

**PHYSICS**  
**Holiday Homework**  
**Class X<sup>th</sup>**  
**Session 2025-2026**

**Holiday Homework Instructions**

1. All students are required to complete their holiday homework in a fair notebook, clearly labeled 'Holiday Homework'.
2. Upon school reopening, each student will submit their homework to their respective subject teachers for evaluation.
3. Please note that this work is to be done independently, as the questions are aligned with your upcoming exam syllabus. The more practice you do, the better prepared you will be."

**Numericals**

1. An object is placed 10 cm in front of a convex mirror of focal length 15 cm. Find the position and nature of the image using the mirror formula.
2. An object is placed at a distance of 10 cm from the pole of a concave mirror. Its image is formed at 6 cm from its pole. Calculate the focal length of the mirror.
3. An object is placed at a distance of 6 cm from a convex mirror of focal length 12 cm. Find the position and nature of the image formed.
4. A concave mirror produces a real image of height 2 cm of an object of 0.5 cm placed 10 cm away from the mirror. Find the position of the image and focal length of the mirror?
5. A dentist uses a small concave mirror of focal length 3.0 cm and holds it at a distance of 2 cm from the tooth. What is the magnification of the image?
6. How far should an object be held from a concave mirror of focal length 40 cm so as to get an image magnified three times?
7. A concave mirror of focal length 10 cm is kept in front of an object at a distance of 50 cm from it. If the object is 1.0 cm high, what will be the size of the image?

8. How far from a lamp must a concave mirror of focal length 3.0 m be placed in order to throw its image on the screen 8.0 m from the lamp?

9. An object is located 20 cm in front of a concave mirror of radius of curvature 60 cm. Find the position and nature of the image formed.

10. An object 5 cm in height is placed in front of a concave mirror on the principal axis at a distance of 10 cm from the mirror. If the focal length of the mirror is 20 cm, find the nature of the image formed.

11. An object 10 cm tall is placed on the principal axis of a convex mirror of focal length 30 cm at a distance of 20 cm from the pole. Find the nature, size, position and magnification of the image formed on the principal axis (by graphical construction).

12. An object 2 cm high is kept at a distance of 16 cm from a concave mirror which produces a real image 3 cm high.

(i) What is the focal length of the mirror?

(ii) Find the position of the image.

13. An object 5 cm high is placed at a distance of 10 cm from a convex mirror of radius of curvature 30 cm. Find the nature, position and size of the image.

14. What is the position of an image when an object is placed at a distance of 20 cm from a concave mirror of focal length of 20 cm?

15. A concave mirror of focal length 30 cm is placed at a distance of 90 cm from the wall. How far from the wall should an object be placed so as to get its real image on the wall.

16. The refractive index of medium 'X' with respect to medium 'Y' is  $\frac{2}{3}$  and refractive index of medium 'Y' with respect to medium 'Z' is  $\frac{4}{3}$ . Find the refractive index of medium 'Z' with respect to medium 'X'.

17. The refractive index of water with respect to air is  $\frac{4}{3}$ . What is the refractive index of air with respect to water?

18. The refractive index of glass with respect to air is 1.65 and that of water w.r.t air is 1.33. Calculate refractive index of water w.r.t to glass.

19. The absolute refractive index of 2 media 'A' and 'B' are 2.0 and 1.5 respectively. If the speed of light in medium 'B' is  $2 \times 10^8$  m/s, calculate the speed of light in: (i) vacuum (ii) medium 'A'.

20. The absolute refractive index of glass and water are  $\frac{4}{3}$  and  $\frac{3}{2}$  respectively. If the speed of light in glass is  $2 \times 10^8$  m/s, calculate the speed of light in: (i) vacuum (ii) water.