Question 5. A person needs a lens of power –5.5 dioptres for correcting his distant vision. For correcting his near vision he needs a lens of power +1.5 dioptre. What is the focal length of the lens required for correcting (i) distant vision, and (ii) near vision?
Answer:

(i) For distant vision, given $f = ?$, $P = -5.5$ D

Using the relation

$$P = \frac{1}{f} \text{ or } f = \frac{1}{P}$$

or $$f = \frac{100}{-5.5} = -18.2 \text{ cm}$$

(ii) For near vision, given $f = ?$

$P = +1.5$ D

Using the relation

$$P = \frac{1}{f} \text{ or } f = \frac{1}{P}$$

or $$f = \frac{100}{1.5} = 66.7 \text{ cm}$$

Question 6. The far point of a myopic person is 80 cm in front of the eye. What is the nature and power of the lens required to correct the problem?
Answer:

Distance of far point, $x = 80$ cm, $P = ?$

For viewing distant objects, focal length of corrective lens,

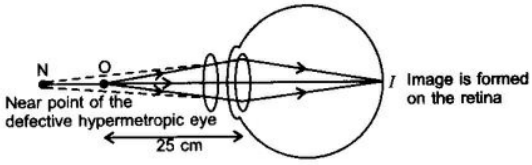
$$f = -x = -80 \text{ cm}$$

Using the relation

$$P = \frac{1}{f} = \frac{100}{f} = \frac{100}{-80} = -1.25 \text{ D}$$

The lens is concave.

Question 7. Make a diagram to show how hypermetropia is corrected. The near point of a hypermetropic eye ¡s 1 m. What is the power of a lens required to correct this defect? Assume that near point of the normal eye is 25 cm.
Answer:



To correct the defect, the image of an object at 25 cm should be brought at 100 cm.

$$\therefore \quad \frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{-100} - \frac{1}{-25}$$

$$\Rightarrow \quad \frac{1}{f} = \frac{-1}{100} + \frac{1}{25} = \frac{-1+4}{100} = \frac{3}{100}$$

$$\therefore \quad f = + \frac{100}{3} = + 33.3 \text{ cm.}$$

So, a convex lens of focal length 33.3 cm is required.

$$\text{Power, } P = \frac{100}{33.3} = 3.0 \text{ D.}$$

Question 10. Why do stars twinkle?
Answer: The stars twinkle at night, because the star light reaching Our eyes increases and decreases continuously due to atmospheric refraction. When star light reaching our eyes increases, the star looks bright and when the star light reaching our eyes decreases, it appears dim.

Question 11. Explain why the planets do not twinkle ?
Answer: Planets being close to earth appear larger in size. A planet can be Considered as a collection of large number of small sized objects. Twinkling effect Of these objects cancel each other. so, planets do not appear to twinkle.

Question 12. Why does the sun appear reddish early in the morning?
Answer: At sunrise, the sun looks almost reddish because only red colour which is least scattered is received by our eye and appears to come from sun. Hence the appearance Of sun at sunrise, near the horizon looks almost reddish.

Question 13. Why does the sky appear dark of blue to an astronaut?
Answer: At such huge heights due to absence of atmosphere, no scattering of the light takes place. Therefore sky appears dark.

********** END **********