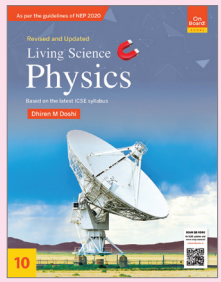
ICSE Living Science PHYSICS

Class 10



Multiple-Choice Questions

Chapter 5: REFRACTION THROUGH LENSES

1. A lens thinner in the middle and thicker at the edges is a

   (a) concave lens. (b) convex lens. (c) plano-convex lens. (d) none of these.

   Ans: (a)

2. Which of the following is a diverging lens?

   (a) (b) (c) (d)

   Ans: (c)

3. The distance between optical centre and principal focus of a lens is called

   (a) radius of curvature. (b) principal axis. (c) aperture. (d) focal length.

   Ans: (d)

4. The maximum portion of the spherical surfaces from which refraction takes place is called

   (a) radius of curvature. (b) principal axis. (c) aperture. (d) focal length.

   Ans: (c)

5. When a ray of light travels from a denser medium to a rarer medium, it

   (a) deviates towards the normal. (b) does not deviate.

   (c) deviates away from normal. (d) gets reflected.

   Ans: (c)

6. In a convex lens since the parallel beam of light travelling to the principal axis actually meets at a point, the focus is called

   (a) real focus. (b) virtual focus. (c) second focus. (d) imaginary focus.

   Ans: (a)

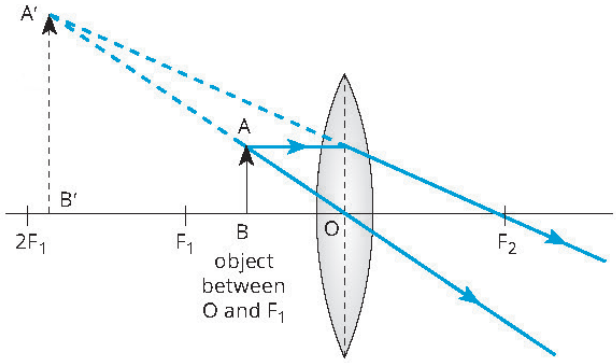
7. A concave lens always forms

   (a) virtual, erect and diminished image. (b) real, inverted and enlarged image.

   (c) virtual, erect and enlarged image. (d) real, inverted and diminished image.

   Ans: (a)

8. The nature and size of the image formed by the convex lens is



(a) virtual, erect and diminished.
(b) real, inverted and magnified.
(c) virtual, erect and magnified.
(d) real, inverted and diminished.

Ans: (c)

9. A ray of light directed towards the optical centre of a lens, after refraction it

(a) passes through the focus.
(b) becomes parallel to the principal axis.
(c) passes undeviated.
(d) is reflected back.

Ans: (c)

10. A ray of light after refraction through a lens emerges parallel to the principal axis of the lens. The incident ray either passes through or appear to meet at

(a) optical centre.
(b) first focus.
(c) second focus.
(d) centre of curvature of the first surface.

Ans: (b)

11. A convex lens of focal length 6 cm forms a real image of the same size as the object. The distance between the object and image will be

(a) 12 cm (b) 18 cm (c) 9 cm (d) 24 cm

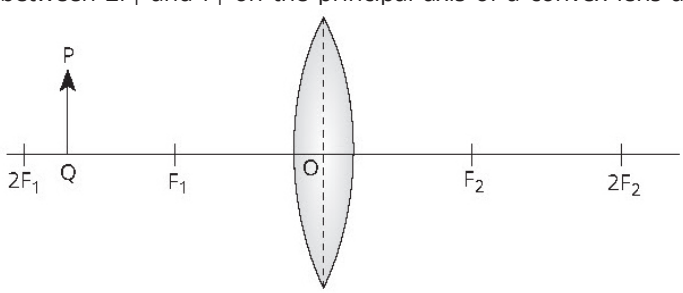
Ans: (d)

12. For an object placed at a distance of 30 cm in front of a convex lens, the image is at distance 30 cm behind the lens. The focal length of the lens is

(a) 15 cm (b) 30 cm (c) 60 cm (d) 45 cm

Ans: (a)

13. An object PQ is placed between $2F_1$ and F_1 on the principal axis of a convex lens as shown in the diagram.



Based on the above diagram, answer the following questions.

(A) Image formed by the convex lens will be

(a) at F_2, on the other side of the lens.
(b) beyond $2F_2$, on the other side of the lens.
(c) at $2F_2$, on the other side of the lens.
(d) between F_2 and $2F_2$ on the other side of the lens.

Ans: (b)

(B) The nature and size of image thus formed will be

(a) virtual, erect and diminished. (b) real, inverted and diminished.

(c) virtual, erect and magnified. (d) real, inverted and magnified.

Ans: (d)

14. One dioptre is the power of a lens whose focal length is

(a) 2 m (b) 1 m (c) 0.5 m (d) 3 m

Ans: (b)

15. A combination of a convex lens of power +3 D and a concave lens of power –7 D has a resultant power of

(a) 10 D (b) –10 D (c) 4 D (d) –4 D

Ans: (d)

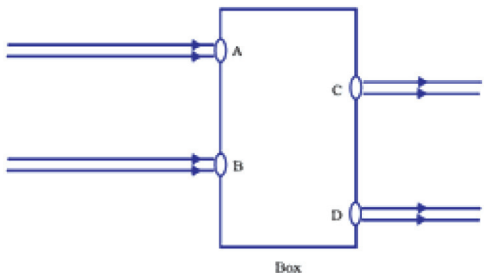
[Hint: $P = P_1 + P_2 = 3 + (-7) = -4$ D]

16. A thin lens has power of –10 dioptres. Which lens is it?

(a) Concave lens (b) Plano-convex lens (c) Convex lens (d) Concavo-convex lens

Ans: (a)

17. Beams of light are incident through the holes A and B and emerge out of the box through the holes C and D respectively as shown in the diagram.



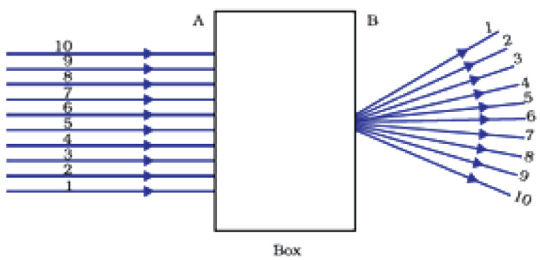
(A) Based on the above diagram, which of the following could be inside the box?

(a) A rectangular glass slab (b) A glass prism

(c) Convex lens (d) Concave lens

Ans: (a)

(B) A beam of light is incident through the holes on one side A of a box and emerges out through the holes on its opposite side B as shown in the diagram below.



The box contains

(a) a parallel-sided glass slab. (b) a glass prism.

(c) convex lens. (d) concave lens.

Ans: (c)

18. The power of a lens is +2.0 D. What should be its focal length?

(a) 100 cm (b) 80 cm (c) 50 cm (d) 200 cm

Ans: (c)

[Hint: $P = 1/f$; $2 = 1/f$; $f = ½$ m = 50 cm]

19. A convex lens of focal length 10 cm is placed in contact with a concave lens of focal length 20 cm. The focal length of the combination of lens will be

(a) 30 cm (b) 20 cm (c) 10 cm (d) 60 cm

Ans: (b)

20. The power of a convex lens of focal length 10 cm is

(a) 5 D **(b)** 0.1 D **(c)** 30 D **(d)** 10 D

Ans: **(d)**

[Hint: $P = 1/f = 1/10 = 1/ (10/100) = 10$ D]

21.

(i) Convex lens
Power +4.5 D

(ii) Concave lens
Power –2.5 D

(iii) Combination of lenses

The power and focal length of less combination are

(a) 2 D, 50 cm **(b)** 7 D, 50 cm **(c)** 4 D, 50 cm **(d)** 2 D, 2 m

Ans: **(a)**

[Hint: Power of combination of lenses, $P = P_1 + P_2 = +4.5 + (-2.5) = +2$ D

$P = 1/f$ So, $f = ½$ m = 50 cm]

22. Where is convex lens not used?

(i) To correct hypermetropia or longsightedness

(ii) To correct myopia or shortsightedness

(iii) In photographic camera

(iv) Eyelens in Galilean telescope

Choose the correct option.

(a) (i) and (iii) only **(b)** (ii) and (iv) only **(c)** (i), (iii) and (iv) only **(d)** (ii) and (iii) only

Ans: **(b)**

23. A ray of light incident on a lens parallel to its principal axis, after refraction passes through or appears to pass through

(a) its first focus. **(b)** its optical centre.

(c) its second focus. **(d)** the centre of curvature of the second surface.

Ans: **(c)**

24. If the words of the page appear enlarged or magnified on placing the lens near the book and inverted on increasing the distance between the lens and the book, then the lens is

(a) convex lens. **(b)** concave lens. **(c)** plano-convex lens. **(d)** concavo-convex lens.

Ans: **(a)**

25. A ray of light after refraction through a lens emerges parallel to the principal axis of the lens. The incident ray either passes through or appear to meet at

(a) optical centre. **(b)** first focus.

(c) second focus. **(d)** the centre of curvature of the first surface.

Ans: **(b)**

26. Where should an object be placed in front of a convex lens of focal length 3 cm to obtain a real image of size three times the size of the object, on the screen?

(a) 4 cm **(b)** 3 cm **(c)** –4 cm **(d)** –3 cm

Ans: **(c)**

[Hint: $m = v/u$; $-3 = v/u$; $v = -3u$

Using lens formula, $1/v - 1/u = 1/f$

$(1/-3u) - (1/u) = 1/3$; $-4/3u = 1/3$ $\therefore u = -4$ cm]