



DELHI PUBLIC SCHOOL, SAIL TOWNSHIP RANCHI

ASSIGNMENT (PHYSICS – X), SESSION- 2018-19

INSTRUCTIONS:-

- The work mentioned below has to be done in A₄ sheets properly filed and presentable.
 - This work has to be submitted by 16th November 2018.
 - This project work will be marked and submitted to the school as evidence.
-

“Diyas are God’s way of telling us that there will be light to drive away darkness”

“An offering of arghya to God sun to thank him for giving sunlight and heat to earth”

VALUE BASED QUESTIONS (VBQ)

- Shruti’s grandmother had a severe toothache. But her grandmother was not willing to visit doctor. Shruti convinced her grandmother for visiting to the dentists. Shruti took the help from her father, she accompanied her grandmother to a nearby dentists. The dentists examined the teeth of her grandmother using a mirror. The dentist gave some medicines and advice her to brush her teeth after every meal. Shruti listened the advice given by dentists very carefully and help her grandmother to clean the tooth regularly.

Answer the following questions :

- Which mirror was used by the dentist to examine the teeth of Shruti grandmother ?
- Draw the ray diagram of the mirror used for this purpose.
- What values were exhibited by Shruti ?

NUMERICAL PROBLEMS

- An object 4.0 cm in size, is placed 25.0 cm in front of a concave mirror of focal length 15.0 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image ? Find the nature and the size of the image.
- Calculate the focal length of a spherical mirror which forms a $\frac{1}{3}$ times magnified virtual image of an object placed 18 cm in front of it. What is the type of mirror ?
- A spherical mirror forms a real image three times as big as the object. If the focal length of the mirror is 15 cm, calculate the distance of image from the mirror. Is the mirror concave or convex ?
- Calculate the focal length of a spherical mirror which forms a three times magnified real image of an object placed 16 cm in front of it.
- A 10 mm long pin is placed vertically in front of a concave mirror. A 5 mm long image of the pin is formed at 30 cm in front of the mirror. Find the focal length of the mirror.
- An object of size 2 cm is placed at a distance of 20 cm from a concave mirror. A real image is formed at 30 cm from the mirror. Calculate the focal length of the mirror and the size of the image.
- The image of an object placed 20 cm from a concave mirror is formed at a distance of 30 cm from the mirror. Calculate the possible focal length of the mirror from this information.
- An object of height 1.2 cm is placed at a distance of 12 cm from a convex mirror of radius of curvature 12 cm. Find the position and height of the image.

9. An object of height 6 cm is placed perpendicular to the principal axis of a concave lens of length 5 cm. Use lens formula to determine the position, size and nature of the image, distance of the object from the lens is 10 cm.
10. The refractive indices of water and glass with respect to air are $\frac{4}{3}$ and $\frac{3}{2}$ respectively. speed of light in glass is 2×10^8 m/s. Find the speed of light in (i) air (ii) water.
11. An object placed on a metre scale at 8 cm mark was focused on a white screen placed at 90 cm mark. Using a converging lens placed on the scale at 50 cm mark.
 - (i) Find the focal length of the converging lens.
 - (ii) Find the position of the image formed if the object is shifted towards the lens at a position 29.0 cm.
 - (iii) State the nature of the image formed, if the object is further shifted towards the lens.
12. A 2.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10 cm. The distance of the object from the lens is 15 cm. Find the nature, position and size of the image. Also find its magnification.
13. A 4 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 24 cm. The distance of the object from the lens is 16 cm. Find the position, size and the nature of the image formed.
14. A convex lens has a focal length of 10 cm. At what distance from the lens should the object be placed, so that it forms a real and inverted image 20 cm away from the lens? What would be the size of the image formed, if the object is 2 cm high?
15. The image of a candle flame placed at a distance of 45 cm from a spherical lens is formed on a screen placed at a distance of 90 cm from the lens. Identify the type of the lens and calculate its focal length. If the height of the flame is 2 cm. Find the height of its image.
16. A convex lens has a focal length of 25 cm. Calculate the distance of the object from the lens so that the image is to be formed on the opposite side of the lens at a distance of 75 cm from the lens. What will be the nature of the image?
17. A convex lens forms a real and inverted image of a needle at a distance of 50 cm from it. Where is the needle placed in front of this lens if the image is equal to the size of the object? Also calculate the power of the lens.
18. A 2 cm high candle flame is placed at a distance of 80 cm from a white screen. On placing a convex lens exactly at the mid-point of the candle and the screen. A distinct image of the flame is seen on the screen. What is the focal length of the lens and the size of the candle image formed?
19. Two lenses of power 2.5 D and -1.5 D are placed in contact. If an object be placed at a distance of 120 cm from the lens combination, where is the image formed.
20. The refractive indices of benzene and water are 1.50 and 1.33 respectively. Calculate the refractive index of benzene with respect to water.
21. A convex lens of power 5 D is placed at a distance of 40 cm from a screen. At what distance from the lens should a candle be placed so that its image is formed on the screen?
22. An object of height 6 cm is placed at a distance of 60 cm from a concave lens of focal length 30 cm. Find the nature and height of the image.
23. A ray of light travelling in air incident on the surface of a transparent medium at an angle of 30° with the surface. It bends by 15° from its path after refraction. Find the refractive index of the medium.