

## Chapter No. : 11

### Human Eye and Colourful World

#### HOTS Questions and Answers

1. What is the least distance of distinct vision of a normal human eye ?
2. Name the muscle responsible for bringing change in the focal length of the eye lens ?
3. Name one defect of vision which cannot be corrected by any type of spectacle lenses ?
4. State one effect produced by the scattering of light by the atmosphere ?
5. What is the nature of image formed on the retina of the eye ?
6. What type of lens is used for correcting hypermetropia ?
7. Who was the first person to obtain the spectrum of sunlight ?
8. What is the function of optic nerve in human eye ?
9. What is range of vision ?
10. Why do different colours deviate through different angles on passing through a prism?
11. As light rays pass from air into glass prism, are they refracted towards or away from the normal ?
12. Which color has largest wavelength ?
13. Which defect of vision can be rectified using a concave lens ?
14. What phenomenon causes twinkling of star on a clear night ?
15. What is meant by scattering of light ?
16. Why does the sky appear black instead of blue to an astronaut?
17. What is the basic cause of atmospheric refraction?
18. Why does clear sky look blue?
19. Can visible light be scattered by atoms/molecules in earth's atmosphere?
20. What is a spectrum?
21. Name the defect of vision in person
  - a. Whose near point is more than 25cm away?.
  - b. Whose far point is less than infinity.

#### ANSWERS OF THE ABOVE QUESTIONS :

Ans 1. 25cm.

Ans.2 Ciliary muscle.

Ans 3. Cataract.

Ans 4. Tyndall effect.

Ans.5 Real and inverted.

Ans.6 Convex lens.

Ans.7 Sir Isaac Newton.

Ans 8 Optic nerve carries the image formed on the retina to the brain in the form of electrical signals.

Ans 9 Range of vision of a normal human eye is between its near point and far point i.e,

from 25cm to infinity.

Ans 10 This is because different colours travel through glass with different speeds and glass has different refractive index for different colours.

Ans 11. Towards the normal.

Ans. 12 Red color.

Ans. 13 Myopia.

Ans. 14 Atmospheric refraction.

Ans. 15 Change of direction of light on striking a scatterer.

Ans. 16 The upper atmosphere does not have particle or dust etc. as a result there is no scattering

of light and hence the sky appear dark instead of blue to an astronaut.

Ans. 17 The basic cause of refraction is variation in optical density of different layers of earth's

atmosphere. The sun passes through earth's atmosphere.

Ans. 18 Because blue color having smallest wavelength is scattered most, Amount of scattering is directly proportional to  $1/\lambda^4$ .

Ans. 19 Yes, as size of molecules/atoms is much less than wavelength of light

Ans. 20 The band of seven colours obtained by dispersion of white light is called spectrum.

Ans. 21

- a. Hypermetropia
- b. Myopia

### More Questions for Practice

1. A person can see only objects beyond 1m. From his eyes. Name the defect of the eye.
2. Out of light of blue and red colours which one is scattered most?
3. What is the function of crystalline lens in the human eye?
4. Which phenomenon is responsible for increasing the apparent length of the day by 4 minute?
5. What is the far point of a person suffering from Myopia.
6. What name is given to front transparent part of human eye?
7. Where do we see : (1) Concave and (2) Convex lens in bifocal lenses.
8. What is the nature of image formed by our eye?
9. Name the liquid which is present between eye lens and cornea.
10. Where does most of the refraction of light in an eye occurs?
11. Which kind of lens is an eye lens?
12. What is the cause of dispersion of light?
13. Under very dim light, we are able to see the objects but can not distinguish between colours why ?
14. What is the range of vision for normal human eye ?
15. How is the amount of light entering the eye controlled ?

16. What is the colour of danger signal? Why?
17. What is rainbow? How is rainbow formed?
18. State two causes of myopic vision.
19. How an uncorrected myopic eye sees far off objects.
20. What is presbyopia? Name the type of lens which can be used to correct presbyopia.
21. Explain why planet do not twinkle at night?
22. Explain about the colour of the sun at sunrise and sunset.
23. Define the term (1) Near point (2) Far point
24. Why is a normal eye not able to see clearly the object closer than 25 cm.
25. Draw a ray diagram to show the refraction of light through a glass prism on the diagram mark.  
(a) Incident ray (b) Emergent ray and (c) Angle of deviation
26. How is the dispersed white light recomposed ?
- 27 The near point of a hypermetropic eye is at 75 cm from the eye. What is the power of the lens required to enable him to read clearly a book held at 25 cm from the eye.