PHYSICS

BOOKS - CAREER POINT

PRACTICE TEST - 5

Physics

1. A plane glass slab is kept over various coloured letters, the letter which appears least raised is -

A. blue

B. violet

C. green

D. red

Answer: D

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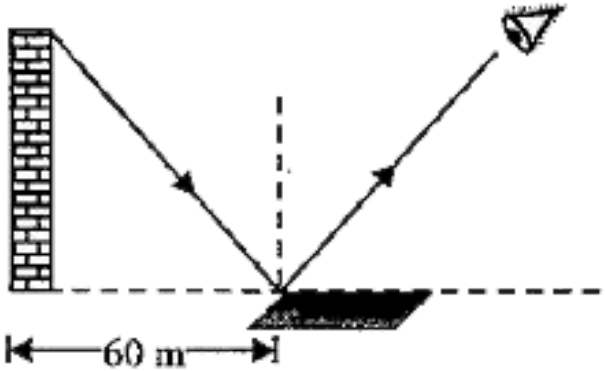
2. A plane mirror is placed horizontally on level ground at a distance of 60 m from the foot of a tower, the light ray from the top of the

tower falling just inside at the edge of the mirror suffers a deviation of 90° . The height of tower is:



A. 30 m

B. 90 m

C. 60 m

D. 120 m

Answer: B

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3. The reflective surface is given by y = 2 sin x. The reflective surface is facing positive axis. What is the least value of coordinates of the point where a ray parallel to positive x-axis becomes parallel to positive y-axis after reflection ?

A. $\left(\frac{\pi}{3}, \sqrt{3}\right)$

B. $\left(\frac{\pi}{2}, \sqrt{2}\right)$

C. $\left(\frac{\pi}{3}, \sqrt{2}\right)$

D. $\left(\frac{\pi}{4}, \sqrt{3}\right)$

Answer: A

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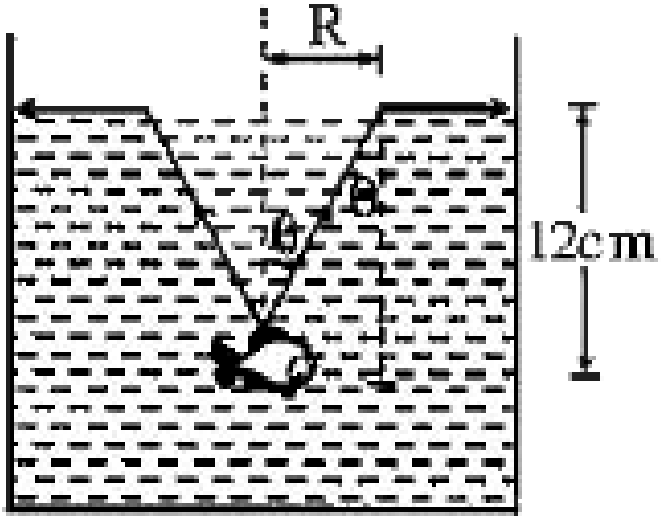
4. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is 4/3 and the fish is 12 cm below the surface then radius of

circle in cm is-



A. $12 \times 3 \times \sqrt{5}$

B. $\frac{12 \times 3}{\sqrt{5}}$

C. $12 \times 3 \times \sqrt{7}$

D. $\frac{12 \times 3}{\sqrt{7}}$

Answer: D

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5. The distance between object and its erect but diminished image formed due to a spherical mirror is 3 times the distance between image and the focus while distance between object and focus is 2u. If the image is half in size of the object, find the distance of the object from the mirror:

A. $\frac{3u}{2}$

B. $\frac{u}{2}$

C. u

D. $\frac{3u}{4}$

Answer: C

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6. Diameter of a plano-convex lens is 6 cm and thickness at the centre is 3 mm. If the speed of

light in the material of the lens is 2×10^8 m/s, the de focal length of the lens is tower is:

A. 15 cm

B. 20 cm

C. 30 cm

D. 10 cm

Answer: C

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7. A man standing infront of a concave spherical mirror of radius of curvature 120 cm sees an erect image of his face four times its natural size. Then the distance of the man from the mirror is -

A. 180 cm

B. 300cm

C. 240cm

D. 45cm

Answer: D

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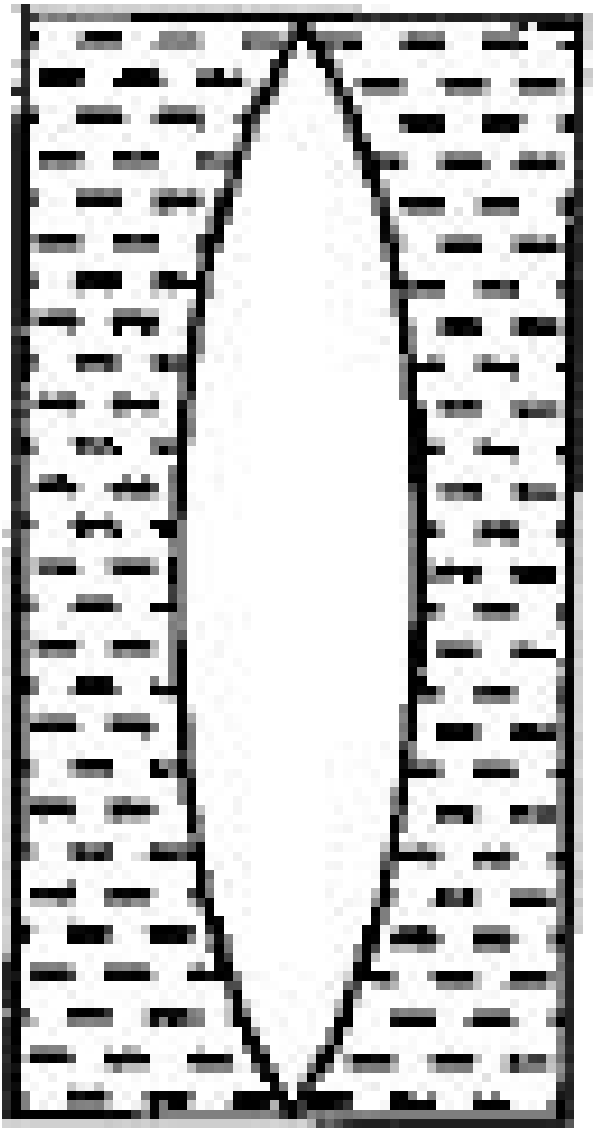
8. As shown in figure, a converget lens is placed inside a cell filled with liquid. The lens has focal length +20 cm when in air and its material has refractive index 1.50. If the liquid has refractive index 1.60, the focal length of

the system is -



A. +80 cm

B. -80 cm

C. -24 cm

D. -100 cm

Answer: D

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9. A convex lens forms an image of an object on a screen 30 cm from the lens. When the lens is moved 90 cm towards the object the

image is again formed on the screen. Then, the focal length of the lens is

A. 13 cm approximately

B. 23 cm approximately

C. 33 cm approximately

D. 40 cm approximately

Answer: D

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10. A cubical room is formed with 6 plane mirrors. An insect moves along diagonal of the floor with uniform speed. The velocity of its image in two adjacent walls are $20\sqrt{2}$ cm/s. Then the velocity of image formed by the roof is

A. 20 cm/sec

B. 40 cm/sec

C. $20\sqrt{2}$ cm/sec

D. $10\sqrt{2}$ cm/sec

Answer: B

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11. Angle of a prism is A and its one surface is silvered. Light rays falling at an angle of incidence of 2A on first surface relum back through the same path after suffering reflection at the second silvered surface. Refractive index of the material is -

A. 2 sin A

B. 2 cos A

C. (1/2)cos A

D. tan A

Answer: B

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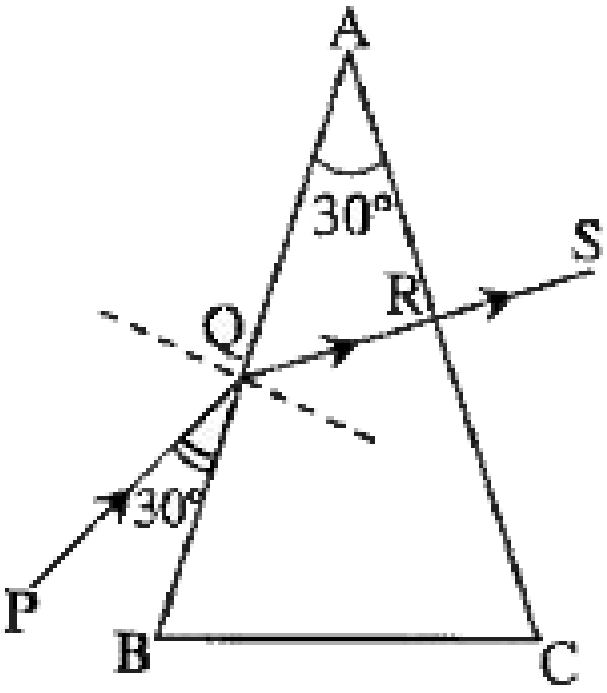
12. In the diagram, a prism of angle 30° is used. A ray PQ is incident as shown. An emergent ray RS emerges perpendicular to the

second face. The angle of deviation is -



A. 0°

B. 60°

C. 30°

D. 90°

Answer: C

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13. A fly is sitting on the objective of a telescope pointed towards the moon. What effect is expected in a photograph of the moon taken through the telescope ?

A. The entire field of vision is blocked

B. There is an image of the fiy on the photograph

C. There is no effect at all

D. There is a reduction in the intensity of image

Answer: D

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14. A cylindrical lens is required to correct

A. myopia

B. presbyopia

C. hypermetropia

D. astigmatism

Answer: D

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15. An astronomical telescope of ten-fold angular magnification has length of 44 cm. The focal length of the objective is -

A. 4 cm

B. 40 cm

C. 44 cm

D. 440 cm

Answer: B

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16. A source of 500 candela is placed at the centre of a piece of spherical surface of area $0.5m^2$. If the radius of surface be 5 m, what is the luminous flux through the surface?

A. 5 lumen

B. 10 lumen

C. 25 lumen

D. 50 lumen

Answer: B

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17. An illuminance of 2.5×10^5 lumen/metre^2 is produced by sunlight falling normally on the surface of the earth. The distance of the earth

from the sun is 1.5×10^8 km. The lumen flux of the sun is

A. 3.5×10^{28} lumen

B. 3.56×10^{27} lumen

C. 7.065×10^{28} lumen

D. 8×10^{29} lumen

Answer: C

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18. In an interference pattern produced by two identical slits, the intensity at the site of central maximum is I. The intensity at the same spot when either of the two slits is closed is I_0 . We must have -

A. $I = I_0$

B. $I = 2I_0$

C. $I = 4I_0$

D. I and I_0 are not related

Answer: C

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19. The angular fringe width of fringes formed with sodium light of wavelength 5890 Å is 0.20° . If the whole arrangement is immersed in water, then the angular width of the fringes will become -

A. 0.11°

B. 0.15°

C. 0.22°

D. 0.30°

Answer: B

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20. Two sources give interference pattern which is observed on a screen, D distance apart from the sources. The fringe width is 2β . If the distance D is now doubled, then the fringe width will -

A. become β

B. become $\frac{\beta}{2}$

C. 4β

D. remain the same

Answer: C

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21. The fringe width in Young's double slit experiment increases when -

A. wavelength increases

B. distance between source and screen decreases

C. distance between slits increases

D. the width of the slits increases

Answer: A

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22. If light of wavelength 6000 Å is used in fraunhoffer single slit diffraction experiment

with slit width 12×10^{-7} m. Then angular width of central maxima is

A. 30°

B. 60°

C. 90°

D. none of these

Answer: B

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23. The first diffraction minimum due to a single slit diffraction is at $\theta = 30^\circ$ for a light of wavelength 5000 Å. The width of the slit is -

A. $5 \times 10^{-5} cm$

B. $1.0 \times 10^{-4} cm$

C. $2.5 \times 10^{-5} cm$

D. $1.25 \times 10^{-5} cm$

Answer: B

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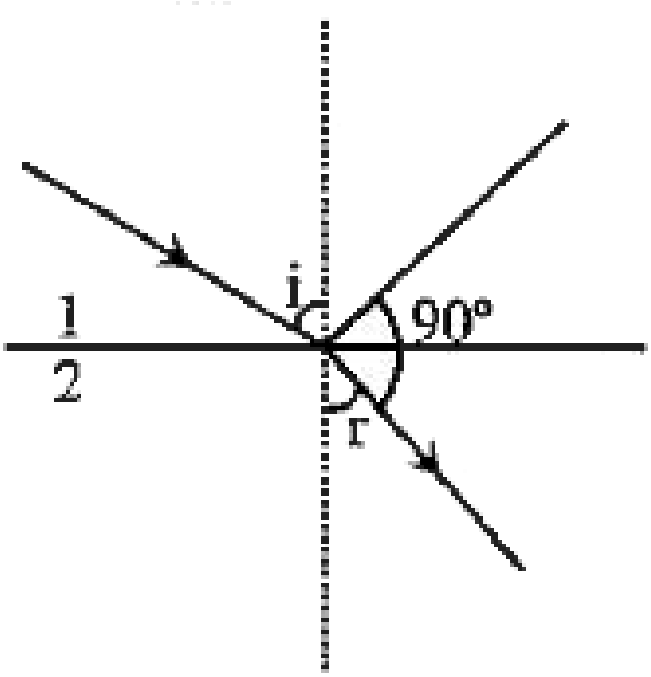
24. Light incident on a surface separating two media is partly reflected and partly refracted as shown in the figure. Then:



A. $\sin i = \dfrac{\mu_2}{\left(\mu_1^2 + \mu_2^2\right)^{1/2}}$

B. $\tan i = \dfrac{\mu_1}{\mu_2}$

C. $\sin i = \mu_1 \mu_2$

D. $\sin i = \frac{\mu_2}{\mu_1}$

Answer: A

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25. The angle of incidence at which reflected light is totally polarised for reflection from air to glass (refractive index n) is -

A. $\sin^{-1} n$

B. $\left(\sin^{-1}(1/n)\right.$

C. $\tan^{-1}(1/n)$

D. $\tan^{-1}(n)$

Answer: D

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26. The maximum number of possible interference maxima for slit separation equal to twice the wavelength in Young's double slit experiment is

A. infinite

B. five

C. three

D. zero

Answer: B

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27. Two periodic waves of intensities I_1 and I_2 pass through a region at the same time in the

same direction. The sum of the maximum and minimum intensities is -

A. $\left(\sqrt{I}_1 - \sqrt{I}_2\right)^2$

B. $2(I_1 + I_2)$

C. $I_1 + I_2$

D. $\left(\sqrt{I}_1 + \sqrt{I}_2\right)^2$

Answer: B

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28. The relationship between phase difference $\Delta\phi$ and. the path difference Δx between two interfering waves is given by

A. $\Delta x = \left(\frac{\lambda}{2\pi}\right)\Delta\phi$

B. $\Delta x = \left(\frac{2\pi}{\lambda}\right)\Delta\phi$

C. $\Delta\phi = \left(\frac{\lambda}{\pi}\right)\Delta x$

D. $\Delta\phi = (2\pi)\Delta x$

Answer: A

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29. A cavity of the shape of equiconvex lens is cut in a slab of refractive index μ. It is filled with different liquids of refractive indices μ_1 and μ_2 so that if once it behave as convergent lens with liquid of refractive index μ_1 , it behaves as divergent lens with another liquid of same focal length. Find μ_2:

A. $2\mu - \mu_1$

B. $2\mu_1$

C. $2\mu / \mu_1$

D. $\mu_1 / 2\mu$

Answer: A

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30. A concave mirror of focal length 'f_1 ' is placed at a distance of 'd' from a convex lens of focal length 'f_2 '. A beam of light coming from infinity and falling on this convex lens-concave mirror combination returns to infinity. The distance d' must equal -

A. $f_1 + f_2$

B. $-f_1 + f_2$

C. $2f_1 + f_2$

D. $-2f_1 + f_2$

Answer: C

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31. The correct formula for fringe visibility is -

A. $V = \frac{I_{\max} - I_{\min}}{I_{\max} + I_{\min}}$

B. $V = \dfrac{I_{\max} + I_{\min}}{I_{\max} - I_{\min}}$

C. $V = \dfrac{I_{\max}}{I_{\min}}$

D. $V = \dfrac{I_{\min}}{I_{\max}}$

Answer: A

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32. The correct relation between the size of the obstacle and wavelength of light in order to observe the diffraction event is -

A. $\frac{a}{\lambda} = 1$

B. $\frac{a}{\lambda} = 0$

C. $\frac{a}{\lambda} = \infty$

D. $\frac{a}{\lambda} = 150$

Answer: A

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33. A ray of light strikes a glass plate at an angle of 60° . If the reflected and refracted

rays are perpendicular to each other, the index of refraction of glass is -

A. $\frac{1}{2}$

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

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

D. 1.732

Answer: D

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34. If length of an optically active solution is / decimeters and concentration is c gram/c.c., its specific rotation is -

A. θ / lc

B. lc / θ

C. $\frac{\theta l}{c}$

D. $\frac{\theta c}{l}$

Answer: A

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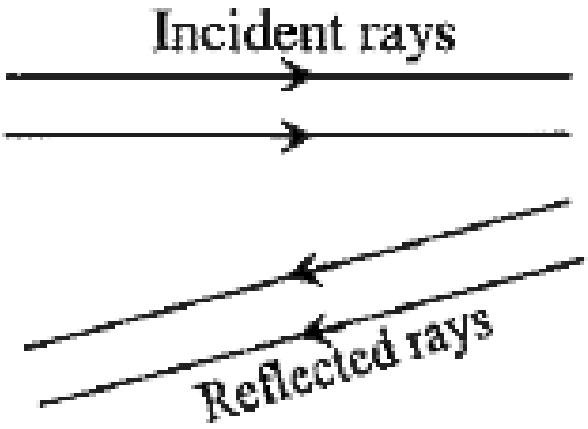
35. Figure shows two parallel rays incident on a mirror. They are reflected as parallel rays as shown in the same figure. What is the nature of the mirror?



A. Plane

B. Convex

C. Concave

D. Parabolic

Answer: A

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36. The angle of minimum deviation for a thin prism when in air and when dipped in water has a ratio :

A. $\frac{1}{4}$

B. $\frac{8}{2}$

C. $\frac{1}{2}$

D. none of these

Answer: D

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37. Two thin lenses are in contact and the focal length of the combination is 80 cm. If the focal length of one lens is 20 cm, then the power of the other lens will be

A. 1.66 D

B. 4.00 D

C. - 100 D

D. -3.75 D

Answer: D

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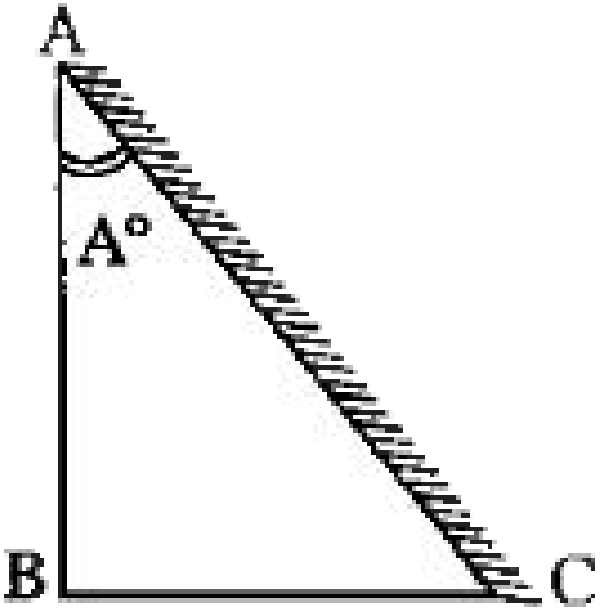
38. Refractive index of prism is $\sqrt{3}$. The maximum value of angle A of prism so that a ray of light incidenting on face AB retraces its

path is -



A. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

B. $\sin^{-1}\sqrt{3}$

C. $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$

D. $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

Answer: D

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39. A double convex lens made of glass of refractive index 1.6 has radius of curvature 15 cm each. The focal length of this lens when immersed in a fluid of refractive index 1.63 is

A. -40.75 cm

B. + 407.5 cm

C. 125 cm

D. 25 cm

Answer: B

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40. An achromatic convergent lens of focal length +20 cms is made of two lenses (in contact) of materials having dispersive powers in the ratio of 1: 2 and having focal lengths f_1 and f_2 . Which of the following is true ?

A. $f_1 = 10cms, f_2 = -20cms$

B. $f_1 = 20cms, f_2 = 10cms$

C. $f_1 = -10cms, f_2 = -20cms$

D. $f_1 = 20cms, f_2 = -10cms$

Answer: A

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41. A simple telescope, consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focussed on a distant object in such a way that parallel rays

emerge from the eye lens. If the object subtends an angle of 2° at the objective, the angular width of the image is

A. 10°

B. 24°

C. 50°

D. $(1/6)^\circ$

Answer: B

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42. A man's near point is 0.5 m and far point is 3 m. Power of spectacle lenses required for (i) reading purposes, (ii) seeing distant objects, respectively, are -

A. -2D and + 3D

B. + 2D and 3D

C. + 2D and -0.33D

D. -2D and + 0.33D

Answer: C

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43. A concave mirror of focal length f (in air) is immersed in water (μ = 4/3). The focal length of the mirror in water will be

A. f

B. $(4/3)f$

C. (3/4) f

D. (7/3) f

Answer: A

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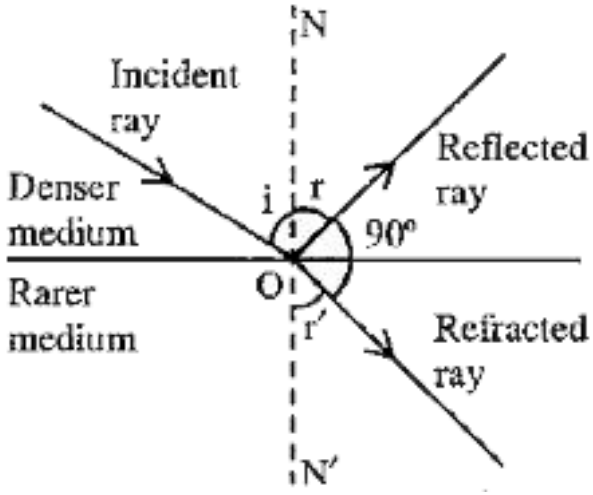
44. A ray of light from a denser medium strikes a rarer medium at an angle of incidence i as shown in figure. Refracted and reflected rays make an angle of 90° with each other. Angle of reflection and refraction are r and r'. Then critical angle is -



A. $\sin^{-1}(\sin i)$

B. $\sin^{-1}(\sin r)$

C. $\sin^{-1}(\cos i)$

D. $\sin^{-1}(\tan r)$

Answer: D

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45. Nature of the final image in a compound microscope is -

A. Virtual, inverted

B. Virtual, erect

C. Real, erect

D. None of these

Answer: A

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