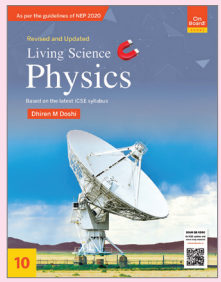
ICSE Living Science PHYSICS

Class 10



Multiple-Choice Questions

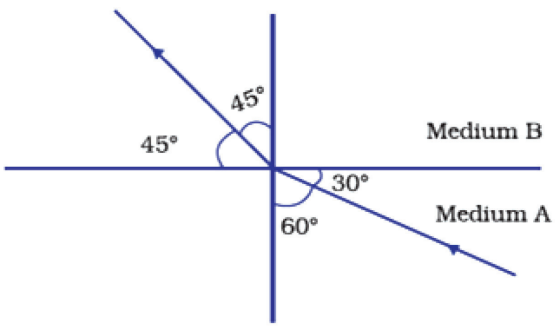
Chapter 4: REFRACTION OF LIGHT

1. The change of direction of light when travelling from one medium to another transparent medium, is called _____

(a) Reflection.
(b) Refraction.
(c) Diffraction.
(d) Polarisation.

Ans: (b)

2. The diagram shows a ray of light travelling from medium A to medium B.



Based on above diagram, answer the following questions.

(A) When the ray of light passes from one denser medium to a rarer medium then the velocity of light
(a) increases.
(b) decreases.
(c) No change.
(d) None of these.

Ans: (a)

(B) 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)

(C) Refractive index of the medium B relative to medium A is
(a) √3/√2
(b) 2/3
(c) 1/2
(d) 2

Ans: (a)

(D) The refractive index of a material does not depend upon the
(a) nature of the material of the medium.
(b) density of the medium.
(c) wavelength of the light.
(d) frequency of light.

Ans: (d)

3. A ray of light passes from a medium X to another medium Y. No refraction of light occurs if the ray of light hits the boundary of medium Y at an angle of

(a) 120° (b) 90° (c) 45° (d) 0°

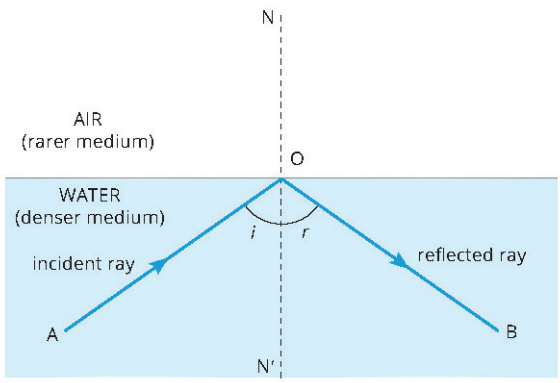
Ans: (b)

4. Which phenomenon is responsible for appearing of the Sun before actual sunrise?

(a) Diffraction of light (b) Refraction of light (c) Reflection of light (d) None of these

Ans: (b)

5. Looking at the diagram showing total internal reflection, what conclusion can you draw?



During total internal reflection

(i) no light is allowed to enter or leave a medium.

(ii) the light travels from a rarer to a denser medium at an angle of incidence greater than the critical angle.

(iii) the light travels from a denser to a rarer medium at an angle of incidence greater than the critical angle.

(iv) no light is refracted or transmitted or absorbed by the surface of separation.

Choose the correct options.

(a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (ii) and (iv)

Ans: (c)

6. Diamonds sparkle more than the glass because they have

(a) smaller critical angle than the glass. (b) larger critical angle than the glass.

(c) critical angle does not play any role. (d) None of these.

Ans: (a)

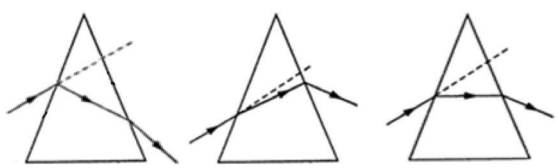
7. The refractive index of water with respect to air is 4/3. What is the refractive index of air with respect to water?

(a) 0.75 (b) 0.65 (c) 0.45 (d) None of these

Ans: (a)

[Hint: $({}_{water}\mu_{air} = 1 / {}_{air}\mu_{water} = 1/(4/3) = ¾ = 0.75)$]

8. Given figure represents three cases of a ray passing through a prism of refractive angle *A*. The case corresponding to minimum deviation is



(i) (ii) (iii)

(a) (i) (b) (ii) (c) (iii) (d) None of these

Ans: (c)

9. During refraction of light, which of the following quantities does not change?

(a) Velocity (b) Wave length (c) Frequency (d) Amplitude

Ans: (c)

10. The refractive index of water is 4/3 and that of glass is 3/2. What is the refractive index of glass with respect of water?

(a) 1.1 (b) 1.23 (c) 1.25 (d) 1.125

Ans: (d)

[Hint: $({}_{water}\mu_{glass} = {}_{air}\mu_{glass} / {}_{air}\mu_{water} = (3/2)/(4/3) = 9/8 = 1.125)$]

11. Which of the following has the highest refractive index?

(a) Glass (b) Water (c) Diamond (d) Ice

Ans: (c)

12. Speed of light in any medium decreases with increase in the refractive index. In which medium the speed of light is maximum?

(a) Water (b) Crown glass (c) Kerosene oil (d) Diamond

Ans: (a)

13. Which of the following statement/s is/are not true about the lateral displacement?

(a) Lateral displacement is directly proportional to the thickness and refractive index of the glass slab.

(b) Lateral displacement is directly proportional to the incident angle.

(c) Lateral displacement is inversely proportional to the incident angle.

(d) Lateral displacement is inversely proportional to the wavelength of the incident angle.

Ans: (c)

14. The refractive index of water is 4/3. It means that

(a) light travels in water 4/3 times faster than in air. (b) light travels in water 3/4 times slower than in air.

(c) light travels in air and in water with the same speed. (d) none of these.

Ans: (b)

15. An object in a denser medium when viewed from a rarer medium appears to be raised. The shift is maximum for

(a) red light. (b) violet light. (c) yellow light. (d) green light.

Ans: (b)

16. The critical angle for glass–air surface is

(a) 24° (b) 48° (c) 45° (d) 42°

Ans: (d)

17. Small air bubbles rising up a fish tank appear silvery when viewed from some particular angle because of the phenomenon of

(a) reflection. (b) refraction. (c) total internal reflection. (d) dispersion.

Ans: (c)

18. Which of these factors affect the critical angle?

(i) Colour (wavelength) of the light (ii) Nature of the pair of media

(iii) Frequency of light (iv) Temperature of medium

Choose the correct option.

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

Ans: (c)

19. A total reflecting prism is used for

(i) deviating a ray of light through 90°.

(ii) deviating a ray of light through 60°.

(iii) deviating a ray of light through 180°.

(iv) to erect the inverted image without deviation.

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: **(c)**

20. Which of the following is called a total reflecting prism?

(a) A prism having an angle of 90° between two reflecting surfaces and other two angles being equal to 45° each.

(b) A prism having an angle of 30° between two reflecting surfaces and other two angles being equal to 75° each.

(c) A prism having all angles equal to 60°.

(d) A prism having an angle of 70° between two reflecting surfaces and other two angles being equal to 55° each.

Ans: **(a)**

21. The critical angle for a material X is 45°. The total internal reflection will take place, if the angle of incidence in the denser medium is

(a) less than 45°. **(b)** 90°.

(c) more than 45° but not 90°. **(d)** less than 45° but not zero degree.

Ans: **(c)**

22. A ray of light is incident on the face of an equilateral prism at an angle of 90°. The ray gets totally reflected on the second refracting face. The total deviation produced in the path of ray is

(a) 60° **(b)** 90° **(c)** 120° **(d)** 180°

Ans: **(c)**