PHYSICS

BOOKS - CENGAGE PHYSICS (ENGLISH)

RAY OPTICS

Dpp 1 1

1. For a concave mirrorr, if real image is formed the graph between $\frac{1}{u}$ and $\frac{1}{v}$ is of the form

A. 

B. 

C. 

D. 

Answer: A

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2. In an experiment to find the focal length of a concave mirror a graph is drawn between

the magnitudes of u and v. The graph looks like

A. 

B. 

C. 

D. 

Answer: C

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3. The graph shown part of variation of v with change in u for a concave mirror. Points plotted above the point P on the curve are for values of v

A. Smaller than f

B. Smaller than 2 f

C. Larger than 2f

D. Larger than f

Answer: C

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4. As the position of an object (u) reflected from a concave mirror is varied, the position of the image (v) also varies. By latting the u changes from 0 to $+\infty$ the graph between v versus u will be

A. 

B. 

C. 

D. 

Answer: A

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5. The graph between u and v for a convex mirror is

A. 

B. 

C. 

D. 

Answer: A

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6. A convergent beam of light is incident on a convex mirror so as to converge to a distance 12 cm from the pole of the mirror. An inverted image of the same size is formed coincident with the virtual object. What is the focal length of the mirror ?

A. 24 cm

B. 12 cm

C. 6 cm

D. 3 cm

Answer: C

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7. A thin rod of 5 cm length is kept along the axis of a concave mirror of 10 cm focal length such that its image is real and magnified and

one end touches to rod. Its magnification will be

A. 1

B. 2

C. 3

D. 4

Answer: B

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8. A square wire of side $3.0cm$ is placed $25cm$ away from a concave mirror of focal length $10cm$. What is the area enclosed by the image of the wire ? The centre of the wire is on the axis of the mirror, with its two sides normal to the axis.

A. $4cm^2$

B. $6cm^2$

C. $16cm^2$

D. $36cm^2$

Answer: A

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9. A piece of wire bent into an L shape with upright and horizontal portion of equal lengths 10 cm each is placed with the horizontal portion along the axis of the concave mirror towards pole of mirror whose radius of curvature is 10 cm. If the bend is 20 cm from the pole of the mirror, then the ratio

of the lengths of the images of the upright and horizontal portion of the wire is

A. $1:2$

B. $3:1$

C. $1:3$

D. $2:1$

Answer: B

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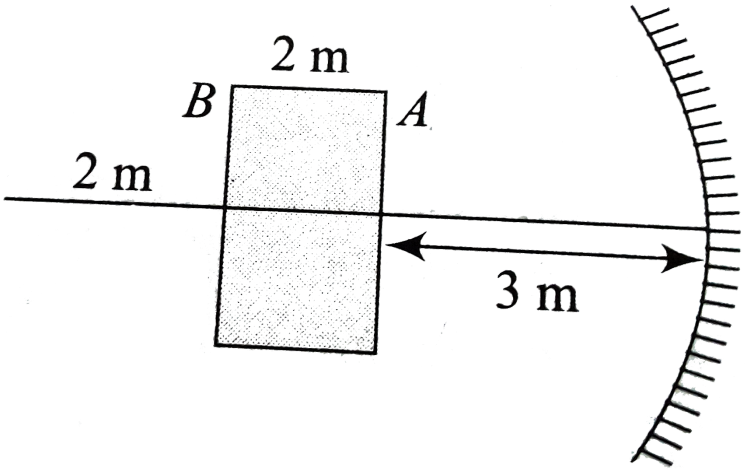
10. A cube of side 2m is placed in front of a concave mirror of focal l ength 1m with its face A at a distance of 3m and face B at a distance of 5m form the mirror. The distance between the images of faces A and B and heights of images of A and B are , repectively,



A. 1 m, 0.5 m, 0.25

B. 0.5 m, 1 m, 0.25 m

C. 0.5 m, 0.25 m , 1 m, 0.5

D. 0.25 m 1 m, 0.5 m

Answer: D

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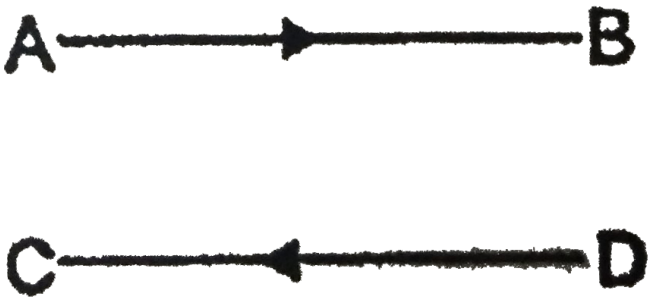
11. AB is an incident beam of light and CD is a reflected beam (the number of reflections for this may be 1 or more than 1) of light. AB and

CD are separated by some distance (may be large). It is possible by placing what type of mirror on the right side.



A. one plane mirror

B. one concave mirror

C. one convex mirror

D. none of these

Answer: B

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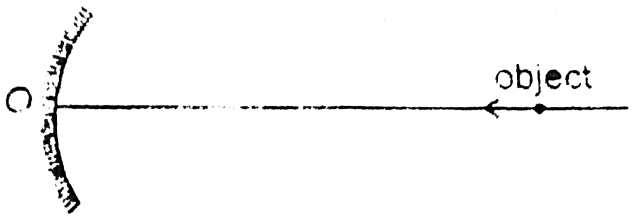
12. A point object is moving along principal axis of concave mirror with uniform velocity towards pole. Initially the object is at infinite distance from pole right side of the mirror as shown. Before the object collides with mirror, the number of times a which the distance

between object and its image is $40cm$ are.



A. one time

B. two times

C. three times

D. data insufficient

Answer: C

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13. A real object is placed infront of a convex mirror (focal length f). It moves towards the mirror, the image also moves. If $V_i =$ speed of image and $V_0 =$ speed of the object and u is the distance of object from mirror along principal axis, then

A. $V_i \leq V_0$ if $|u| < |F|$

B. $V_i > V_0$ if $|u| > |F|$

C. $V_i < V_0$ if $|u| > |F|$

D. $V_i = V_0$ if $|u| = |F|$

Answer: A::C

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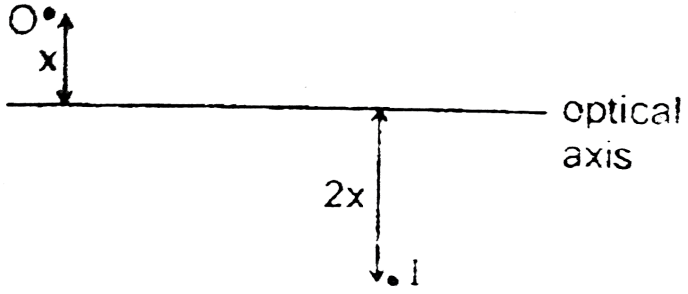
14. The positions of the object O (real or virtual) and the image I(real or virtual) with respect to the optical axis of a spherical mirror is shown. Then select the possible mirror and its position to realise it.



A. concave mirror closer to object

B. concave mirror closer to image

C. convex mirror closer to object

D. convex mirror closer to image

Answer: A::C

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Matching Column Type

1. Ratio of amplitude for two wave is 1:4 .Find the ratio of intensity?

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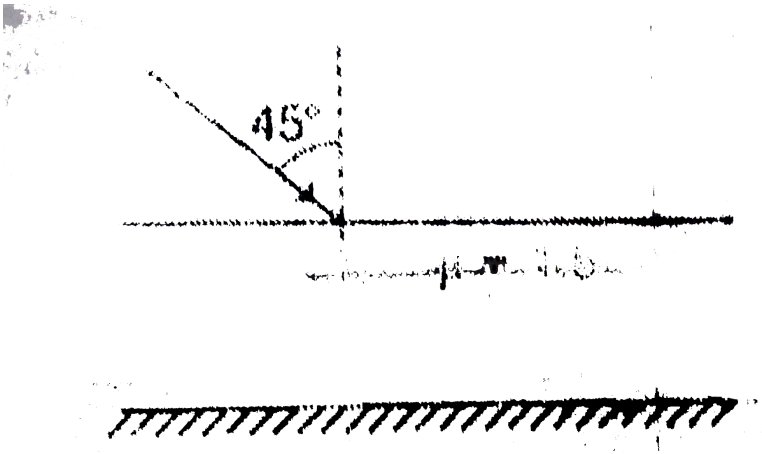
Dpp 1 2

1. One side of a glass slab is silvered as shown. A ray of light is incident on the other side at angle of incidence $i = 45^\circ$. Refractive index of glass a is given as 1.5. The diviation of the ray

of light from its initial path when it comes out of the slab is



A. 90°

B. 180°

C. 120°

D. 45°

Answer: A

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2. When the rectangular metal tank is filled to the top with an unkown liquid, as observer with eyes level with the top of the tank can just see the corner E, a ray that refracts towards the observer at the top surface of the liquid is shown. The refractive index of the liquid will be

A. 1.2

B. 1.4

C. 1.6

D. 1.9

Answer: A

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3. A transparent cube of $15cm$ edge contains a small air bubble. Its apparent depth when viewed through one face is $6cm$ and when

viewed through the opposite face is $4cm$. Then the refractive index of the material of the cube is

A. 2.0

B. 2.5

C. 1.6

D. 1.5

Answer: D

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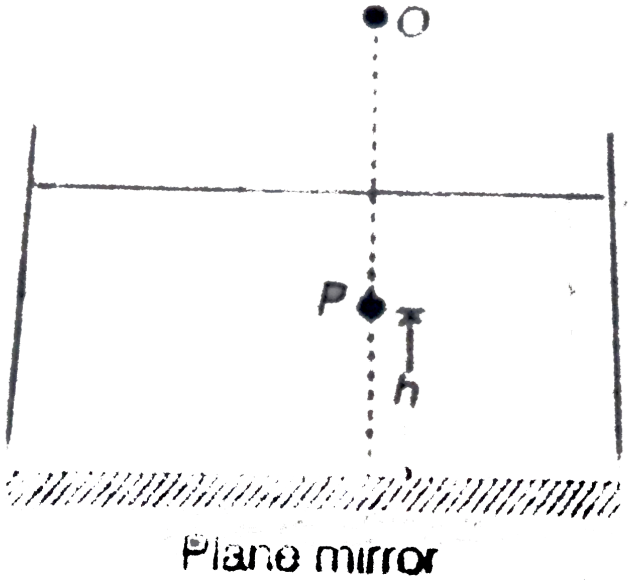
4. A plane mirror is placed at the bottom of a tank containing a liquid of refractive index μ. P is a small object at a height h above the mirror. An observer observes P and its image in the mirror. The apparent distance between two will be



A. $2\mu h$

B. $\frac{2h}{\mu}$

C. $\frac{2h}{\mu - 1}$

D. $h\left(1 + \frac{1}{\mu}\right)$

Answer: B

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5. One face of a rectangular glass plate 6 cm thick is silvered. An object held 8 cm in front of the first face, forms an image 12 cm behind the

silvered face. The refractive index of the glass is

A. 0.4

B. 0.8

C. 1.2

D. 1.6

Answer: C

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6. A concave mirror is placed at the bottom of an empty tank with face upwards and axis vertical. When sunlight falls normally on the mirror, then it is focused at distance of 32 cm from the mirror. If the tank filled with water ($\mu = \frac{4}{3}$) upto a height of

A. 16 cm above water level

B. 9 cm above water level

C. 24 cm below water level

D. 9 cm below water level

Answer: B

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7. A slab of glass, of thickness 6 cm and refractive index μ=1.5 is placed in front of a concave mirror as shown in the figure. If the radius of curvature of the mirror is 40 cm and the reflected image coincides with the object, then the distance of the object from the mirror is

A. 30 cm

B. 22 cm

C. 42 cm

D. 28 cm

Answer: C

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8. A ray of light travels from an optically denser to rarer medium. The critical angle of

the two media is C. The maximum possible deviation of the ray will be

A. $\left(\frac{\pi}{2} - C\right)$

B. 2C

C. $\pi - 2C$

D. $\pi - C$

Answer: C

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9. A point source of light S is placed at the bottom of a vessel containg a liquid of refractive index $5/3$. A person is viewing the source from above the surface. There is an opaque disc of radius $1cm$ floating on the surface. The centre of the disc lies vertically above the source S. The liquid from the vessel is gradually drained out through a tap. What is the maximum height of the liquid for which the source cannot at all be seen from above?

A. 1.50 cm

B. 1.64 cm

C. 1.33 cm

D. 1.86 cm

Answer: C

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10. Light enters at an angle of incidence in a transparent rod of refractive index n. For what value of the refractive index of the material of the rod the light once entered into it will not

leave it through its lateral face whatsoever be the value of angle of incidence.

A. $n > \sqrt{2}$

B. n=1

C. n=1.1

D. n=1.3

Answer: A

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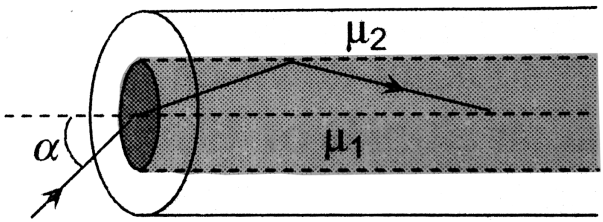
11. An optical fibre consists of core of μ_1 surrounded by a cladding of $\mu_2 < \mu_1$. A beam of light enters from air at an angle α with axis of fibre. The highest α for which ray can be travelled through fibre is



A. $\cos^{-1}\sqrt{\mu_2^2 - \mu_1^2}$

B. $\sin^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

C. $\tan^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

D. $\sec^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

Answer: B

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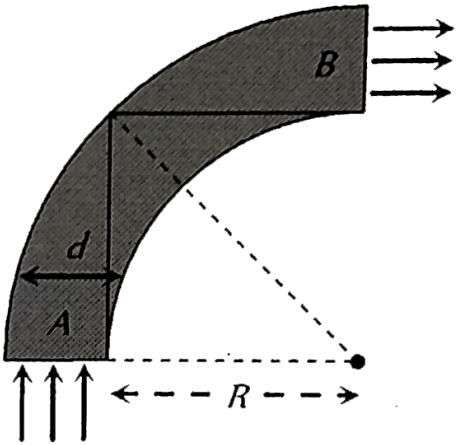
12. A rod of glass $(\mu = 1.5)$ and of square cross section is bent into the shape shown in the figure. A parallel beam of light falls on the plane flat surface A as shown in the figure. If d is the width of a side and R is the radius of circular arc then for what maximum value of

$\frac{d}{R}$ light entering the glass slab through surface A emerges from the glass through B



A. 1.5

B. 0.5

C. 1.3

D. None of these

Answer: B

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13. A ray of light travels from a medium of refractive index μ to air. Its angle of incidence in the medium is i, meansured from the normal to the boundary , and its angle of deviation is δ. δ is plotted against i. Which of the following best represents the resulting curve ?

A. 

B. 

C. 

D. 

Answer: A

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14. The apparent depth of water in cylindrical water tank of diameter 2R is reducing at the rate of x cm/min when water is being drained

out at a constant rate. The amount of water drained in cc/min is (n_1=refractive index of air, n_2=refractive index of water)

A. $x\pi R^2 n_1 / n_2$

B. $x\pi R^2 n_2 / n_1$

C. $2\pi R n_1 / n_2$

D. $\pi R^2 x$

Answer: B

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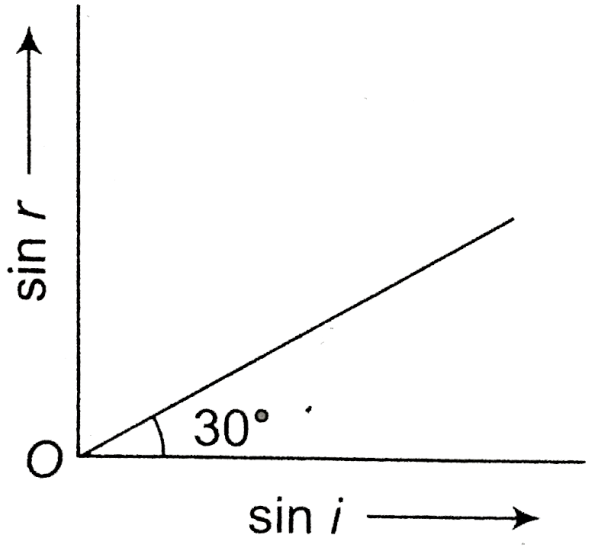
15. When light is incident on a medium at angle i and refracted into a second medium at an angle r, the graph of $\sin r$ versus $\sin i$ is as shown. From this one can conclude that



(i) the velocity of light in second medium is $\sqrt{3}$ times the velocity of light in the first medium

(ii) the velocity of light in the first medium is

$\sqrt{3}$ times the velocity of ligth in second medium

(iii) the critical angle of the two media is given by $\sin i_C = 1\sqrt{3}$

(iv) the critical anlge of the two media is given by $\sin i_C = 1\sqrt{2}$

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Dpp 1 3

1. A parallel paraxial beam of light is incident on the arrangement as shown $(\mu_A = 3/2, \mu_B = 4/3)$. The two spherical surfaces are very close and each has a radius of curvature 10 cm. Find the point where the rays are focussed. (w.r.t. point of entry)

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2. A ray of light falls on the surface of a spherical glass paper weight making an angle α with the normal and is refracted in the medium at an angle β. The angle of deviation of the emergent ray from the direction of the incident ray is :

A. $(\alpha - \beta)$

B. $2(\alpha - \beta)$

C. $(\alpha - \beta)/2$

D. $(\beta - \alpha)$

Answer: B

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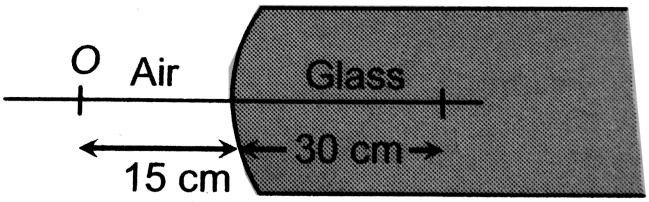
3. A poinit object O is placed in front of a glass rod having spherical end of radius of curvature $30cm$. The image would be formed at



A. 30 cm left

B. Infinity

C. 1 cm to the right

D. 18 cm to the left

Answer: A

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4. A glass hemisphere of radius 0.04 m and refractive index of the material 1.6 is placed centrally over cross mark on a paper (i) with the flat face, (ii) with the curved face in contact

with the paper. In each case, the cross mark is viewed directly from above. The position of the images will be

A. 0.04 m from the flat face, (ii) 0.025 m from the flat face

B. (i) At the same position of the cross mar, (ii) 0.025 m below the flat face

C. (i) 0.025 m from the flat face, (ii) 0.04 m from the flat face

D. For both (i) and (ii) 0.025 m from the highest point of the hemisphere

Answer: B

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5. An air bubble in sphere having 4 cm diameter appears 1 cm from surface nearest to eye when looked along diameter If $._a \mu_8 = 1.5$, the distance of bubble from refracting surface is

A. $1.2cm$

B. $3.2cm$

C. $2.8cm$

D. $1.6cm$

Answer: A

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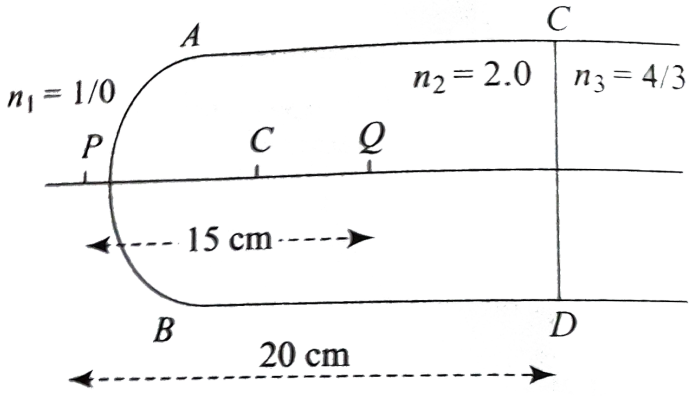
6. A slab of a material of refractive index 2 shown in the figure, has a curved surface APB of radius of curvature 10cm and a plane

surface CD. On the left oa APB is air and on the right of CD is water with refractive indices as given in the figure. An object O is placed at a distance of 15cm from the pole P as shown. The distance of the final image of O from P, as viewed from the left is _____ cm.



A. $20cm$

B. $30cm$

C. $40cm$

D. $50cm$

Answer: B

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7. A parallel beam of light emerges from the opposite surface of the sphere when a point source of light lies at the surface of the sphere. The refractive index of the sphere is

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

B. $\frac{5}{3}$

C. 2

D. $\frac{5}{2}$

Answer: C

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8. In a thin spherical fish bowl of radius 10 cm filled with water of refractive index $4/3$ there is a small fish at a distance of 4 cm from the

centre C as shown in the figure. Where will the image of fish appears, if seen from E.

A. $5.2cm$

B. $7.2cm$

C. $4.2cm$

D. $3.2cm$

Answer: A

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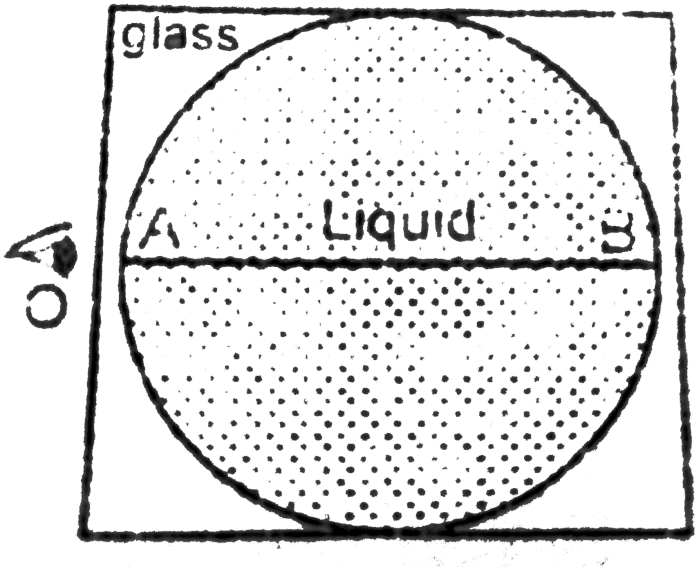
9. The observer 'O' sees the distance AB as infinitely large. If refractive index of liquid is μ_1 and that of glass is μ_2, then $\frac{\mu_1}{\mu_2}$ is :



A. 2

B. $1/2$

C. 4

D. None of these

Answer: A

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10. The first factor length f_1 for refraction at a spherical surface is defined as the value of u corresponding to $v = \infty$ (as shown) with refractive indices of two mediums, as n_1 and n_2. The second focal length f_2 is defined as

value of v for $u = \infty$.

A. f_2 is equal to $\frac{n_2 R}{(n_2 - n_1)}$

B. f_1 is equal to $\frac{n_2 R}{(n_2 - n_1)}$

C. f_2 is equal to (-) $\frac{n_2 R}{(n_2 - n_1)}$

D. f_1 is equal to (-) $\frac{n_1 R}{(n_2 - n_1)}$

Answer: A::D

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11. Ratio of amplitude for two wave is 1:2 .Find the ratio of max:min Intensity?

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12. Ratio of amplitude for two wave is 1:4 .Find the ratio of maximum amplitude to minimum amplitude.

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13. Ratio of amplitude for two wave is 1:4 .Find the ratio of maximum intensity to minimum intensity.

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14. What is the specific heat ratio of monoatomic gases ?

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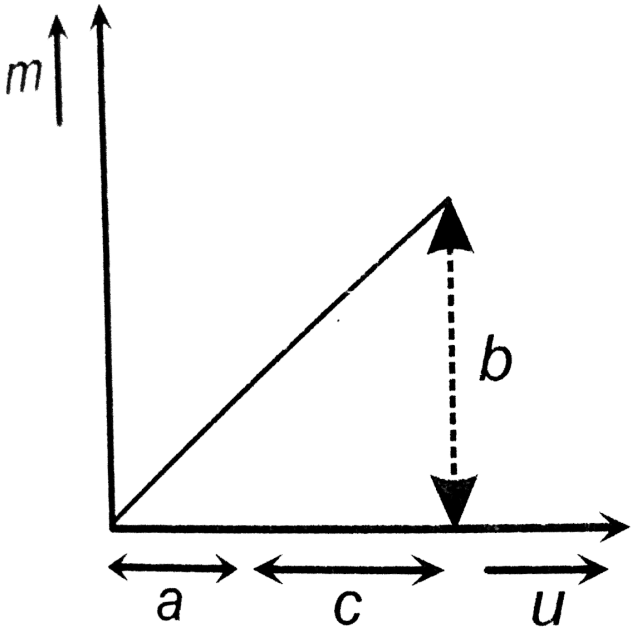
1. The graph shows how the magnification m produced by a convex thin lens varies with image distance v. What was the focal length of the used ?



A. $\frac{b}{c}$

B. $\frac{b}{ca}$

C. $\frac{bc}{a}$

D. $\frac{c}{b}$

Answer: D

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2. The distance v of the real image formed by a convex lens is measured for various object

distance u. A graph is poltted between v and u, which one of the following graphs is correct

A. 

B. 

C. 

D. 

Answer: D

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3. Point object O is placed on the principal axis of a convex lens of focal length 20cm at a distance of 40 cm to the left of it. The diameter of the lens is 10cm to the right of the lens at a distance h below the principal axis, then the maximum value of h to see the image will be

A. 0

B. 5 cm

C. 2.5 cm

D. 10 cm

Answer: C

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4. A luminous object is placed at a distance of 30 cm. from the convex lens of focal length 20 cm. On the other side of the lens, at what distance from the lens, a convex mirror of radius of curvature 10 cm. be placed in order

to have an upright image of the object coincident with it ?

A. 12 cm

B. 30 cm

C. 50 cm

D. 60 cm

Answer: C

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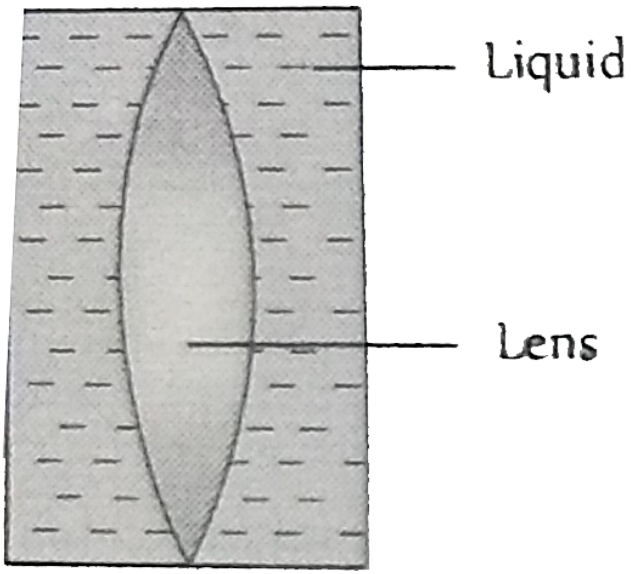
5. Shown in the figure here is a convergent lens placed inside a cell filled with a liquid. The lens has focal length $+20cm$ when in air and its material has refractive index 1.50. If the liquid has refractive index 1.60, the focal length of the system is



A. $+80cm$

B. $-80cm$

C. $-24cm$

D. $-100cm$

Answer: D

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6. Two point sources S_1 and S_2 are 24 cm apart. What should a convex lens of focal length 9 cm be placed between them so that

the images of both sources formed at the same place ?

A. 6 cm

B. 9 cm above water level

C. 12 cm

D. 15 cm

Answer: A

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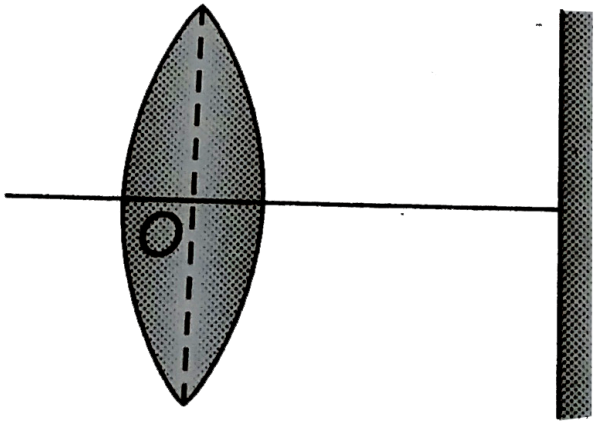

7.

The distance between a convex lens and a plane mirror is 10 cm. The parallel rays incident on the convex lens after reflection from the mirror forms image at the optical centre of the lens. Focal length of lens will be

A. 10 cm

B. 20 cm

C. 30 cm

D. Cannot be determined

Answer: B

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8. A small fish 0.4 m below the surface of a lake is viewed through a simple converging lens of focal length 3 m.the lens is kep at 0.2 m above the water surface such that the fish lies on the

optical axis of the lens. Find the image of the fish seen by the observed. $\left(\mu_{water} = \frac{4}{3}\right)$

A. A distance of 0.2 m from the water surface

B. A distance of 0.6 m from the water surface

C. A distance of 0.3 m from the water surface

D. The same location of fish

Answer: D

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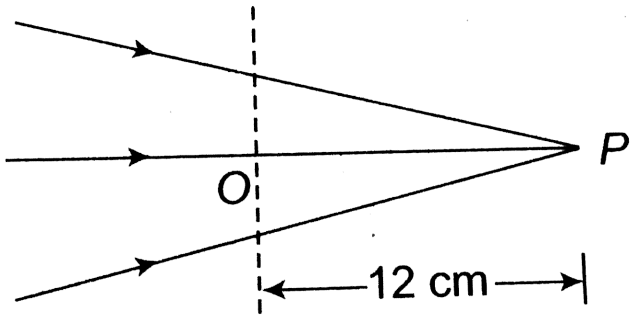
9. Figure given below shows a beam of light converging at point P. When a concave lens of focal length $16cm$ is introduced in the path of the beam at a place O shown by dotted line such that OP becomes the axis of the lens, the beam converges at a distance x from the

lens. The value x will be equal to



A. 12 cm

B. 24 cm

C. 36 cm

D. 48 cm

Answer: D

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10. The object distance u, the image distance v and the magnification m in a lens follow certain linear relations.

A. $\frac{1}{u}$ versus $\frac{1}{v}$

B. m versus u

C. u versus v

D. m versus v

Answer: A::D

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11. A biconvex thin lens is prepared from glass of refractive index $\mu_2 = \frac{3}{2}$. The two conducting surfaces have equal radii of 20 cm each. One of the the surface is silvered from outside to make it reflecting. It is placed in a medium of refractive index $\mu_1 = \frac{5}{3}$. It acts as a

A. converging mirror

B. diverging mirror

C. concave mirror of focal length 12.5 cm

D. convex mirror of focal length 12.5 cm

Answer: A::C

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12. A convex lens of focal length 15 cm and concave mirror of focal length 30 cm are kept their optical axes PQ and RS parallel but separated in vertical direction by 0.6 m, as shown. The distance between the lens and

mirror is 30 cm. An upright object AB of height 1.2 m is placed on the optic axic PQ of the lens at a distance of 20 cm from the lens.

Find the linear magnification of the first image after refraction from the lens.

A. $+3$

B. -3

C. $+2$

D. -2

Answer: B

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13. A convex lens of focal length 15 cm and concave mirror of focal length 30 cm are kept their optical axes PQ and RS parallel but separated in vertical direction by 0.6 m, as shown. The distance between the lens and mirror is 30 cm. An upright object AB of height 1.2 m is placed on the optic axic PQ of the lens at a distance of 20 cm from the lens.

Find the linear magnification of the second image after reflection from the mirror.

A. $+2$

B. -2

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

D. $-\frac{1}{2}$

Answer: C

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14. A convex lens of focal length 15 cm and concave mirror of focal length 30 cm are kept their optical axes PQ and RS parallel but separated in vertical direction by 0.6 m, as shown. The distance between the lens and mirror is 30 cm. An upright object AB of height 1.2 m is placed on the optic axic PQ of the lens at a distance of 20 cm from the lens.

If A'B' is the final image formed, A' corresponding to A and B' corresponding to B,

find the distance of B' below optics axis of lens.

A. 0.3 m

B. 0.5 m

C. 0.6 m

D. None of these

Answer: A

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15. A convex lens of focal length 15 cm and concave mirror of focal length 30 cm are kept their optical axes PQ and RS parallel but separated in vertical direction by 0.6 m, as shown. The distance between the lens and mirror is 30 cm. An upright object AB of height 1.2 m is placed on the optic axic PQ of the lens at a distance of 20 cm from the lens.

As in the lat problem, find the distance of A' below the optic axis of lens.

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Dpp 1 5

1. A ray of light is incident on the hypotenuse of a right-angled prism after travelling parallel to the base inside the prism. If μ is the refractive index of the material of the prism, the maximum value of the base angle for which light is totally reflected from the hypotenuse is

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

B. $\tan^{-1}\left(\frac{1}{\mu}\right)$

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

D. $\cos^{-1}\left(\frac{1}{\mu}\right)$

Answer: D

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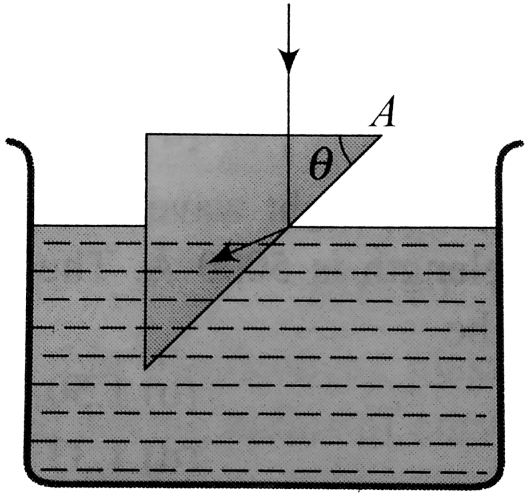
2. The refractive indices of the material of the prism and liquid are 1.56 and 1.32 respectively. What will be the value of θ for the following

refraction?



A. $\sin\theta \leq \dfrac{13}{11}$

B. $\sin\theta \geq \dfrac{11}{13}$

C. $\sin\theta \leq \dfrac{\sqrt{3}}{2}$

D. $\sin\theta \leq \dfrac{1}{\sqrt{2}}$

Answer: B

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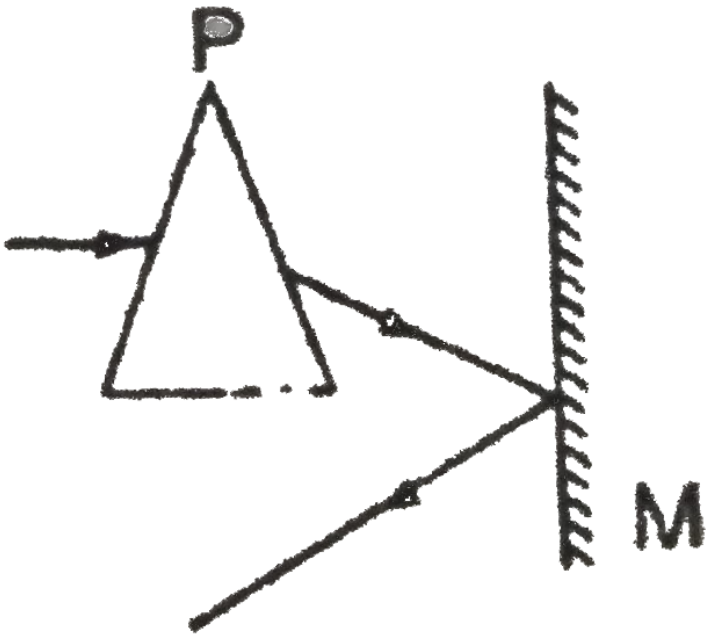
3. A prism having an apex angle of 4° and refractive index of 1.50 is located in front of a vertical plane mirror as shown in the figure. A horizontal ray of light is incident on the prism. The total angle through which the ray is

deviated is:



A. 176°

B. 4°

C. 178°

D. 2°

Answer: C

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4. A light ray is incident by grazing one of the face of a prism and after refraction ray does not emerge out, what should be the angle of prism while critical angle is C ?

A. Equal to 2C

B. Less than 2C

C. More than 2C

D. None of the above

Answer: C

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5. The light ray is incidence at angle of 60° on a prism of angle 45°. When the light ray falls on the other surface at 90°, the refractive

index of the material of prism μ and the angle of deviation δ are given by

A. $\mu = \sqrt{2}, \delta = 30^\circ$

B. $\mu = 1.5, \delta = 15^\circ$

C. $\mu = \frac{\sqrt{3}}{2}, \delta = 30^\circ$

D. $\mu = \sqrt{\frac{3}{2}}, \delta = 15^\circ$

Answer: D

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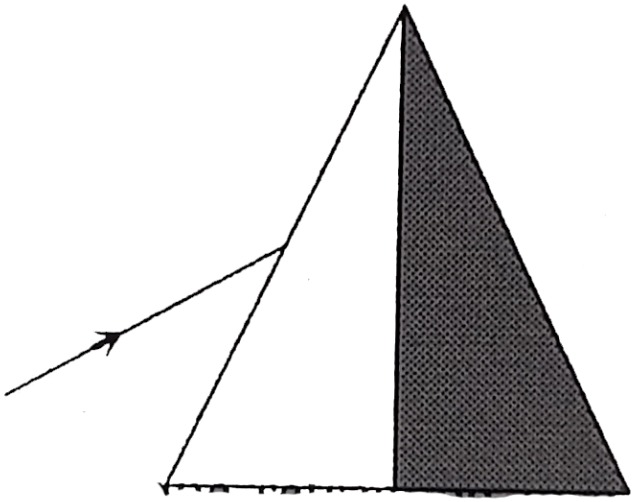
6. A light ray is incident upon a prism in minimum deviation position and suffers a deviation of 34°. If the shaded half of the prism is knocked off, the ray will



A. suffer a deviation of 34°

B. suffer a deviation of 68°

C. suffer a deviation of 17°

D. not come out of the prism

Answer: C

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7. A ray of monochromatic light is incident on one refracting face of a prism of angle 75°. It passes thorugh the prism and is incident on the other face at the critical angle. If the refractive index of the material of the prism is

$\sqrt{2}$, the angle of incidence on the first face of the prism is

A. 30°

B. 45°

C. 60°

D. 0°

Answer: B

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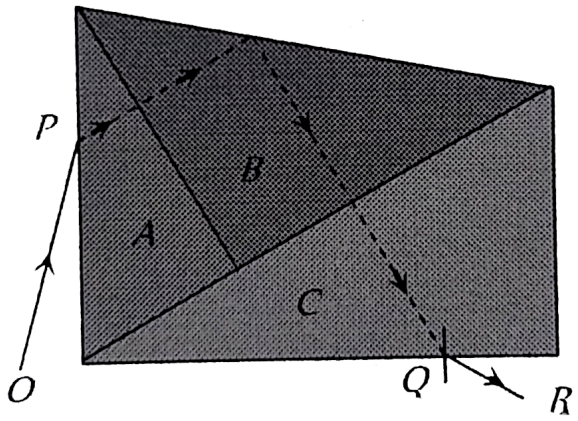
8. Three glass prisms A , B and C of same refractive index are placed in contact with each other as shown in figure, with no air gap between the prisms. Monochromatic ray of light OP passes through the prism assembly and emerges as QR . The conditions of minimum deviation is satisfied in the prisms



A. A and C

B. B and C

C. A and B

D. In all prisms A, B and C

Answer: C

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9. The refractive index of material of a prism of angles 45°, -45°, and -90° is 1.5. The path

of the ray of light incident normally on the hypotenuse side shown in

A. 

B. 

C. 

D. 

Answer: A

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10. The angle of a prism is A. One of its refracting surfaces is silvered. Light rays falling at an angle of incidence 2A on the first returns back through the same path after sufferin reflection at the silvered surface. The refractive index μ, of the prism

A. 2 sin A

B. 2 cos A

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

D. tan A

Answer: B

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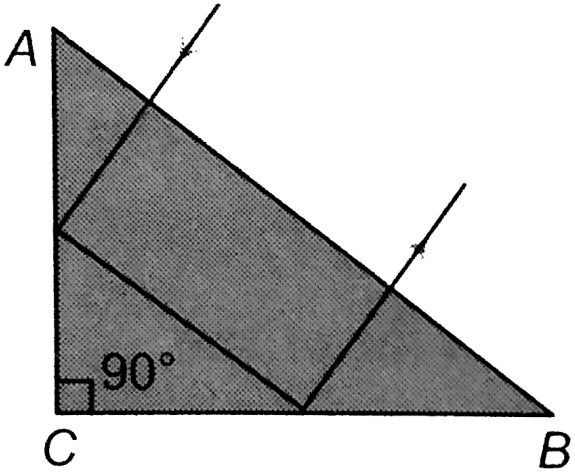
11. A ray of light incident normally on an isosceles right angled prism travels as shown in the figure. The least value of the refractive

index of the prism must be



A. $\sqrt{2}$

B. $\sqrt{3}$

C. 1.5

D. 2.0

Answer: A

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12. When a ray of light is incident normally on one refracting surface of an equilateral prism (Refractive index of the material of the prism $= 1.5$)

A. Emerging ray is deviated by 30°

B. Emerging ray is deviated by 45°

C. Emerging ray just grazes the second refracting surface

D. The ray undergoes total internal reflection at the second refracting surface

Answer: D

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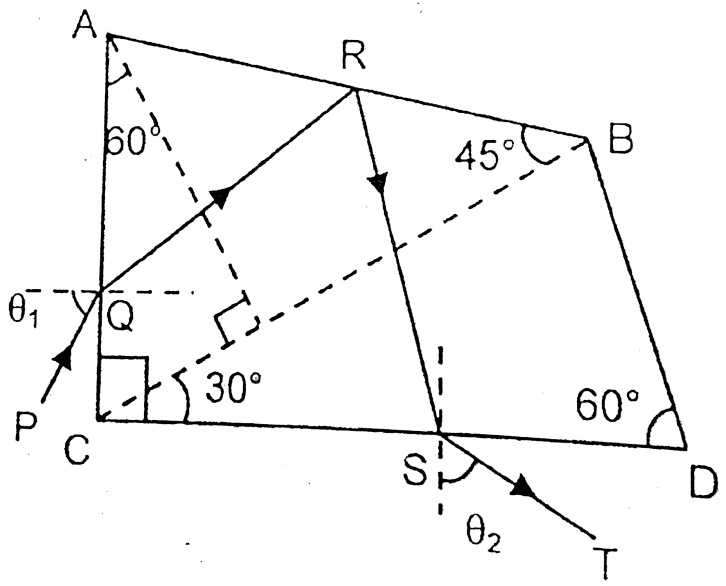

13.

The figure shows a constant deviation prism ABCD. The incident ray is PQ and the emergent ray is ST. Although it is made up of one piece of glass, but it is equivalent to two $30^\circ - 60^\circ - 90^\circ$ prism and one $45^\circ - 45^\circ 90^\circ$ prism.The angle θ_1 is the angle

of incidence on face AB. The path of the ray inside the prism is indicated in the figure. for this prism $\mu = 2\sin\theta_1$.

Q. The ratio $\frac{\theta_1}{\theta_2}$ is

A. 1

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

C. $\sqrt{2}$

D. $\frac{1}{\sqrt{2}}$

Answer: A

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Dpp 1 6

1. A simple telescope consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focused on a distant object in such a way that parallel rays emerge from eye lens. If the object subtends an angle of 2° at the objective, the angular width of the image is (Let $\tan\theta = \theta$ assuming θ small).

A. 10°

B. 24°

C. 50°

D. $1/6^\circ$

Answer: B

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2. The focal length of objective and eye lens of a astronomical telescope are respectively $2m$ and $5cm$. Final image is formed at (i) least

distance of distinct vision (ii) infinity. The magnifying power in both cases will be

A. $-48, \ -40$

B. $-40, \ -48$

C. $-40, 48$

D. $-48, 40$

Answer: A

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3. A compound microscope has an eye piece of focal length $10cm$ and an objective of focal length $4cm$. Calculate the magnification, if an object is kept at a distance of $5cm$ from the objective so that final image is formed at the least distance vision $(20cm)$

A. 12

B. 11

C. 10

D. 13

Answer: A

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4. The length of the compound microscope is 14 cm. The magnifying power for relaxed eye is 25. If the local of the eye lens is 5 cm, then the object distance for objective lens would be

A. 1.8 cm

B. 1.5 cm

C. 2.1 cm

D. 2.4 cm

Answer: A

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5. If the focal length of the objective and eye lens are 1.2 cm and 3 cm respectively and the object is put 1.25 cm away from the objective lens and the final image is formed at the infinity. The magnifying power of the microscope is

A. 150

B. 200

C. 250

D. 400

Answer: B

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6. The focal length of the objective and the eye lens of a microscope are 4 cm and 8 cm respectively. If the least distance of distinct

vision is 24 cm and is object distance is 4.5 cm from the objective lens, then the magnifying power of the microscope will be

A. 18

B. 32

C. 64

D. 20

Answer: B

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7. In an astronomical telescope in normal adjustment,a straight black line of length L is drawn on the objective lens. The eypeice forms a real image of this line. The length of this image ie l. The magnification of the telescope is

A. $\frac{L}{l}$

B. $\frac{L}{l}+1$

C. $\frac{L}{l}-1$

D. $\frac{L+l}{L-l}$

Answer: A

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8. A telescope uses light having wavelength 5000 Å and using lenses of focal length 2.5cm and 30cm. If the diameter of the aperture of the objective is 10 cm, then the resolving limit and magnifying power of the telescope is respectively

A. 6.1×10^{-6} rad and 12

B. 5.0×10^{-6} rad and 12

C. 6.1×10^{-6} rad and 8.3×10^{-2}

D. 5.0×10^{-6} rad and 8.3×10^{-2}

Answer: A

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9. The diameter of the moon is $3.5 \times 10^{3} km$ and its distance from the earth is $3.8 \times 10^{5} km$. It is seen by a telescope having the focal length of the objective and the eye-

piece as $4m$ and $10cm$ respectively. The diameter of the image of the moon will be approximately

A. 15°

B. 20°

C. 30°

D. 35°

Answer: B

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10. The focal length of an objective of a telescope is 3 meter and diameter 15 cm . Assuming for a normal eye, the diameter of the pupil is 3 mm for its complete use, the focal length of eye piece must be

A. 6 cm

B. 6.3 cm

C. 20 cm

D. 60 cm

Answer: A

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11. A telescope has an objective lens of $10cm$ diameter and is situated at a distance of one kilometer feom two ovjects. The minimum dustance between these two objects. Which can be resolved by the telescope, when the mean wavelength of light is $5000\text{Å},$ is of the order of

A. 0.5 m

B. 5 m

C. 5 mm

D. 5 cm

Answer: C

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12. If the focal length of the objective lens and the eye lens are 4 mm and 25 mm respectively in a compound microscope. The length of the tube is 16 cm . Find its magnifying power for relaxed eye position

A. 32.75

B. 327.5

C. 0.3275

D. None of the above

Answer: B

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