

CBSE CLASS 10 SCIENCE

Chapter Practice Paper: The Human Eye and the Colourful World

Maximum Marks: 40 | Suggested Time: 90 minutes

Instructions: All questions are compulsory unless an internal choice is provided. Draw neat, labelled diagrams wherever relevant. For numerical questions, show the formula, substitution, unit and sign.

SECTION A — Objective Questions ($8 \times 1 = 8$ marks)

1. The ability of the eye lens to adjust its focal length for viewing objects at different distances is called: (1)
(a) Dispersion (b) Accommodation (c) Scattering (d) Refraction
2. The image of an object in a normal human eye is formed on the: (1)
(a) Cornea (b) Iris (c) Retina (d) Pupil
3. A student can read a book clearly but cannot see the classroom board from the back row. Which defect is most likely? (1)
(a) Hypermetropia (b) Myopia (c) Presbyopia (d) Cataract
4. Which lens is used to correct myopia? (1)
(a) Convex (b) Concave (c) Cylindrical only (d) Bifocal only
5. When white light passes through a glass prism, the splitting of light into its component colours is called: (1)
(a) Reflection (b) Dispersion (c) Accommodation (d) Diffusion
6. Which colour deviates the most on passing through a glass prism? (1)
(a) Red (b) Yellow (c) Green (d) Violet
7. Assertion (A): Stars appear to twinkle when viewed from Earth.
Reason (R): Atmospheric conditions cause the refraction of starlight to vary continuously. (1)
Choose: (a) Both A and R are true, and R explains A. (b) Both true, but R does not explain A. (c) A true, R false. (d) A false, R true.
8. The sky appears blue mainly because air molecules scatter which part of visible light more strongly? (1)
(a) Red (b) Orange (c) Blue (d) All colours equally

SECTION B — Very Short Answer Questions ($4 \times 2 = 8$ marks)

9. What is the least distance of distinct vision for a normal young adult? Why is it difficult to see an object clearly when it is held much closer than this distance? (2)
10. State two differences between myopia and hypermetropia in terms of (i) which objects are seen unclearly and (ii) the corrective lens used. (2)
11. Define the angle of deviation in a prism. How is the path of the emergent ray different from that through a rectangular glass slab? (2)
12. Why do planets generally not twinkle as noticeably as stars? (2)

SECTION C — Short Answer Questions ($4 \times 3 = 12$ marks)

- 13.** Explain how the eye focuses on (i) a distant object and (ii) a nearby object. Include the role of ciliary muscles and the change in focal length. (3)
- 14.** A person's far point is 80 cm in front of the eye. Identify the defect of vision and calculate the power of the corrective lens required to see distant objects clearly. Show the formula and sign of the answer. (3)
- 15.** Describe the formation of a rainbow. Include the role of refraction, dispersion and internal reflection in water droplets. (3)
- 16.** Explain the Tyndall effect and give one everyday observation in which it can be seen. (3)

SECTION D — Case-Based Question ($1 \times 4 = 4$ marks)

17. A student shines a narrow beam of white light through a glass prism onto a white screen. A band of colours appears on the screen. The student notices that the red component is at one end and the violet component is at the other.

- (a) Name the phenomenon observed. (1)
- (b) Write the correct sequence of colours from the red end to the violet end. (1)
- (c) Which colour deviates more, red or violet? (1)
- (d) What does this experiment demonstrate about white light? (1)

SECTION E — Long Answer Questions ($2 \times 4 = 8$ marks)

18. A person can see distant objects clearly but has difficulty reading a book held at the normal reading distance of 25 cm. The person's near point is 1 m.

- (a) Name the likely defect. (1)
- (b) State the type of lens needed. (1)
- (c) Calculate the approximate focal length and power of the lens required so that an object at 25 cm forms a virtual image at the person's near point. Use the Cartesian sign convention. (2)

OR

Explain presbyopia, state its main cause, and describe how bifocal lenses help a person who has difficulty seeing both near and distant objects. (4)

19. Answer the following about atmospheric refraction:

- (a) Why does a star appear slightly higher than its actual position in the sky? (2)
- (b) Why can the Sun be seen for a short time before actual sunrise and after actual sunset? (2)

OR

Explain why the clear sky appears blue and why the sky would appear dark to an astronaut outside Earth's atmosphere. (4)

NOTE: This question paper is intended for educational and exam-practice purposes. It is not an official CBSE question paper.