doubtnut
India's Number 1 Education App

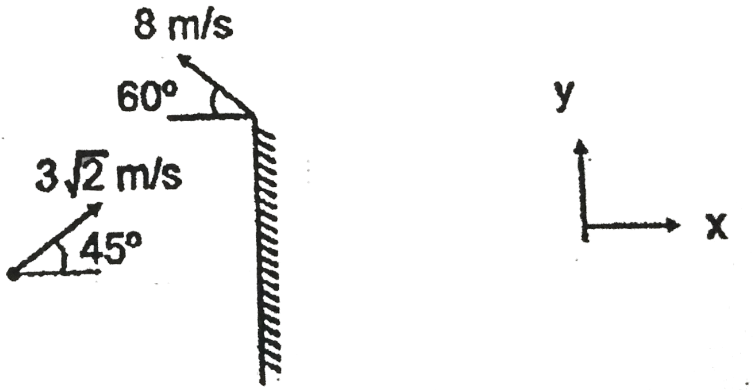
PHYSICS

RESONANCE ENGLISH

PART TEST 4

Exercise

1. In the situation shown in figure, find the velocity of image.



A. $-11\hat{i}+\left(8\sqrt{3}-3\right)\hat{j}m/s$

B. $-7\hat{i}+3\hat{j}m/s$

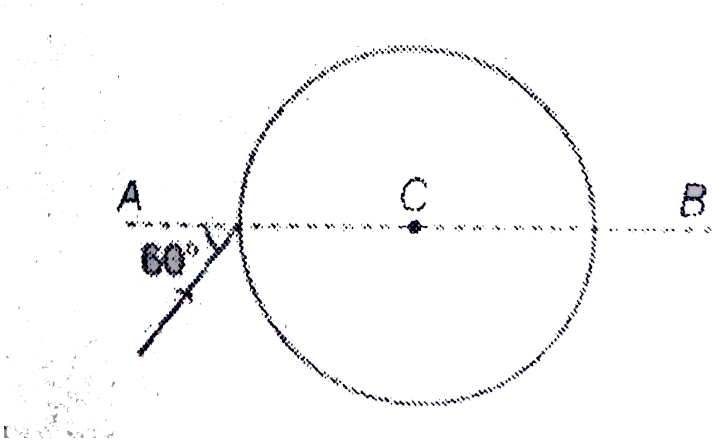
C. $-3\hat{i}+3\hat{j}m/s$

D. $-11\hat{i}+3\hat{j}m/s$

Answer: D

Watch Video Solution

2. A ray of light falls on a transparent sphere with centre at C as shown in figure. The ray emerges from the sphere parallel to line AB. The refractive index of the sphere is



A. $\sqrt{2}$

B. $\sqrt{3}$

C. $\frac{3}{\sqrt{2}}$

D. 2

Answer: B

Watch Video Solution

3. A light waves travels from glass to water. The refractive index for glass and water are $\frac{3}{2}$ and $\frac{4}{3}$ respectively. The value of the critical angle will be

A. $\sin^{-1}\left(\frac{1}{2}\right)$

B. $\sin^{-1}\left(\frac{9}{8}\right)$

C. $\sin^{-1}\left(\frac{8}{9}\right)$

D. $\sin^{-1}\left(\frac{5}{7}\right)$

Answer: C

Watch Video Solution

4. A simple microscope has a focal length of $5cm$. The magnification at the least distince of distinct vision is-

A. 1

B. 5

C. 4

D. 6

Answer: D

Watch Video Solution

5. Refractive index of water is $5/3$. A light source is placed in water at a depth of 4m. Then what must be the minimum radius of

disc placed on water surface so that the light of source can be stopped?

A. 3m

B. 4m

C. 5m

D. ∞

Answer: A

Watch Video Solution

6. A boy is trying to start a fire by focusing Sunlight on a piece of paper using an equiconvex lens of focal length 10 cm. The diameter of the Sun is $1.39 \times 10^{9} m$ and its mean distance from the earth is $1.5 \times 10^{11} m$. What is the diameter of the Sun's image on the paper?

A. $9.2 \times 10^{-4} m$

B. $6.5 \times 10^{-4} m$

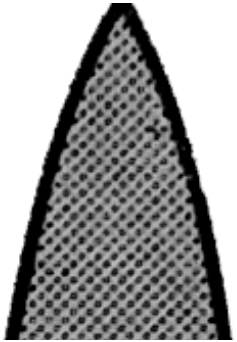
C. $6.5 \times 10^{-5} m$

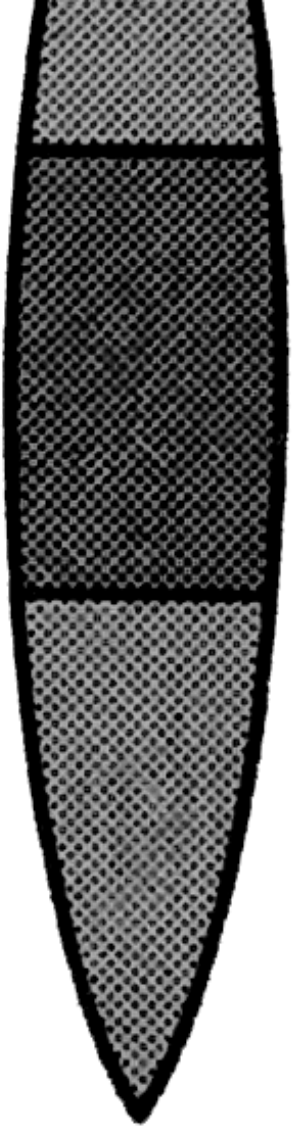
D. $12.4 \times 10^{-4} m$

Answer: A

Watch Video Solution

7. A convex lens is made up of three different materials as shown in the figure. For a point object placed on its axis, the number of images formed are





A. 5

B. 1

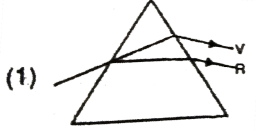
C. 3

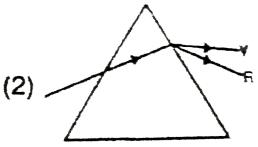
D. 4

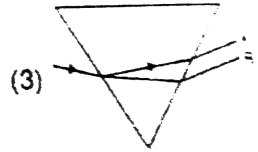
Answer: C

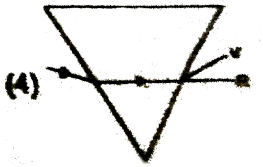
Watch Video Solution

8. Which of the following diagrams shows correctly the dispersion of white light by a prism ?

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

9. In a Fresnel biprism experiment the two positions of lens give separation between the slits as 16 cm and 9 cm respectively. The actual distance of separation is

A. 10.5 cm

B. 12 cm

C. 13 cm

D. 14 cm

Answer: B

Watch Video Solution

Watch Video Solution

10. In a compound microscope, the intermediate image is

A. virtual, errect and magnified

B. real,erect and magnified

C. real,inverted and magnified

D. virtual,erect and reduced

Answer: C

Watch Video Solution

11. The angular dispersion produced by a prism

A. increrases if the average refractive index of the prism increases

B. increases if the average refractive index increases

C. remain constant whether the average refractive index or decreases

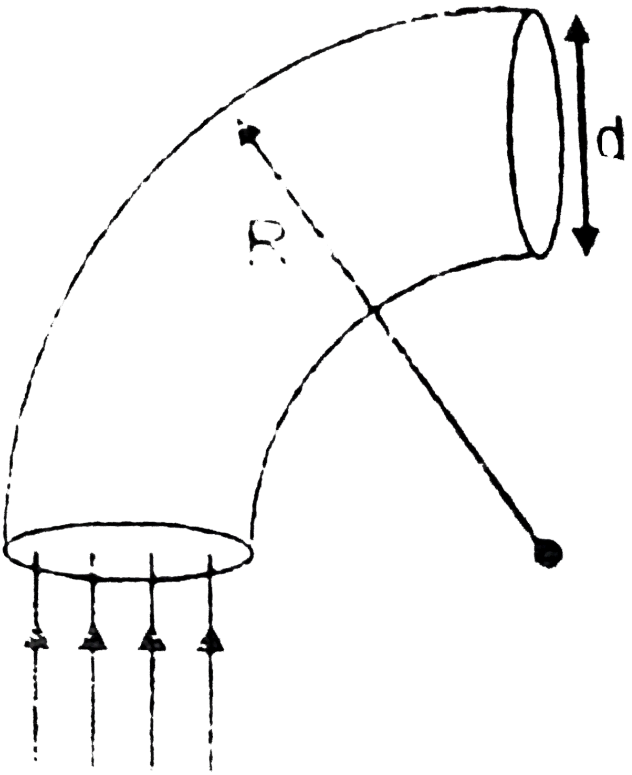
D. has no relation with average refractive index

Answer: A

Watch Video Solution

12. A cylinderical optical fibre (quarter circular shape) of refractive index $n = 2$ and diameter $d = 4mm$ is surrounded by air. A light beam is sent into the fibre along its axis as shown in figure. Then the smallest outer radius R (as shown in figure) for which no light escapes

after incident on curved surface of fibre is:



A. 2mm

B. 4mm

C. 8mm

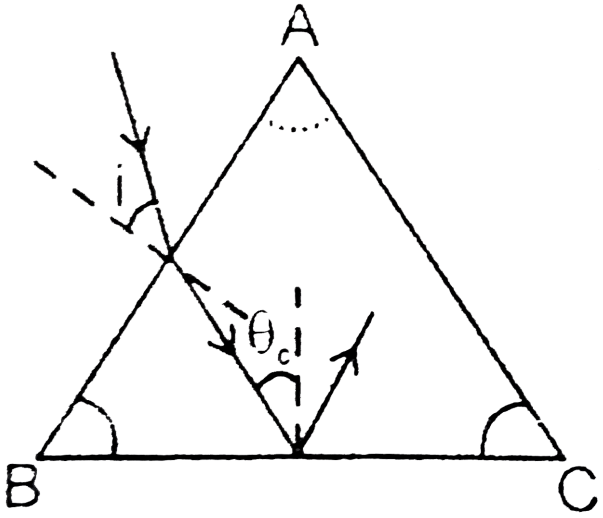
D. 6mm

Answer: C

Watch Video Solution

13. A light is incident on face AB of an equilateral glass prism ABC. After refraction at AB, the ray is incident on face BC at the angle slightly greater than critical angles so that it gets reflected from face BC and finally emerges out from face AC. Net deviation

angle of the ray is 112° anticlockwise. The angle of incidence 'i' has value:



A. 22°

B. 24°

C. 26°

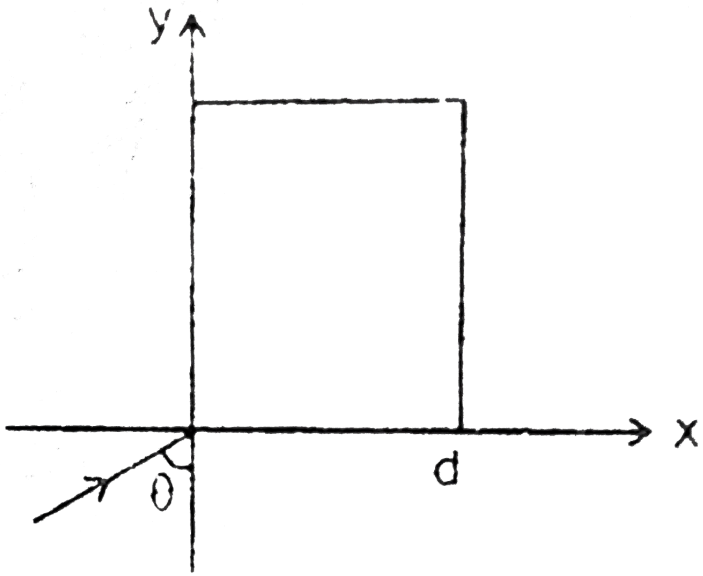
D. 28°

Answer: C

Watch Video Solution

14. A ray hits the y-axis making an angle θ with y-axis as shown in the figure. The variation of refractive index with x-coordinate is $\mu = \mu_0\left(1 - \frac{x}{d}\right)$ for $0 \leq x \leq d\left(1 - \frac{1}{\mu_0}\right)$ and $\mu = \mu_0$ for $x < 0$ where d is a positive constant. The maximum x-coordinate of the

path traced by the ray is



A. $d(1-\sin\theta)$

B. $d(1-\cos\theta)$

C. $d\sin\theta$

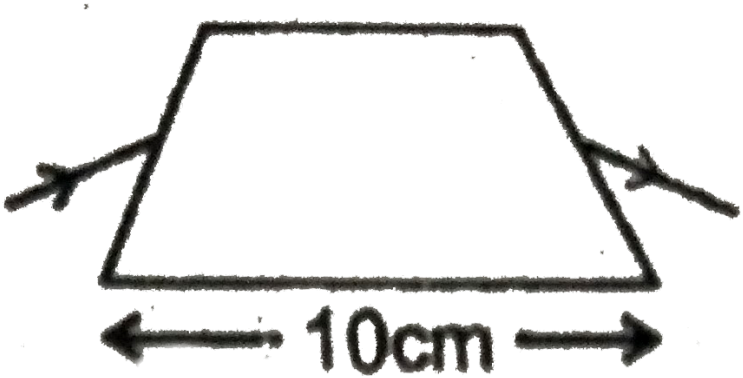
D. $d\cos\theta$

Answer: B

Watch Video Solution

15. An isosceles trapezium of reflecting material of refractive index $\sqrt{2}$ and dimension of sides being 5cm, 5cm, 10cm and 5 cm. The angle of minimum deviation by this when light

is incident from air and emerges in air is:



A. $22\frac{1}{2}.^{\circ}$

B. 45°

C. 30°

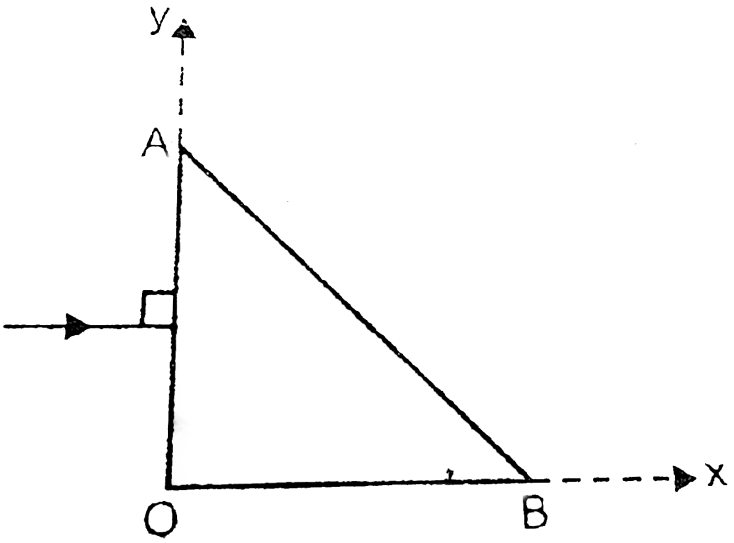
D. 60°

Answer: C

Watch Video Solution

16. A triangular medium has varying refracting index $n = n_0 + ax$, where x is the distance (in cm) along x-axis from origin and $n_0 = \frac{4}{3}$. A ray is incident normally on face OA at the mid-point of OA. The range of a so that light does not escape through face AB when it falls first time on the face $AB(OA = 4cm, OB = 3cm \text{ and } AB = 5cm)$

: (surrounding medium is air)



A. $a > \frac{1}{9}$

B. $a > \frac{2}{9}$

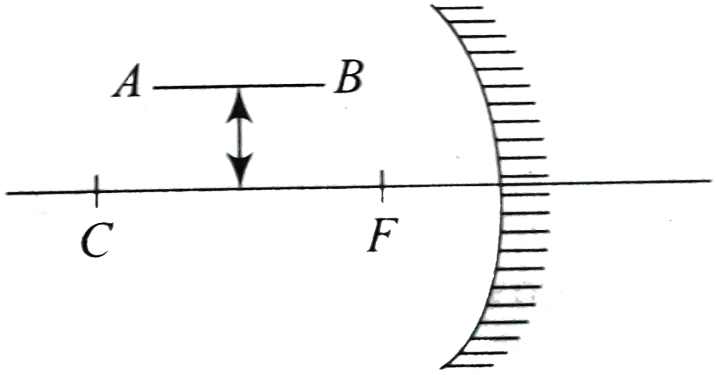
C. $a > \frac{1}{3}$

D. none of these

Answer: B

Watch Video Solution

17. An object AB is placed parallel and close to the optical axis between focus F and center of curvature C of a converging mirror of focale length f as shown in Figure. Then,



A. image of A will be closer than that of B from the mirror

B. image of AB will be parallel to the optical axis

C. image of AB will be straight line inclined to the optical axis

D. image of AB will not be straight line

Answer: A

Watch Video Solution

18. A ray of light travelling in a transparent medium falls on a surface separating the medium from air at an angle of incidence 45°. The ray undergoes total internal reflection. If n is the refractive index of the medium with respect to air, select the possible value (s) of n from the following

A. 1.3

B. 1.4

C. 1.2

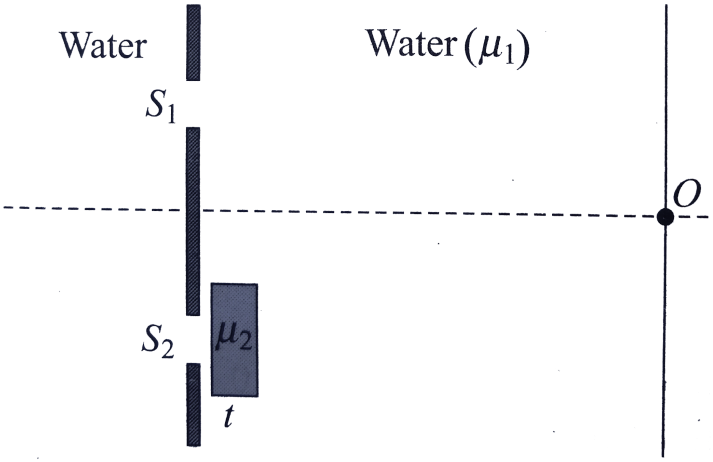
D. 1.6

Answer: D

Watch Video Solution

19. Young's double-slit experiment is conducted in water (μ_1) as shown in figure and a glass plate of thickness t and refractive index μ_2 is placed in the path of S_2. Find the

magnitude of the optical path difference at 'O'.



A. $\left|\left(\frac{\mu_2}{\mu_1}-1\right)t\right|$

B. $\left|\left(\frac{\mu_1}{\mu_2}-1\right)t\right|$

C. $|(\mu_2-\mu_1)t|$

D. $|(\mu_2-1)t|$

Answer: C

Watch Video Solution

20. Two coherent monochromatic light beams of intensities I and 4I are superposed. The maximum and minimum possible intensities in the resulting beam are

A. 5I and I

B. 5I and 3I

C. 9I and I

D. 9I and 3I

Answer: C

 Watch Video Solution

21. If yellow light emitted by sodium lamp in Young's double - slit - experiment is replaced by a monochromatic blue light of the same intensity

A. fringe width will decreases

B. fringe width will increases

C. fringe width will remain unchanged

D. fringe will becomes less intense

Answer: A

Watch Video Solution

22. What happens by the use of white light in Young's double slit experiment:

A. Bright fringe are obtained

B. Only bright and dark fringes are obtained

C. Central fringes is bright and two or three coloured and dark fringes are observed

D. none of the above

Answer: C

Watch Video Solution

23. The reflecting surface of a plane mirror is vertical. A particle is projected in a vertical plane which is also perpendicular to the

mirror. The initial speed of the particle is $10m/s$ and the angle of projection is 60° from the normal of the mirror. The point of projection is at a distance 5 m from the mirror. The particle moves towards te mirror. Just before the particle touches the mirror, the velocity of approach of the particle and the image is 2 n (in m/s) then find n.

A. 10 m/s

B. 5 m/s

C. $10\sqrt{3}m/s$

D. $5\sqrt{3}m/s$

Answer: A

Watch Video Solution

24. Astronomial telescope has two lenses of focal power 0.5D and 20D. Then its magnifying power is:

A. 10

B. 20

C. 80

D. 40

Answer: D

 Watch Video Solution

25. The plane face of a plano convex lens is silvered.If μbe the refrative index and R, the radius of curvature of curved suraface, then system will behave like a concave mirror of curvature

A. μR

B. $\frac{R}{(\mu - 1)}$

C. $\frac{R^2}{\mu}$

D. $\left[\frac{(\mu + 1)}{(\mu - 1)}\right] R$

Answer: B

Watch Video Solution

26. A vessel of depth 2 d cm is half filled with a liquid of refractive index μ_1 and the upper half with a liquid of refractive index μ_2. The

apparent depth of the vessel seen perpendicularly from about is

A. $d\left(\frac{\mu_1\mu_2}{\mu_1+\mu_2}\right)$

B. $d\left(\frac{1}{\mu_1}+\frac{1}{\mu_2}\right)$

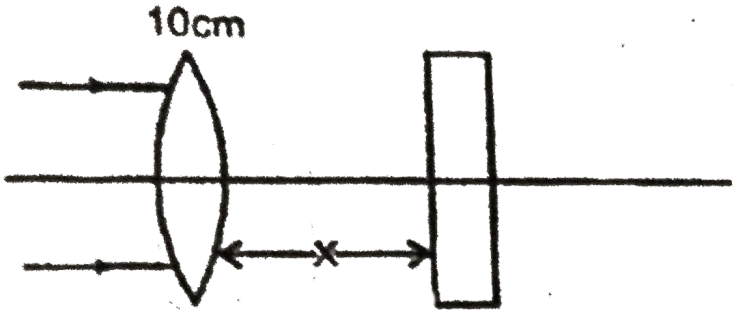
C. $2d\left(\frac{1}{\mu_1}+\frac{1}{\mu_2}\right)$

D. $2d\left(\frac{1}{\mu_1\mu_2}\right)$

Answer: B

Watch Video Solution

27. A parallel beam of light is incident on a lens of focal length 10cm. A parallel slab of refractive index 1.5 and thickness 3 cm is placed on the other side of the lens. The nature of the final image from the lens slab combination is: (Assume rays paraxial)



A. At distance of 11 cm and image is vertual if X=12 cm

B. At distance of 11 cm and image virtual if X=14 cm

C. At the Distance of 11 cm and image is virtual if X=16 cm

D. All of the above

Answer: D

Watch Video Solution

28. Wavelength of light used in an optical instrument are $\lambda_1 = 4000\text{Å}$ and $\lambda_2 = 5000\text{Å}$ then ratio of their respective resolving powers (corresponding to λ_1 and λ_2) is

A. $16:25$

B. $9:1$

C. $4:5$

D. $5:4$

Answer: D

Watch Video Solution

Watch Video Solution

29. Statement I: Thin films such as soap bubble or a thin layer of oil on water show beautiful colors when illuminated by white light.

Statement II: It happens due to the interference of light reflected form the upper surface of thin film.

A. Statement-1 is true, Statement-2: is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is true, Statement-2: is true, Statement-2 is NOT a correct explanation for Statement-1.

C. Statement-1 is true but statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: C

 Watch Video Solution

30. Statement 1: If two prisms of small apex angles are made of same material then prism of larger apex angle will produce more dispersion. Statement 2: Dispersive power of a prism is proportional to apex angle of prism.

A. Statement-1 is true, Statement-2: is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is true, Statement-2: is true, Statement-2 is NOT a correct explanation

for Statement-1.

C. Statement-1 is true but statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: C

 Watch Video Solution