INDIAN SCHOOL NIZWA - WORKSHEET

PHYSICS	
CH: HUMAN EYE AND COLOURFUL WORLD	Class: X

I NUMERICALS

1. **A person with a myopic eye cannot see objects beyond a distance of 1.5m. What would be the power of the corrective lens used to restore proper vision?**

   Ans. The remedial lens should make the objects at infinity appear at the far point.
   Therefore *object distance , u = -α*
   Far point of the defective eye is the image distance , v = -1.50m =-150 cm
   By lens formula, 1/f = 1/v – 1/u = 1/(-150) – 1/α = -1/150
   Therefore, f = -150 cm
   Power of the lens P = 1/f (m) = 1/(-1.5) = -.67 D.

2. **A person can see clearly up to 3m only. Prescribe a lens for him that he can see clearly up to 12m.**

   Ans. The person can see only up to 3m. A lens has to be used such that objects kept at 12m is also made visible .Therefore object distance, u = -12m
   His far point will be the image distance, v = -3m
   Using lens formula 1/f = 1/v – 1/u, 1/f = 1/(-3) – 1/(-12) = 1/12 – 1/3 =- ¼
   Or f =- 4m.
   Thus a concave lens of focal length 4m should be used.

3. **A person wears glasses of power -2.5 D. IS the person far- sighted or near sighted? What is the far point of the person without glasses**?

   Ans. Power , P = -2.5D
   Negative sign show that the lens is concave , hence the defect is near sightedness.
   Foca length , f = 1/P = 1/(-2.5) = -40 m.
   Object distance , u = -α , v = ?
   From lens formula , 1/f = 1/v – 1/u
   1/v = 1/f + 1/u = 1/(-40) + 1/(-α) = 1/(-40)
   Therefore v = -40cm.
   Thus the far point of the defective eye is at 40 cm from the eye.

4. The near point of a person is at 40 cm from the eye. Find the power of the lens he should use while reading at 25 cm.

   Ans. The object which is placed at 25 cm from the correcting lens must produce the virtual image at 40cm.
   Object distance , u = -25cm, v = -40cm
   By lens formula , 1/f = 1/v – 1/u = 1/(-40) – 1/(-25) = 3/200
   Focal length , f= 200/3 = 2/3 m
   Power , P = 3/2 = 1.5 D.

5. 1. Name the light sensitive cells present in the retina of the eye.

   Ans. Rods and cones. Rods are responsible for twilight or black and white vision. Cones are responsible for colour vision

6. Which nerve connects the light sensitive cells of the retina to the brain?
   Ans. Optic nerve

7. What is blind spot and yellow spot?
   Ans. The region of the retina where the optic nerve enters the eye is called blind spot . The region in the centre of the retina which has maximum concentration of rods and cones is called yellow spot.

8. Ciliary muscles of normal eye are in their (i) most relaxed (ii) most contracted state. In which of the two cases is the focal length of eye lens more?
   Ans. When ciliary muscles of the eye are in the most relaxed state, the eye lens is thin and its focal length is maximum.

9. What is persistence of vision?
   Ans. The phenomenon of continuation of the impression of an image on the retina for some time even after light from the object is cut-off is called persistence of vision. Cinematography works on this principle.

10. Why can't we recognise the colours of objects in a dark room?
    Ans. This is because cones are not sensitive in dim light.

11. Why spokes of a rapidly revolving wheel cannot be distinguished?
    Ans. Due to persistence of vision, the images of various spokes on the retina get merged .

12. Describe with a ray diagram how person with (a) myopia (b) hypermetropia can be corrected by using spectacles.