

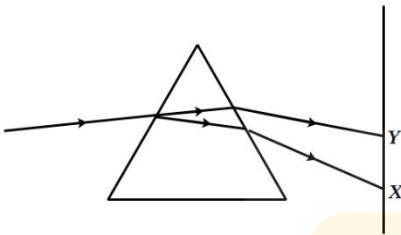
## 11- Human Eye and the Colourful World

### 1 Mark

1. Name the part of our eyes that helps us to focus near and distant objects in quick succession. [CBSE,2010]

### 2 Mark

2. In a figure given below a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism it produces a spectrum  $XY$  on a screen. [CBSE,2010]



- A. State the colour seen at  $X$  and  $Y$ .  
B. Why do different colours of white light bend through different angles with respect to the incident beam of light?

### 3 Marks

3. What is meant by scattering of light? Use this phenomenon to explain why the clear sky appears blue or the sun appears reddish at sunrise. [CBSE,2015]
4. Describe an activity to show that the colours of white light split by a glass prism can be recombined to get white light by another identical glass prism. Also draw ray diagram to show the recombination of the spectrum of white light. [CBSE,2016]
5. State the cause of dispersion of white light by a glass prism. How did Newton, using two identical glass prisms, show that white light is made of seven colours? Draw a ray diagram to show the path of a narrow beam of white light, through a combination of two identical prisms arranged together in inverted position with respect to each other, when it is allowed to fall obliquely on one of the faces of the first prism of the combination. [CBSE,2017]

### 5 Marks

6. A. What is meant by dispersion of white light? Describe the formation of rainbow in the sky with the help of a diagram.  
B. What is hypermetropia? Draw ray diagrams to show the image formation of an object by :  
i. Hypermetropic eye  
ii. Correction made with a suitable lens for hypermetropic eye.

OR

- A. Give reasons for the following :  
i. Colour of the clear sky is blue.  
ii. The sun can be seen about two minutes before actual sunrise.  
iii. We cannot see an object clearly if it is placed very close to the eyes.

- B. What is Presbyopia? Write two causes of this defect. [CBSE,2008]

7. A. What is myopia? State the two causes of myopia. With the help of labelled ray diagrams show  
i. the eye defect myopia.  
ii. correction of myopia using a lens.  
B. Why is the normal eye unable to focus on an object placed within 10 cm from the eye?

OR

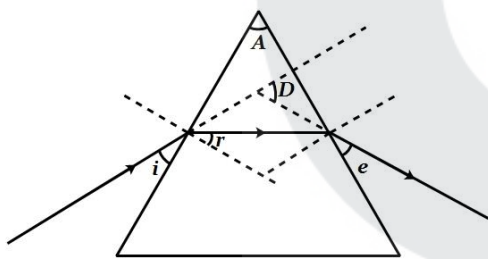
- A. What is dispersion of white light? What is the cause of such dispersion? Draw a diagram to show the dispersion of white light by a glass prism.  
B. A glass prism is able to produce a spectrum when white light passes through it but a glass slab does not produce any spectrum. Explain why it is so. [CBSE,2009]

8. Write the importance of ciliary muscles in the human eye. Name the defect of vision that arises due to gradual weakening of the ciliary muscles in old age. What type of lenses are required by the persons suffering from this defect to see the objects clearly? Akshay, sitting in the last row in his class, could not see clearly the words written on the blackboard. When the teacher noticed it, he announced if any student sitting in the front row could volunteer to exchange his seat with Akshay. Salman immediately agreed to exchange his seat with Akshay. He could now see the words written on the blackboard clearly. The teacher thought it fit to send the message to Akshay's parents advising them to get his eyesight checked. In the context of the above event, answer the following questions :
- Which defect of vision is Akshay suffering from? Which type of lens is used to correct this defect?
  - State the values displayed by the teacher and Salman.
  - In your opinion, in what way can Akshay express his gratitude towards the teacher and Salman? [CBSE,2015]
9. What is atmospheric refraction? Use this phenomenon to explain the following natural events. [CBSE,2016]
- Twinkling of stars
  - Advanced sun-rise and delayed sun-set.
  - Draw diagram to illustrate your answers
10. A student suffering from myopia is not able to see distinctly the objects placed beyond 5 m. List two possible reasons due to which this defect of vision may have arisen. With the help of ray diagrams, explain
- why the student is unable to see distinctly the objects placed beyond 5 m from his eyes.
  - the type of the corrective lens used to restore proper vision and how this defect is corrected by the use of this lens.
- B. If, in this case, the numerical value of the focal length of the corrective lens is 5 m, find the power of the lens as per the new Cartesian sign convention. [CBSE,2017]

### Practical Based Questions

#### 1 Mark

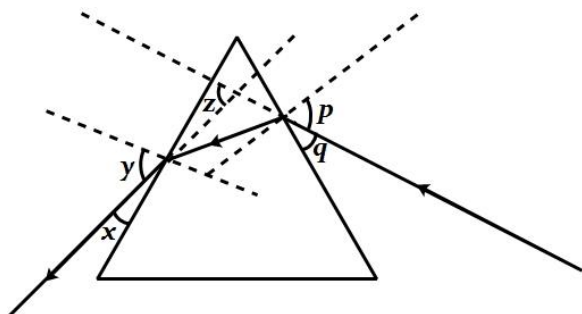
11. A student traces the path of a ray of light through a triangular glass prism for different values of angle of incidence. On analyzing the ray diagrams, which one of the following conclusions is he likely to draw? [CBSE,2015]
- The emergent ray is parallel to the incident ray.
  - The emergent ray bends at an angle to the direction of the incident ray.
  - The emergent ray and the refracted ray are at right angles to each other.
  - The emergent ray is perpendicular to the incident ray
12. In the following ray diagram the correctly marked angle are : [CBSE,2016]



- A)  $\angle i$  and  $\angle e$                       B)  $\angle A$  and  $\angle D$                       C)  $\angle i, \angle e$  and  $\angle D$                       D)  $\angle r, \angle A$  and  $\angle D$

13. Study the following ray diagram :

In this diagram, the angle of incidence, the angle of emergence and the angle of deviation respectively have been represented by [CBSE,2017]



- A)  $y, p, z$                       B)  $x, q, z$                       C)  $p, y, z$                       D)  $p, z, y$