PHYSICS- CLASS 10th

CHAPTER: THE HUMAN EYE AND THE COLOURFUL WORLD

Very Short Answer Type Question [1 Mark]

1. Name the part of our eyes that helps us to focus near and distant objects in quick succession.

2. The sky appears dark instead of blue to an astronaut. State its reason.

3. What is Tyndall effect?

4. Give an example of optical phenomena which occurs in nature due to atmospheric refraction.

5. What are the values of (a) near point and (b) far point of vision of a normal adult person?

6. Define dispersion of light.

7. What is the angle of prism?

8. for the first time used a glass prism to obtain the spectrum of sun light.

9. phenomenon is responsible for making the path of light visible.

10. Human eye has ..... lens.

11. The nature of the image formed at the retina of human eye is.....and ……

12. Range of vision for normal eye is.....to infinity.

13. corrective lens is required by a person who can neither clearly see objects placed at the near point nor at infinity.

14. Concave lens is used to correct hypermetropic eye. (T/F)

15. Concave lens is used to correct myopic eye. (T/F)

16. Violet colour has the least wavelength among all the other components of white light. (T/F)

17. Red colour suffers minimum deviation while passing through a prism. (T/F)

18. Electrical signals from light sensitive cells are sent to the brain via. optic nerve. (T/F)

19. Hotter air has refractive index: (Choose the most appropriate option)

    (i) Equal to the cooler air

    (ii) Higher than cooler air

    (iii) Lower than cooler air

    (iv) None of these

20. White light is dispersed into: (Choose the most appropriate option)

    (i) 5 colours

    (ii) 6 colours

    (iii) 7 colours

    (iv) 8 colours

21. The time difference between actual and apparent sunset is about: (Choose the most appropriate option)

    (i) 1 min

    (ii) 2 min

    (iii) 3 min

    (iv) No difference

22. Light enters the eye through:

(i) Retina

(ii) Iris

(iii) Lens

(iv) Cornea

23. Short- sightedness is also known as:

(i) Myopia

(ii) Hypermetropia

(iii) Presbyopia

(iv) Cataract

24. Dark muscular diaphragm that controls the size of the pupil is:

(i) Iris

(ii) Optic nerve

(iii) Retina

(iv) Cornea

25. Which part of the human eye regulates and controls the amount of light entering it:

(i) Pupil

(ii) Cornea

(iii) Retina

(iv) Eye ball

Question 26-30: *In each of the following questions, a statement of Assertion is given by the corresponding statement of Reason. Of the statements, mark the correct answer as*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) If Assertion is true, but Reason is false.

(d) If Assertion is false, but Reason is true.

(e) If Assertion and Reason both are false.

26. **Assertion**: The least distance of distinct vision for a young adult with normal vision is 20 cm.
Reason: Far point for a human eye with normal vision is infinity.

27. **Assertion**: Tyndall Effect is an optical phenomenon of light used to explain atmospheric refraction.
Reason: The tiny particles of dust disperse sunlight in it falls through foliage in a forest.

28. **Assertion**: On a clear summer night twinkling of stars is observed.
Reason: The twinkling of stars is caused by dispersion of star light by the atmosphere.

29. **Assertion**: On mid-day, the colour of the sunlight becomes white.
Reason: No atmospheric refraction is caused due to overhead sun.

30. **Assertion**: Ciliary muscles adjust the size of the crystalline lens inside the human eye.
Reason: Gradual weakening of ciliary muscles leads to astigmatism.

Short Answer Type Questions [2 Marks]

1. Explain why do the planets not twinkle but the stars twinkle.

2. Why does the sun appear reddish at sunrise?

3. State two causes of myopia.

4. A short-sighted person cannot see clearly beyond 2 m. Calculate the power of lens required to correct his vision.

5. A star sometimes appears brighter and some other times fainter. What is this effect called? State the reason for this effect.

6. What is the colour of the clear sky during day time? Give reason for it.

7. What is meant by scattering of light?

8. Why do we have two eyes instead of one eye?

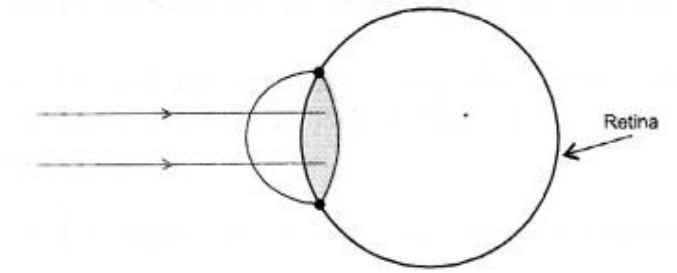
9. When we enter a dim-lit room from a bright light, we are not able to see the object in the room for some time.
   Explain, why?

10. State two properties of the image formed by the eye lens on the retina.

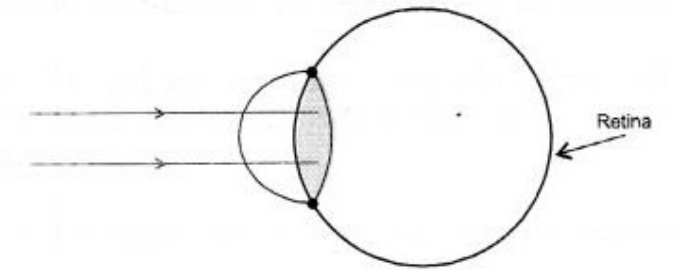
11. The ciliary muscles of a normal eye are in their (i) most relaxed (ii) most contracted state. In which of the two cases is the focal length of the eye-lens more?

12. Arrange constituent colours of white light in descending order of their wavelengths.

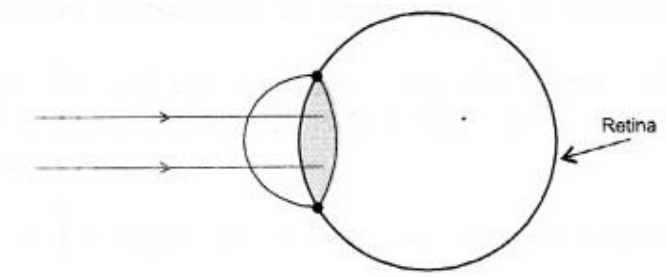
13. Copy the following diagram on your answer sheet after showing the refracted rays of light from eye lens, assuming the eye is a normal human eye.



14. Copy the following diagram on your answer sheet showing the formation of image, assuming the given eye is a myopic eye.



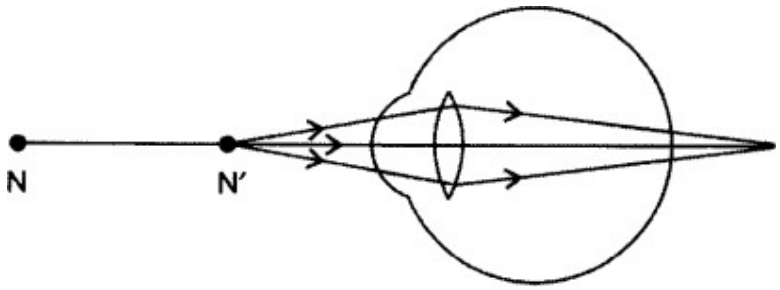
15. Copy the following diagram on your answer sheet showing the formation of image, assuming the given eye is a hypermetropic eye.



Short Answer Type Questions [3 Marks]

1. Study the diagram given below and answer the questions that follow it:

(a) Which defect of vision is represented in this case? Give reason for your answer.
(b) What could be the two causes of this defect?
(c) With the help of a diagram show how this defect can be corrected by the use of a suitable lens.



2. What is meant by spectrum of white light? How can we recombine the components of white light after a prism has separated them? Draw a diagram to illustrate it.

3. Name and explain the three phenomena of light responsible for the formation of rainbow in the sky.

4. Why does sky look blue on a clear day?

5. What is presbyopia? State the cause of Presbyopia. How is presbyopia of a person be corrected

6. (a) What is meant by the power of accommodation of an eye?
   (b) A person with a myopic eye cannot see objects beyond 1.2 m directly. What should be the type of the corrective lens used? What would be its power?

7. Draw a ray diagram to show the refraction of light through a glass prism. Mark on it (a) the incident ray. (b) the emergent ray and (c) the angle of deviation.

8. A star appears slightly higher (above) than its actual position in the sky. Illustrate it with the help of a labelled diagram.

9. A convex lens made of glass forms a sharp image on the screen for a particular position of an object with respect to the lens. A human eye lens is also a convex lens but it can form sharp images on the retina of eye for different positions of the objects. Explain, why?

10. Why do we see a rainbow in the sky only after rainfall?

11. Why are stop signals on roads in red coloured light?

12. Draw a well labelled diagram of human eye.

13. With the help of a labelled diagram, explain why the sun appears reddish at the sun-rise and the sunset.

14. About 45 lac people in the developing countries are suffering from corneal blindness. About 30 lac children below the age of 12 years suffering from this defect can be cured by replacing the defective cornea with the cornea of a donated eye. How and why can students of your age involve themselves to create awareness about this fact among people?

15. Define cataract. How is it caused? How can it be corrected?

Long Answer Type Question [5 Marks]

1. A 14-year-old student is not able to see clearly the questions written on the blackboard placed at a distance of 5 m from him.
   (a) Name the defect of vision he is suffering from.
   (b) With the help of labelled ray diagrams show how this defect can be corrected.
   (c) Name the type of lens used to correct this defect.

2. (a) What is dispersion of white light? What is the cause of such dispersion? Draw a diagram to show the dispersion of white light by a glass prism.
   (b) A glass prism is able to produce a spectrum when white light passes through it but a glass slab does not produce any spectrum. Explain why is it so?

3. (a) Explain the following terms used in relation to defects in vision and correction provided by them:
   (i) Myopia (ii) Bifocal lenses (iii) Far-sightedness.
   (b) Why is the normal eye unable to focus on an object placed within 10 cm from the eye?

4. Describe atmospheric refraction. Explain with the help of diagram why the sun is visible to us two minutes before the actual sun-rise and two minutes even after the sunset.

5. Why does the sun appear oval at sunset and sunrise but appears circular at noon?

6. Why do different colours get separated when white light passes through prism? How can we recombine the components of white light after a prism has separated them? Explain with the help of figure.

7. How did Newton, using two identical glass prisms, show that white light is made of seven colours? Explain with the help of a figure.

8. (i) Show formation of rainbow with the help of a ray diagram.
   (ii) What are the conditions to observe rainbow?

9. Write different parts of eye and explain their functions. Also explain, how an image of an object is formed on the retina of eye.

10. In your views, what should we do to our eyes after death and why? What is the accurate time to remove the eyes after death and how much time a doctor takes to do so? Which part of the eye can be donated after death? Which group of people cannot donate their eyes?