CBSE Important Questions for Class 10 Science Chapter 11: CBSE Important Questions for Class 10 Science Chapter 11 Human Eye and Colourful World focuses on the structure and functioning of the human eye, including concepts like accommodation, defects of vision (myopia, hypermetropia, and astigmatism), and their corrections using lenses.

It also explores the phenomenon of refraction through a prism, dispersion of light, formation of the rainbow, scattering of light, and why the sky appears blue and the sun looks red during sunrise and sunset. Important questions in this chapter often cover these topics, with conceptual and numerical problems related to optics and the behavior of light in various media.

CBSE Important Questions for Class 10 Science Chapter 11 Overview

CBSE Important Questions for Class 10 Science Chapter 11 Human Eye and Colourful World, focusing on optics and light-related phenomena. It explains the structure and functioning of the human eye, including common vision defects like myopia, hypermetropia, and their corrections using lenses, which form the foundation of practical applications in daily life. The chapter also introduces students to key concepts such as refraction through prisms, dispersion of light, scattering, and the formation of natural wonders like rainbows. It enhances understanding of atmospheric phenomena, explaining why the sky appears blue or the sun turns red during sunrise and sunset.

This chapter is significant for board exams, as it includes theoretical concepts and numericals. Understanding optics, light behavior, and its applications makes this chapter highly scoring and important for conceptual clarity in higher studies.

CBSE Important Questions for Class 10 Science Chapter 11 Human Eye and Colourful World

Below is the CBSE Important Questions for Class 10 Science Chapter 11 Human Eye and Colourful World -

Very Short Answer Questions (1 Mark)

1. When a person is myopic, he/ she can clearly see

- **Both nearby and far-off objects**
- **Only nearby objects**
- **Only far-off objects**
- **Neither near nor far off objects**

Ans: b. Only nearby objects

2. The defect of myopia can be corrected by using

- Concave lens
- Convex lens
- Either concave or convex
- A complicated combination of lenses.

Ans: a. Concave lens

3. The colour that is scattered the least by the tiny particles and the atoms/ molecules of the atmosphere is

- Violet
- Green
- Yellow
- Red

Ans. d. Red

4. Which of the following phenomena contributes significantly to the reddish appearance of the sun at sunrise or sunset?

- Dispersion of light
- Scattering of light
- Total internal Reflection
- Reflection of light from the earth

Ans: b. Scattering of light

5. The focal length of the eye lens increases when eye muscles.

- are relaxed and lens becomes thinner
- contract and lens becomes thicker
- are relaxed and lens becomes thicker
- Contract and lens become thinner.

Ans: a. are relaxed and lens becomes thinner

6. Define the power of accommodation?

Ans: The ability of the eye lens to change its focal length and focus on things that are close to or far from the retina is known as accommodation power.

7. Which part of the human eye provides most of the refraction for the light rays entering the eye?

Ans: The majority of light rays entering the eye are refracted by the cornea and aqueous humour.

8. What happens to the image distance in the eye when we increase the distance of an object from the eye?

Ans: The image distance stays constant while an object's distance from the eye increases, and the image is produced on the retina of the eye.

9. What happens to the pupil of the eye when the light is very bright?

Ans: The pupil shrinks in size and reduces the amount of light that can enter the eye in extremely bright light.

10. Which part of the human eye conveys the electrical signals generated by the light sensitive cells of the retina to the brain?

Ans: Optic nerves convey the electrical signals generated by the light sensitive cells of the retina to the brain.

11. The human eye can focus on objects at different distances by adjusting the focal length of the eye lens. This is due to

- Presbyopia
- Accommodation
- Near-sightedness
- Far-sightedness

Ans: b. Accommodation

12. The human eye forms the image of an object at its

- Cornea
- Iris
- Pupil
- Retina

Ans: d. Retina

13. The least distance of distinct vision for an eye lens is caused by the action of the

1. 25 m
2. 2.5 cm
3. 25 cm
4. 2.5 m

Ans: c. 25 cm

14. The change in focal length of an eye lens is caused by the action of the

1. Pupil
2. Retina
3. Ciliary muscles
4. Iris

Ans: c. Ciliary muscles

15. What would have been the colour of the sky if there had not been any atmosphere around the earth?

Ans: If there was no atmosphere surrounding the world, the sky would be black.

16. For dispersion of light through a prism which colour has a maximum deviation?

Ans: The largest divergence in light dispersion through a prism is violet.

17. What is the least distance of distinct vision of a normal human eye?

Ans: The least distance of distinct vision of a normal human eye is 25 cm.

18. Name the muscle responsible for bringing change in the focal length of the eye lens?

Ans: Ciliary muscles are responsible for bringing change in the focal length of the eye lens.

19. Name one defect of vision which cannot be corrected by any type of spectacle lens?

Ans: A cataract, or clouding of the lens in the eyes, is a visual impairment that is not treatable with any kind of contact lens.

20. State one effect produced by the scattering of light by the atmosphere?

Ans: Tyndall effect is produced by the scattering of light by the atmosphere.

Short Answer Questions (2 Marks)

1. The far point of a myopic person is 8080 cm in front of the eye. What is the nature and power of the lens required to correct the problem?

Ans: The far point of a myopic person is given as 80 cm.

Since the person is Myopic, the lens would be concave and the focal length will be negative.

$\Rightarrow f = -80\ cm = -0.8\ m$

We know, the power of a lens is equal to the reciprocal of the focal length.

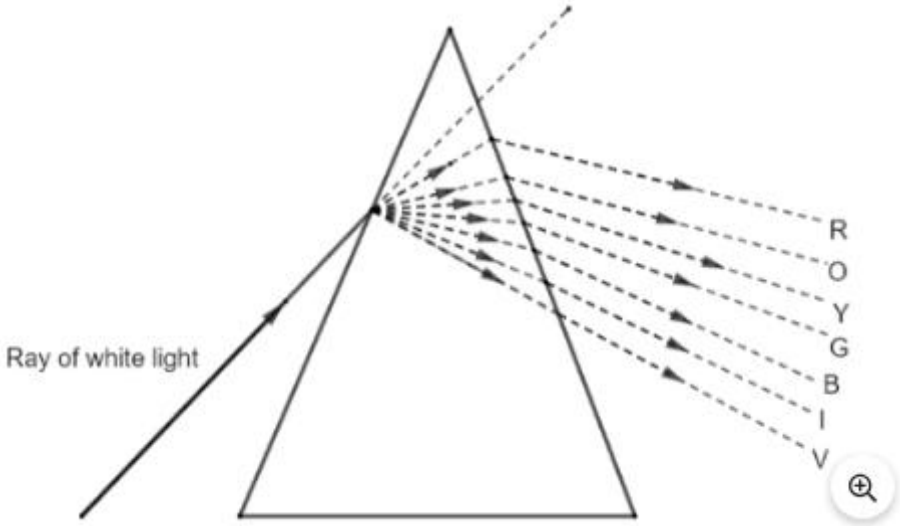
$\Rightarrow P = \frac{1}{f}$

$\Rightarrow P = \frac{1}{-0.8} = -1.25D$

The nature of the lens is concave and its power is $-1.25D$.

2. Draw a diagram to show the dispersion of white light by a glass prism.

Ans: Diagram depicting the dispersion of white light by a glass prism is drawn below.



3**. Name the phenomenon responsible for the observed twinkling of stars. Will this twinkling be observed by an observer on the moon?**

Ans:

The atmospheric refraction phenomenon is the cause of star twinkling.

An observer on the moon will not be able to see the stars twinkle because the moon lacks an atmosphere.

4. Name the part of the eye that

1. determines the colour of a person's eye

Ans: Iris

2.Controls the amount of light entering the eye

Ans: Iris

5. What is the role of the ciliary muscles?

Ans: The ciliary muscles' primary function is to maintain the position of the eye lens. The ciliary muscles contract and relax to change the focal length of the eye lens, which in turn alters the shape of the lens to concentrate on objects that are close or far away.

6. Why is a convex lens called a converging lens?

Ans: After refraction, a convex lens concentrates all of the parallel light rays at its focal. It is known as a converging lens as a result.

7. State the role of the eye lenses in the human eye?

Ans: The retina receives light rays that are focused by the eye lens, creating an accurate but reversed image of the item there.

8. A person with a myopic eye cannot see objects beyond 1.2 m distinctly. What should be the corrective lens used to restore proper vision?

Ans: Since the person is myopic and cannot see objects clearly beyond 1.2 m, he should use a concave lens having a focal length 1.2 m to restore his normal vision.

9. What is the far point and near the point of the human eye with normal vision?

Ans: The near point is 25 centimetres from the eye, and the far point is infinity for a human with normal vision.

10. A student has difficulty reading the blackboard while sitting in the last row. What could be the defect the child is suffering from? How can it be corrected?

Ans: The student, who is seated in the last row and finds it difficult to read the chalkboard, has short sight, or myopia. To rectify his vision defect, a concave lens with the appropriate power should be employed.

Short Answer Questions (3 Marks)

1. Explain in brief:

a. What is hypermetropia?

Ans: With hypermetropia, also known as longsightedness, items in close proximity appear blurry whereas distant objects are clearly visible.

b. What are the two causes of this defect of vision?

Ans: The two possible causes of this defect are:

(i). An increase is the focal length of the eye lens or the power of the eye lens decreases

(ii). Size of the eyeball decreases

2. Explain the scattering of light?

Ans: Scattering of light is defined as the change in the direction of light on striking an obstacle such as dust, water vapour, etc.

3. A person is known to use a lens of power

i. -5.5 **D for his distant vision**
ii. $+1.5$ **D for his near vision**

Calculate the focal length of the lens used for correcting his

a. Distant vision

Ans: For distant vision, the power of lens is given to be -5.5 D.
The focal length is given by,

$$\Rightarrow f = \frac{1}{P}$$
$$\Rightarrow f = \frac{1}{-5.5} \text{ m}$$
$$\Rightarrow f = -18.2 \text{ cm}$$

b. Near vision problems.

Ans: For near vision, the power of the lens is given to be $+1.5$ D.
The focal length is given by,

$$\Rightarrow f = \frac{1}{P}$$
$$\Rightarrow f = \frac{1}{1.5} \text{ m}$$
$$\Rightarrow f = 66.7 \text{ cm}$$

4. What is presbyopia? State the causes of this defect? How is the presbyopia of a person corrected?

Ans:

Presbyopia is a visual impairment mostly associated with ageing that results in blurry vision in both near and far away objects.

The following are the primary causes of presbyopia:

rigidity of the eye's lens

The eye's ability to accommodate may weaken with age.

The muscles of the cilia weaken.

A bifocal lens, with a concave upper half and a convex lower half, is used to correct presbyopia.

5. The rainbow is a natural spectrum appearing in the sky after a rain shower.

a. Is it correct to say that a rainbow is always formed in a direction opposite to the sun?

Ans: Yes, since a rainbow is simply sunlight that has been refracted and reflected, it always forms in the direction opposite the sun.

b. Can it be seen on a sunny day?

Ans: Sure, if the sunlight reaches the observer's eye through the water droplets suspended in the atmosphere, they will see a rainbow on a sunny day.

c. Arrange the sequence in correct sequential order Refraction, Internal Reflection, Refraction & Dispersion.

Ans: The correct sequential order is:

Refraction & Dispersion, Internal Reflection, Refraction.

Long Answer Questions (5 Marks)

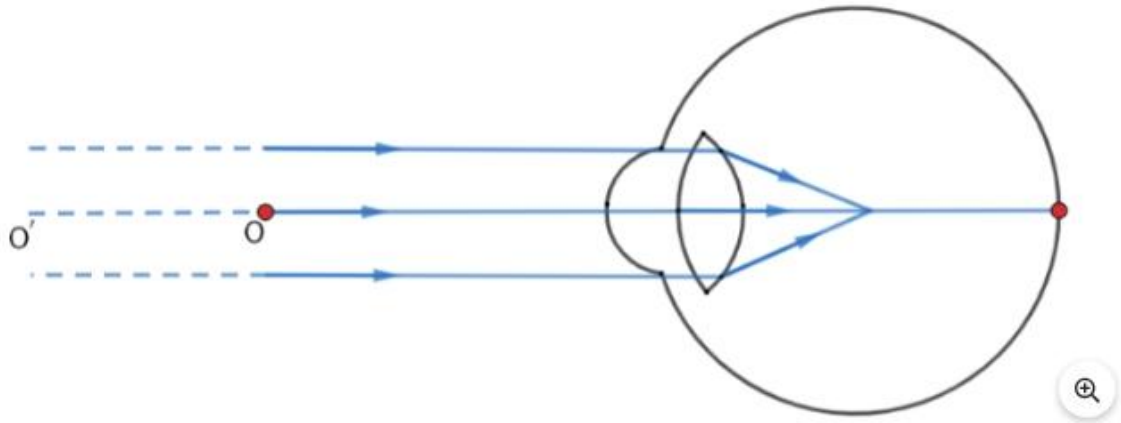
1. A 1414-year-old student is not able to clearly see the questions written on the blackboard placed at a distance of 55 m from him.

a. Name the defect of vision he is suffering from?

Ans: The student is suffering from myopia.

b. Draw the diagram to show this defect?

Ans: The diagram showing the myopic defect is drawn below.



c. Name the type of lens used to correct this defect?

Ans: A concave lens is used to correct myopia.

d. Name two possible causes of this defect.

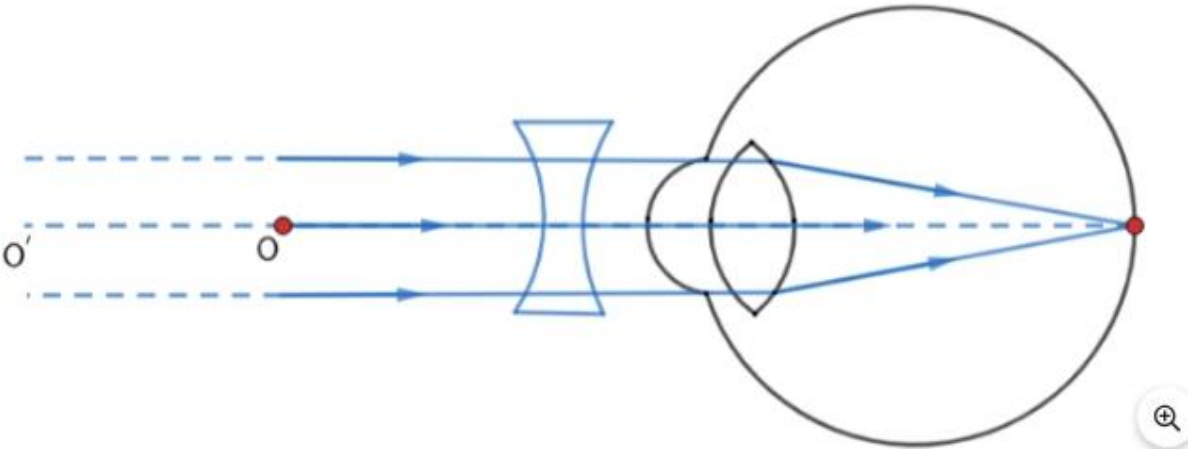
Ans: The two possible causes of myopia are:

i. Elongation of the eyeball

ii. Decrease in the focal length of the eye lens

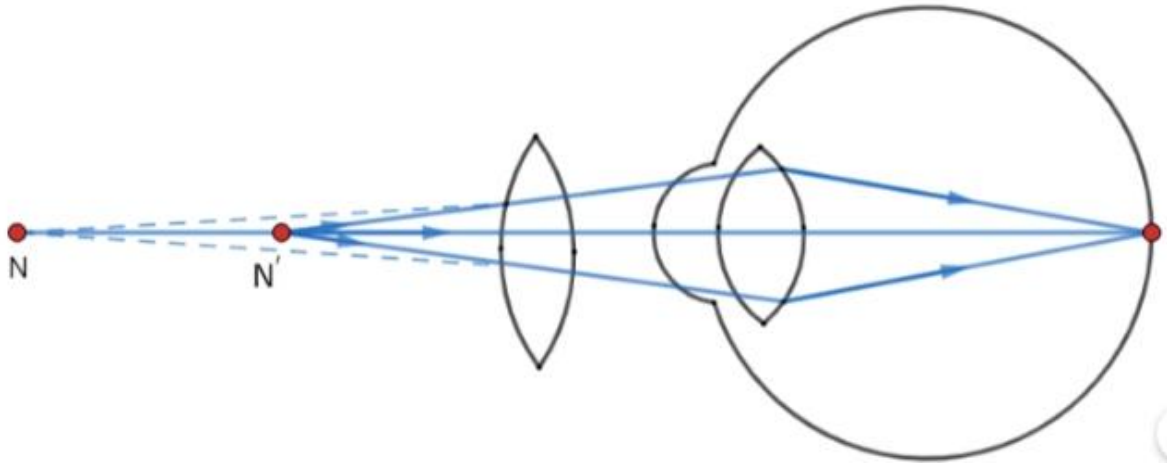
e. Draw the diagram to show how this defect can be corrected.

Ans: The diagram showing how myopic defect is corrected is drawn below.



2. Make a diagram to show how hypermetropia is corrected. The near point of a hypermetropic eye is 11 m. What is the power of the lens required to correct this defect? Assume that the near point of the normal eye is 2525 cm.

Ans: The diagram showing the correction of hypermetropia is drawn below.



Near point of a hypermetropic eye is 1 m and that of a normal eye is 25 cm.

Given,

$\Rightarrow v = -1\ \text{m} = -100\ \text{cm}$

$\Rightarrow u = -25\ \text{cm}$

From the lens formula, we have:

$$\Rightarrow \frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\Rightarrow \frac{1}{f} = \frac{1}{-100} - \frac{1}{-25}$$

$$\Rightarrow f = \frac{100}{3}\ \text{cm} = \frac{1}{3}\ \text{m}$$

The focal length is given by,

$$\Rightarrow f = \frac{1}{P}$$

$$\Rightarrow P = \frac{1}{\left(\frac{1}{3}\right)}\ \text{D}$$

$$\Rightarrow P = +3.0\ \text{D}$$

Benefits of CBSE Important Questions for Class 10 Science Chapter 11

The benefits of studying CBSE Important Questions for Class 10 Science Chapter 11, "Human Eye and Colourful World," include:

Exam-Oriented Preparation: These questions help students focus on key topics likely to appear in exams, enabling efficient preparation.

Conceptual Clarity: By answering important questions, students deepen their understanding of crucial concepts like vision defects, refraction, dispersion, and scattering of light.

Improved Problem-Solving: Practicing important questions, especially numerical problems, strengthens analytical skills and boosts confidence in solving similar problems in exams.

Time Management: Solving these questions helps students learn how to manage time effectively, particularly during exams.

Revision Aid: These questions act as a great revision tool, ensuring students cover all essential topics comprehensively before the exam.

Boosts Scoring Potential: Focused practice of important questions increases the chances of scoring well by preparing students for commonly tested areas.