

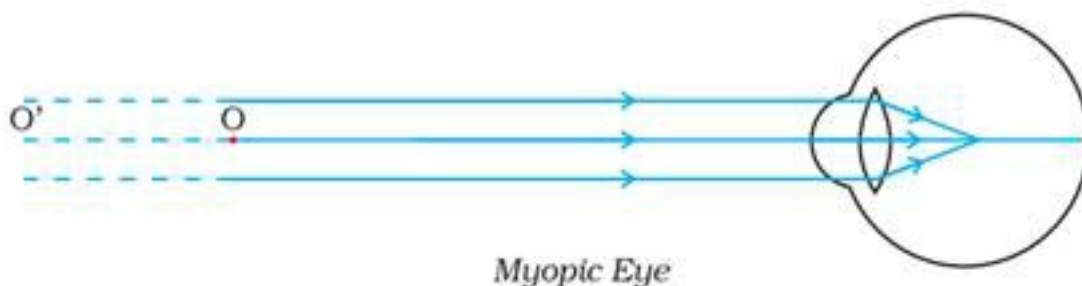
CBSE Class 10 Science
NCERT Exemplar Solutions
Chapter 11
Human Eye and Colourful World

Short Answer Questions

15. Draw ray diagrams each showing

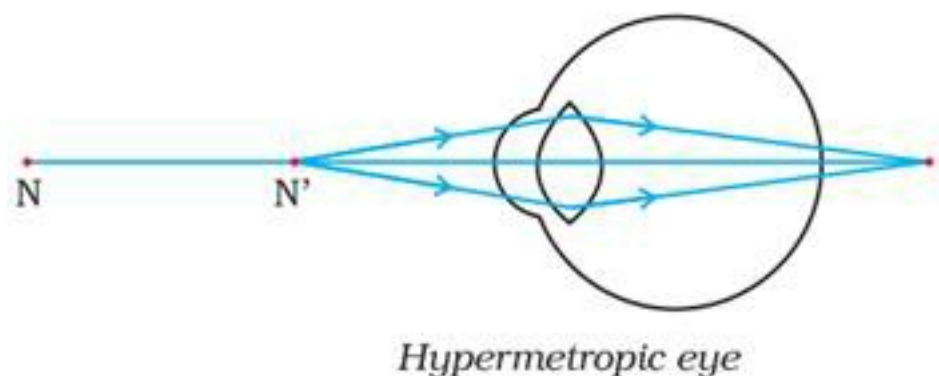
(i) myopic eye and

Ans.



(ii) hypermetropic eye

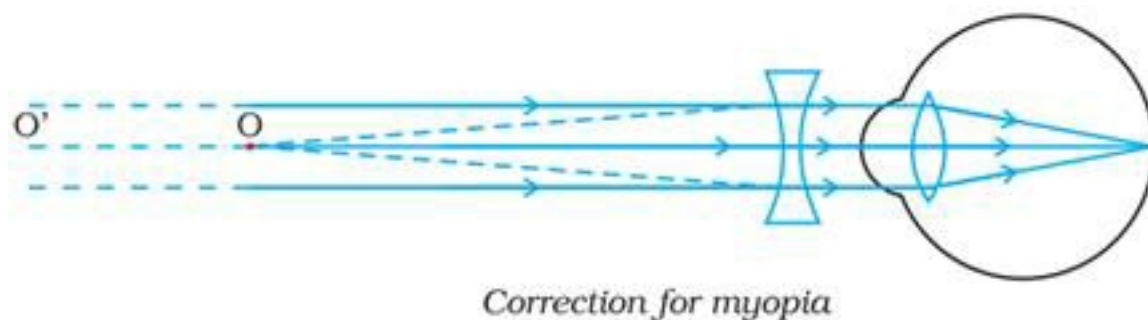
Ans.



16. A student sitting at the back of the classroom cannot read clearly the letters written on the blackboard. What advice will a doctor give to her? Draw ray diagram for the correction of this defect.

Ans. This student is unable to see far off objects. This means that the student is suffering

from myopia. Doctor will prescribe a concave lens of suitable focal length.



17. How are we able to see nearby and also the distant objects clearly?

Ans. Human eyes have power of accommodation. When we have to see distant objects, the eye muscles relax and lens becomes thin. Due to this, the focal length of the lens increases and the eye is able to see distant objects. When we have to see nearby objects, the eye muscles contract and lens becomes thick. Due to this, the focal length of the lens decreases and the eye is able to see nearby objects.

18. A person needs a lens of power -4.5 D for correction of her vision.

(a) What kind of defect in vision is she suffering from?

Ans. Myopia

(b) What is the focal length of the corrective lens?

Ans. $P = \frac{1}{f}$ or, $f = \frac{1}{P}$

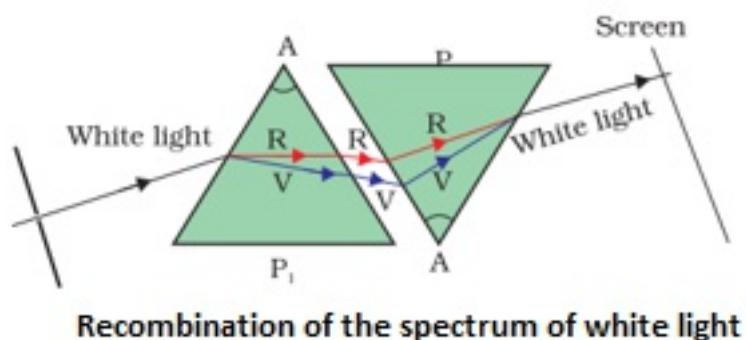
$$= \frac{1}{-4.5\text{D}} = -0.22\text{m}$$

(c) What is the nature of the corrective lens?

Ans. The negative sign shows that it is a concave lens.

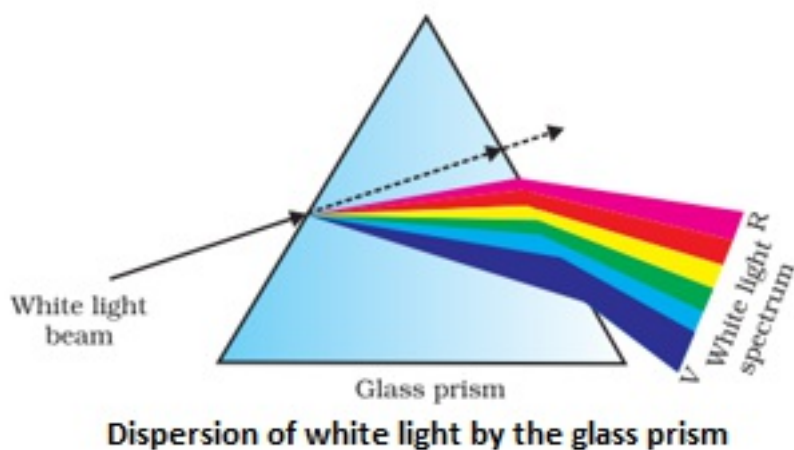
19. How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light? Draw the diagram.

Ans. For this, one prism is placed near another prism so that one prism is in erect position and another prism is in inverted position. When ray of white light enters the first prism, dispersion of light takes place. When lights of different colours pass through the second prism, they recombine to make a ray of white light.



20. Draw a ray diagram showing the dispersion through a prism when a narrow beam of white light is incident on one of its refracting surfaces. Also, indicate the order of the colours of the spectrum obtained.

Ans.



Order of colours from bottom to top: Violet, Indigo, Blue, Green, Yellow, Orange and Red.

21. Is the position of a star as seen by us its true position? Justify your answer.

Ans. The density of atmospheric layers increases as we move from top to bottom. Due to this, starlight bends towards the normal as it passes through different layers of atmosphere. Due

to this, the apparent position of star is a little above its actual position in sky.

22. Why do we see a rainbow in the sky only after rainfall?

Ans. Formation of rainbow is only possible when dispersion of light takes place through a suitable surface. After rainfall, some raindrops remain in the clouds. Moreover, the opposite side of sky works like a screen on which rainbow is formed. Hence, rainbow is seen in the sky only after rainfall.

23. Why is the colour of the clear sky blue?

Ans. Out of all the colours in the visible spectrum, blue colour scatters the most. Due to this, it is the blue colour which reaches our eyes. As a result, the colour of sky appears blue.

24. What is the difference in colours of the Sun observed during sunrise/sunset and noon? Give explanation for each.

Ans. The sky appears reddish during sunrise/sunset but it appears white at noon. During noon, the sunlight has to travel less distance to reach us. Most of the colours reaching us get scattered. Due to this, Sky appears white at noon.

Colours near the red end of the spectrum scatter the least. During sunset, and sunrise, sunlight needs to travel more distance to reach us. Red colour is able to reach us because it is scattered the least. Hence, sky appears reddish during sunrise/ sunset.