

PHYSICS

CLASS NOTES FOR CBSE

Chapter 11. The Human Eye and The Colourful World

01. The Human Eye

The main parts of the human eye are : Cornea, Iris, Pupil, Ciliary muscles, Eye lens, Retina and Optic nerve

02. Working of the Eye

As far as physics is concerned, the eye consists of a convex lens (called eye-lens) and a screen (called retina). The eye-lens forms a real image of the objects on the retina of the eye and we are able to see the objects.

The human eye is like a camera. In the eye, a convex lens (called eye-lens) forms a real and inverted image of an object on the light-sensitive screen called retina whereas in a camera, the convex lens (called camera-lens) forms a real and inverted image of an object on the light sensitive photographic film.

03. Rods and Cones

- (i) **Rods are the rod-shaped cells present in the retina of an eye which are sensitive to dim light** : Rods are the most important for vision in dim light (as during the night). We can see things to some extent in a dark room or in the darkness of night due to the presence of rod cells in the retina of our eyes. Nocturnal animals (animals which sleeps during the day and come out at night) like the owl have a large number of rod cells in their retina which help them see properly during the night when there is not much light. IN fact, our night vision is relatively poor as compared to the night vision of an owl due to the presence of relatively smaller number of rod cells in the retinas of our eyes. Rod cells of the retina, however, do not provide information about the colour of the object.



MISOSTUDY.COM

The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804

- (ii) **Cones are the cone-shaped cells present in the retinal of an eye which are sensitive to bright light (or normal light) :** The cone cells of our retina also respond to colours. In other words, cone cells cause the sensation of colour of objects in our eyes. The cone-shaped cells of the retina make us see colours and also make us distinguish between various colours. Cone cells of the retina function only in bright light. The cones do not function in dim light. This is why when it is getting dark at night, it becomes impossible to see colours of cars on the road.



04. Accommodation

A normal eye can see the *distant* objects as well as the *nearby* objects clearly. We will now discuss how the eye is able to focus the objects lying at various distances. An eye can focus the images of the distant objects as well as the nearby objects on its retinal by changing the focal length (or converging power) of its lens. The focal length of the eye-lens is changed by the action of ciliary muscles. The ciliary muscles can change the thickness of the soft and flexible eye-lens and hence its focal length which, in turn, changes the converging power of the eye-lens. Let us see how it happens.

05. Defects of Vision and their Correction

- (i) **Myopia** (Short-sightedness or Near-sightedness)
- (ii) **Hypermetropia** (Long-sightedness or Far-sightedness), and
- (iii) **Presbyopia**.

- (i) **Myopia** : Myopia (or short-sightedness) is that defect of vision due to which a person cannot see the distant objects clearly (through he can see the nearby objects clearly). The far point of an eye suffering from myopia is less than infinity. The defect of eye called myopia (or short-sightedness) is caused :
- (a) Due to *high* converging power of eye-lens (because of its *short* focal length), or
 - (b) Due to eye-ball being too *long*.



MISOSTUDY.COM

The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804