

CLASS : X (CBSE)

WORKSHEET-1

SUBJECT :

PHYSICS

NAME OF THE STUDENT:

SEC:

ROLL NO.

DATE:

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**LIGHT-REFLECTION & REFRACTION**

1. What is light? What is its nature?

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2. What is the speed of light in vacuum?

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3. What is a mirror?

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4. What is the focal length of a plane mirror?

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5. Differentiate between real and virtual image.

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6. What type of image is formed on a cinema screen?

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7. A concave mirror is a part of sphere of radius 40 cm. What is the focal length of the mirror?

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8. Radius of curvature of a mirror is 20 cm. What type of mirror is it?

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9. Magnification of a mirror is  $+2/3$ . What type of mirror is it?

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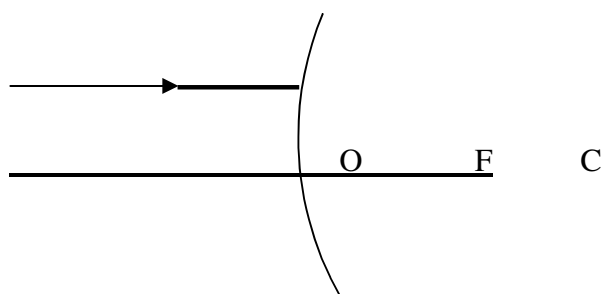
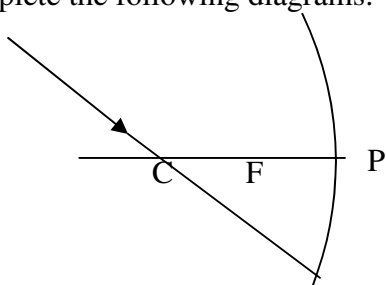
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10. Complete the following diagrams:-



11. Magnification of a mirror is  $-1$ . What type of mirror is it? What is the position of object and image? Give the nature of image.

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12. Name the type of mirror used:-

- (i) as a reflector in search light \_\_\_\_\_
- (ii) by the dentist \_\_\_\_\_
- (iii) as side view mirror in vehicles. \_\_\_\_\_
- (iv) (iv) as a shaving mirror \_\_\_\_\_

13. Wherever you may stand in front of mirror, your image is always erect & same sized, what type of mirror is it?

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14. (a) A ray of light strikes the mirror at an angle of  $20^\circ$ . What is the angle of reflection?

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(b) Give the angle of incidence and reflection for normal incidence.

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A candle is kept in front of plane mirror at distance of 15 cm. What is distance between candle & its image?

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15. Radius of curvature of a mirror is +24cm. Name the kind of mirror and give the characteristics of the image formed by it.

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Define refraction.

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16. State the laws of refraction.

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17. How does the lateral displacement depend upon:- (a) Thickness of the glass slab. (b) Angle of incidence

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18. What is the lateral displacement when a ray of light falls normally on a glass slab?

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Refractive index of water with respect to air is 1.33, what is refractive index of air with respect to water?

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Under what condition, the angle of refraction will be equal to the angle of incidence?

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19. Refractive index of glass is 1.65, what is the speed of light in glass?

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If refractive indices of alcohol & water are 1.36 and 1.33 respectively, which of the two is optically denser?

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20. A 1cm high object is placed at a distance of  $2F$  from a convex lens, what is the height of the image formed?

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21. Focal length of a lens is 25 cms. What is its power?

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22. Where should an object be placed for using a convex lens as magnifying glass?

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23. Power of a lens is 0.4 D. what is its focal length?

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24. Why does a stick, partly immersed in water, appear to be bent? Explain with a diagram.

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25. A small electric lamp is placed at the focus of a convex lens. What is the nature of the beam of light produced by the lens?

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**NUMERICALS:**

26. Find the position, nature and size of the image of an object 3 cm high placed at a distance of 9 cm from a concave mirror of focal length 18 cm. HINT:( $v = 18$  cm,  $h = 6$  cm)
27. An object 4 cm high is placed 40 cm in from of a concave mirror of focal length 20 cm. find the distance from the mirror, at which a screen be placed to obtain a sharp image. Hint:  $V=40$ cm
28. A convex lens has focal length of 30 cm. at what distance should object be placed from the lens so that it forms an image at 60 cm on other side of the lens? Find the magnification produced by the lens. HINT ( $v=-60$ cm,  $m = -1$ )
29. An arrow 2.5cm high is placed at a distance of 25 cm from a diverging mirror of focal length 20 cm. find the nature, position and size of the image formed  
HINT (11.1, 1.11cm).
30. The image formed by a convex mirror of focal length 30 cm is a quarter of the object, what is the distance of object from the mirror?  
HINT ( -90 cm)
31. An erect image 3 times the size of the object is obtained with a concave mirror of radius of curvature 36 cm. calculate the position of the object.  
HINT (-12cm)
32. A concave lens has focal length of 15 cm. at what distance should an object be placed from the lens so that it forms an image at 10 cm from the lens? Find the magnification of the lens.  
HINT (-30cm,  $1/3$ )
33. A 2 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. HINT (30cm, -4cm)
34. The image obtained with a convex lens is erect and its length is 4 times the length of the object. If the focal length of the lens is 20 cm, calculate the object and image distance.  
HINT (-15 cm, - 60cm)
35. A concave lens of focal length 25 cm and a convex lens of focal length 20 cm are placed in contact with each other. What is the power of this combination? What is the focal length of the combination? HINT (1D, 1m)
36. Find the focal length and nature of lens which should be placed in contact with a lens of focal length 10 cm so that the power of the combination becomes 5 dioptre.  
HINT (-20cm, concave)