

Chapter-1

Worksheet-3

Section 1

Q1. What is understood as lateral displacement of light? Illustrate this with the help of a diagram. List two factors on which the lateral displacement in a particular substance depends.

Q2. A concave lens has focal length of 20 cm. At what distance from the lens a 5 cm tall object be placed so that it forms an image at 15 cm from the lens? Also calculate the size of the image formed.

Q3. Draw the ray diagram in each case to show the position and nature of the image formed when the object is placed:

- (i) at the centre of curvature of a concave mirror
- (ii) between the pole P and focus F of a concave mirror
- (iii) in front of a convex mirror
- (iv) at 2F of a convex lens
- (v) in front of a concave lens

Q4. “The refractive index of diamond is 2.42”. What is the meaning of this statement in relation to speed of light?

Q5. Explain with the help of a diagram, why a pencil partly immersed in water appears to be bent at the water surface.

Q6. A ray of light, incident obliquely on a face of a rectangular glass slab placed in air, emerges from the opposite face parallel to the incident ray. State two factors on which the lateral displacement of the emergent ray depends.

Q7. An object 2 cm high is placed at a distance of 64 cm from a white screen. On placing a convex lens at a distance of 32 cm from the object it is found that a distinct image of the object is formed on the screen. What is the focal length of the convex lens and size of the image formed on the screen? Draw a ray diagram to show the

formation of the image in this position of the object with respect to the lens.

Q8. What is the minimum number of rays required for locating the image formed by a concave mirror for an object? Draw a ray diagram to show the formation of a virtual image by a concave mirror.

Q9. For which position of the object does a convex lens form a virtual and erect image? Explain with the help of a ray diagram.

Q10. In an experiment with a rectangular glass slab, a student observed that a ray of light incident at an angle of 55° with the normal on one face of the slab, after refraction strikes the opposite face of the slab before emerging out into air making an angle of 40° with the normal. Draw a labelled diagram to show the path of this ray. What value would you assign to the angle of refraction and angle of emergence?

Section 2

Q11. An object is placed at a distance of 0.25 m in front of a plane mirror. The distance between the object and image will be

- a) 0.25 m
- b) 1 m
- c) 0.5 m
- d) 0.125 m

Answer: c

Q12. Which of the following mirror is used by a dentist to examine a small cavity?

- (a) Convex mirror
- (b) Plane Mirror
- (c) Concave Mirror

(d) Combination of convex and concave mirror

Answer: c

Q13. An object at a distance of 30 cm from a concave mirror gets its image at the same point. The focal length of the mirror is

- a) -30 cm
- b) 30 cm
- c) -15 cm
- d) 15 cm

Answer: c

Q14. An object at a distance of + 15 cm is slowly moved towards the pole of a convex mirror. The image will get

- a) Shortened and real
- b) Enlarged and real
- c) Enlarged and virtual
- d) Diminished and virtual

Answer: d

Q15. A concave mirror of focal length 20 cm forms an image having twice the size of object. For the virtual position of object, the position of object will be at

- a) 25 cm
- b) 40 cm
- c) 10 cm
- d) At infinity

Answer: c

Q16. The nature of image formed by a convex mirror when the object distance from the mirror is less than the distance between pole and focal point (F) of the mirror would be

- a) Real, inverted and diminished
- b) Real, inverted and Enlarges
- c) Virtual, upright and diminished
- d) Virtual, upright and Enlarged

Answer: c

Q17. The refractive index of water is 1.33. The speed of light in water will be

- a) 1.33×10^8 m/s
- b) 3×10^8 m/s
- c) 2.26×10^8 m/s
- d) 2.66×10^8 m/s

Answer: c

Q18. You are given three media A, B and C of refractive index 1.33, 1.65 and 1.46. The medium in which the light will travel fastest is

- a) A
- b) B
- c) C
- d) Equal in all three media

Answer: b

Q19. Large number of thin strips of black paint are made on the surface of a convex lens of focal length 20 cm to catch the image of a white horse. The image will be

- a) A zebra of black stripes
- b) A horse of black stripes

- c) A horse of less brightness
- d) A zebra of less brightness

Answer: c

Q20. A divergent lens will produce

- a) Always real image
- b) Always virtual Image
- c) Both real and virtual image
- d) None of these

Answer: b