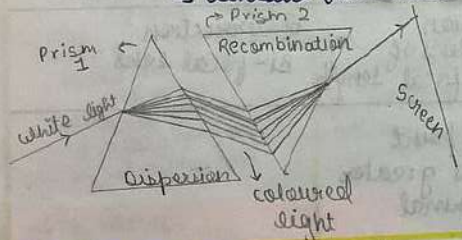
Prism: is a transparent refractive medium bounded by at least 2 lateral surfaces inclined at each other at a certain angle.

- $\angle A$ = angle of prism \rightarrow angle between 2 lateral faces.
- $\angle D$ = angle of deviation \rightarrow angle between direction of incident ray and emergent ray after light passes through prism.

DISPERSION OF LIGHT THROUGH PRISM:
 \rightarrow The phenomenon of splitting of white light into its seven colours when passed through glass prism is dispersion.

- * **Spectrum:** The band of 7 colours is called spectrum.
- * **Red light** \rightarrow maximum wavelength \rightarrow fastest \rightarrow deviates the least
- * **Violet** \rightarrow minimum wavelength \rightarrow slowest \rightarrow deviates the most

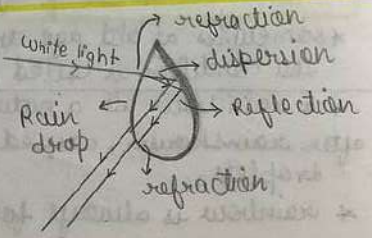
$$\left. \begin{array}{l} \text{Intensity of scattering} \\ \text{of light} \end{array} \right\} = \frac{1}{[\text{wavelength}]^4}$$



- This shows recombination of white light.
- \Rightarrow this observation shows white light is composed of 7 colours.

formation of Rainbow:

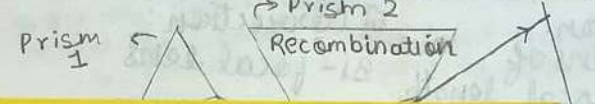
- water droplet acts like a prism \Rightarrow explain the dig.



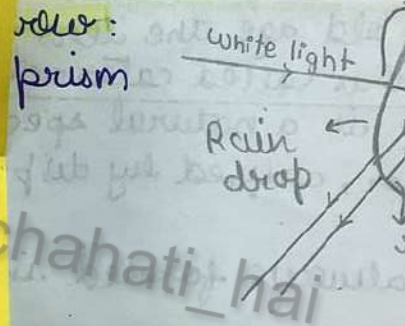
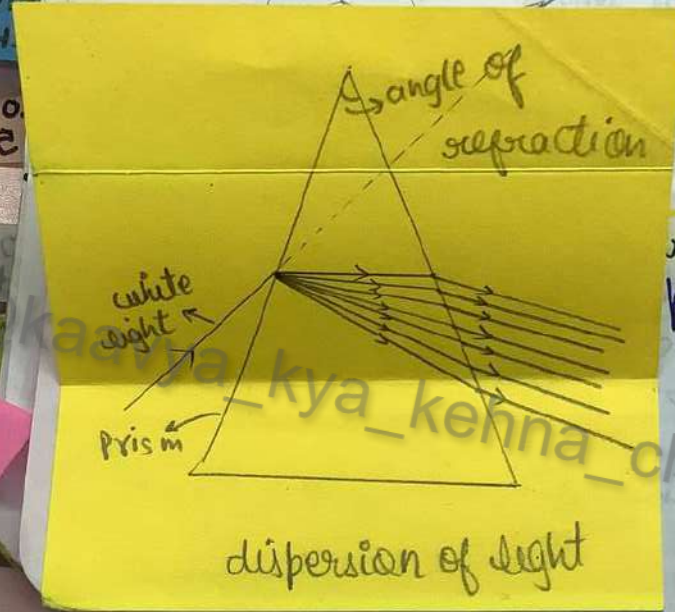
Angle of refraction

- * **spectrum**: The band of 7 colours is called spectrum
- * **Red light** → maximum wavelength
→ fastest
→ deviates the least
- * **violet** → minimum wavelength
→ slowest
→ deviates the most

Intensity of scattering of light =



• This shows recombination of white light.
⇒ this observes white light of 7 colours



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ATMOSPHERIC REFRACTION:

* The refraction of light caused by the Earth's atmosphere is called atmospheric refraction.

Why do stars twinkle?

→ It is due to atmospheric refraction. Distant stars act like a point source of light. As the beam of starlight deviating from its path, the apparent position of stars keeps on changing because earth's atmosphere is not stationary. Hence, the amt of light entering fluctuates.

Advanced sunrise and delayed sunsets.

• The sun is visible to us about 2 minutes before the actual sunrise and about 2 minutes after the actual sunset because of atmospheric refraction.

• By 'actual sunrise' we mean the actual sun and not apparent one.

SCATTERING OF LIGHT:

* When light is absorbed by the particles in the form of energy, particles emit light in all directions → scattering of light.

Why does the sky appear blue during day light?

→ This is due to scattering of light, blue has the shortest wavelength. ∴ scattering of blue light by the air molecules in all directions make the atmosphere appear blue.
 (because of short WL easily scattered)
the small particles get scattered

Why does sky appear red at the time of SS & SR?

→ During SS & SR, the sun is near the horizon ∴ the sunlight has to travel a long distance.

Due to this, most of the blue light is scattered away so, red (longer λ) reaches our eye.

TYNDALL EFFECT:

- 1] The earth's atmosphere is heterogeneous with suspended dust and other particles.
- 2] When beam of light strikes such particles, the path of beam is visible.

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