CLASS X : ASSIGNMENT : CH-10 : HUMAN EYE AND COLOURFUL WORLD : SCIENCE (PHY)

THE HUMAN EYE

1. Mention the name of a structure found in the human eye
   a) that controls the size of the pupil
   b) which is a thin membrane forming the transparent bulge on the front surface of the eyeball
   c) regulates and controls the amount of light entering the eye
   d) changes the focal length of the eye lens
   e) light-sensitive screen on which the eye lens forms the image
2. Explain how a normal human eye is able to see distinctly the object placed at a distance as well as those placed at a nearer distance. (b) What are the far point and near point of a normal human eye?
3. What is cataract? How can it be corrected?

DEFECTS OF VISION AND THEIR CORRECTION

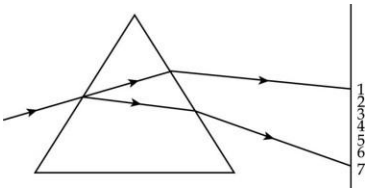
4. A person suffering from an eye defect uses lenses of power - 1D. Name the defect he is suffering from and the nature of the lens used.
5. a) What is the least distance of distinct vision for the normal eye?
   b) Does the above distance increase or decrease for long-sighted eyes? Give a reason for your answer with a diagram.
6. a) Draw a diagram to show the formation of the image of a distant object by a myopic eye. How can such an eye –defect be rectified? b) State two reasons due to which this eye defect may be caused.
7. A person is advised to wear spectacles with convex lenses. What type of defect of vision is he suffering from?
8. About 45 lac people in 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?
9. Roshini and Naina were classmates. Roshini and Naina were also in a competition to gain first position in the class. However, Roshini noticed that Naina was not her usual self for the past few days. She found out that Naina was not able to see the letters in the textbook and dictionary properly and also complained of frequent headaches. Roshini suggested to Naina to get her eyes checked. Naina followed Roshini's suggestion and thanked her saying she felt very comfortable after wearing the spectacles.
   a) Name the defect Naina might be having. Give any two causes of defect and what is the remedy?
   b) List any two qualities displayed by Roshini.
10. A person needs a lens of power - 2.5D to correct his distant vision. To correct his near vision he needs a lens of power + 1.5D. What is the focal length of the lens required for correcting (i) distant vision, and (ii) near vision?
11. The far point of a myopic person is 80cm in front of the eye. What is the nature and power of the corrective lens?
12. The far point of a myopic person is 100cm in front of the eye. What is the nature and power of the corrective lens? Draw the diagram to show the defect and its correction.
13. The near point of a person is 40cm. Name the defect of the vision and find the power of the lens required to correct the vision. The near point of the normal eye is 25cm. Draw the diagram to show the defect and its correction
14. Name the defect of vision
    a) A convex lens is used to correct the vision
    b) A concave lens is used to correct the vision
    c) A bifocal lens is used to correct the vision
    d) The far point of a person is nearer than infinity
    e) The near point of a person is more than 25cm
    f) Distant objects cannot be seen distinctly

Contact: Vinita Chawla, 91-8168258349, www.physicsinduction.com

g) A student sitting in a classroom is not able to read the blackboard clearly
h) A man can read the number of a distant bus clearly but finds difficulty in reading a book
i) A person is unable to thread a needle
j) Eyeball is smaller than normal
k) The power of accommodation of the eye has decreased due to ageing
l) Due to aging ciliary muscles have become weak and the flexibility of the eye lens has diminished
m) A person uses a lens of power -2.5D
n) A person uses a lens of power +2.5D

REFRACTION OF LIGHT THROUGH A PRISM / DISPERSION

15. Name the angle between the incident and emergent ray of a prism.
16. Name the angle between two lateral faces of a prism.
17. What is the phenomenon of the splitting of white light into seven colours on passing through a prism known as?
18. Name all optical phenomena that occur in water droplets during the formation of a rainbow. Draw the required figure.
19. Draw a diagram to show the following
a) Dispersion of white light
b) Recombination of the spectrum of white light
20. When we place a glass prism in the path of a narrow beam of white light a spectrum is obtained. What happens when a second identical prism is placed in an inverted position with respect to the first prism? Why?
21. A beam of white light falling on a glass prism gets split up into seven colours marked 1 to 7 as shown in the diagram



a) The colour at the position marked 3 and 5 are similar to the colour of the sky and the colour of gold metal respectively. Is the above statement made by the student correct or incorrect? Justify.
b) Which of the above-shown positions corresponds approximately to the colour of? (i) brinjal (ii) Neel which is applied to clothes (iii) danger signal (iv) Orange

ATMOSPHERIC REFRACTION / SCATTERING OF LIGHT

22. What is the cause of atmospheric refraction?
23. On what factor does the colour of scattered light depend?
24. Name the phenomena involved in the following examples
(a) Flickering of objects seen through hot air rising above a campfire
(b) Twinkling of stars
(c) Stars appear higher than the actual position
(d) the sun is visible to us about 2 minutes before the actual sunrise
(e) The Sun appears reddish at sunrise
(f) To astronauts sky appears dark instead of blue
(g) Sky appears blue
25. Arul and his friends had to cross the railway tracks every day on their way to school. One day while returning from school, Arul observed that a couple of fish plates were missing from one side of the tracks. He asked his friend who was wearing a red t-shirt to take it off and give it to him and started waving it furiously on the track. The driver of the approaching train saw him, applied the brakes, and an accident was prevented.

a) Why did Arul waive his friend's red t-shirt and not the blue t-shirt that he himself was wearing?
b) Explain the optical phenomena involved here.
c) What qualities were exhibited by Arul and his friends? (Any two)