

10. THE HUMAN EYE AND THE COLOURFUL WORLD

I. ANSWER THE FOLLOWING

1. The near point of a hypermetropic eye is 50cm. What is the nature and power of the lens required to enable him to read a book placed at 25cm from the eye?

$$U = -25 \text{ V} = -50\text{cm} \text{ Power of lens} = ?$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{f} = \frac{1}{-50} - \frac{1}{-25}$$

$$\frac{1}{f} = -\frac{1}{50} + \frac{1}{25}$$

$$\frac{1}{f} = \frac{1}{50}$$

$$f = +50\text{cm}$$

$$f = +0.5\text{m}$$

Nature of the lens is Convex

$$P = \frac{1}{f(\text{m})} = \frac{1}{0.5} = +2.0\text{D}$$

2. You are given three lenses namely, bifocal lens, convex lens and concave lens. Which lens would you prefer to correct the myopia, hypermetropia and presbyopia respectively.

Eye Defects	Corrective lens
Myopia	Concave lens
Hypermetropia	Convex lens
Presbyopia	Bifocal lens.

3. The far point of myopic person is 150cm in front of the eye. Calculate the focal length and power of the lens required to enable him to see distant object clearly.

$$u = \infty \quad v = -150\text{cm} \quad f = ?$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$= \frac{1}{-150} - \frac{1}{\infty}$$

$$= -\frac{1}{150}$$

$$f = -150\text{cm}, \quad \boxed{f = -1.5\text{m}}$$

$$p = \frac{1}{f(m)}$$

$$p = -\frac{1}{1.5}$$

$$p = -\frac{2}{3}$$

$$p = -0.66D$$

Concave lens of power $0.66D$ enable him to see distance objects clearly.

4. Draw the ray diagram for the defective and corrected eye of Myopia and Hypermetropia.

Refer Textbook pg.no 163