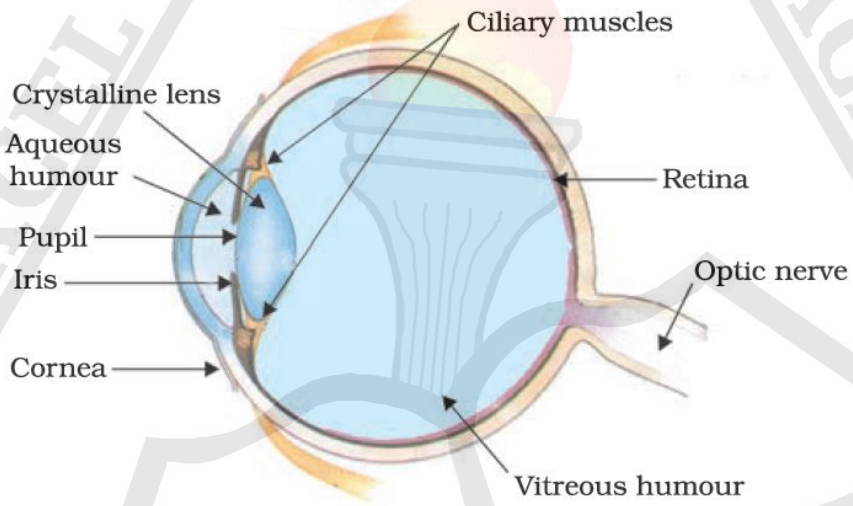
Class X Science Class Notes

The Human Eye and The colourful World

The human eye is like a camera. Its lens system forms an image on a light-sensitive screen called the retina. Light enters the eye through a thin membrane called the cornea.

Cornea forms the transparent bulge on the front surface of the



eyeball as shown in Figure

The eyeball is approximately spherical in shape with a diameter of about 2.3 cm. Most of the refraction for the light rays entering the eye occurs at the outer surface of the cornea.

The crystalline lens merely provides the finer adjustment of focal length required to focus objects at different distances on the retina

Cornea: It is the curved front surface, through which light enters the eye.

Pupil: Light passes through the pupil which is the central hole in the iris.

Iris : It is the muscular assembly that helps to change the size of the pupil can change under control of muscles.

Retina: The retina is a film of nerve fibres covering the curved back surface of the eye. The light is further focussed by the eye lens on the

retina. The retina contains rods and cones which sense light intensity and colour, respectively, and transmit electrical signals via the **Optic nerve** to the brain which finally processes this information.

Ciliary muscles The shape (curvature) and therefore the focal length of the lens can be modified somewhat by the cilliary muscles..

Accommodation

The property of the eye to be able to somewhat modify the shape and hence focal length of lens is called *accommodation*.

If the object is too close to the eye, the lens cannot curve enough to focus the image on to the retina, and the image is blurred. The closest distance for which the lens can focus light on the retina is called the *least distance of distinct vision*, or the *near point*. The standard value for normal vision is taken as 25 cm. (D.)

Q) Why do we need to control the amount of light entering our eye

Answer: We come across situations, where we need to gather more or less light to be able to see correctly. Thus the amount of light entering our eye needs to be varied

For example, if we go out to sunshine from a dark place, we need less light to enter our eye, so that we can adjust to the change. Similarly if we move from a well-lit place to a dark room, we need to gather more light to be able to see properly.

These adjustments are made possible by changing the size of the pupil of our eye, and the iris helps us on doing so

Q) With reference to human eye – what is called "BLIND SPOT" Why?

Answer: In the retina, the spot where optic nerve is joined with retina is called BLIND SPOT.

Reason : Since the retina is covered at this spot, no image is formed here

Q) What is presbyopia?

Answer: It is a health condition where the eye exhibits a progressively diminished ability to focus on near objects with age. Due to old age and hence weakening of cilliary muscles, the crystalline lens loses its ability to change its curvature and hence focal length. Hence the person loses ability to properly focus the nearby objects.

For most people, the near point gradually recedes away. They find it difficult to see nearby objects comfortably and distinctly without corrective eye-glasses.

Q) What do you understand by a) Near Point b) Far Point