Roll No :
Date : 2025-12-24

School : ACHIEVERS FOUNDATION
Assessment : Light MCQ
Subject : Physics
Class : CBSE -X

Time : 00:00
Marks: 100

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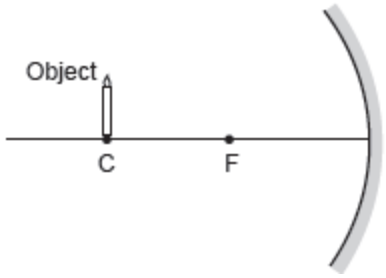
1 **1**



Which of the following statements is not true in reference to the diagram shown above?

(a) Image formed is real.

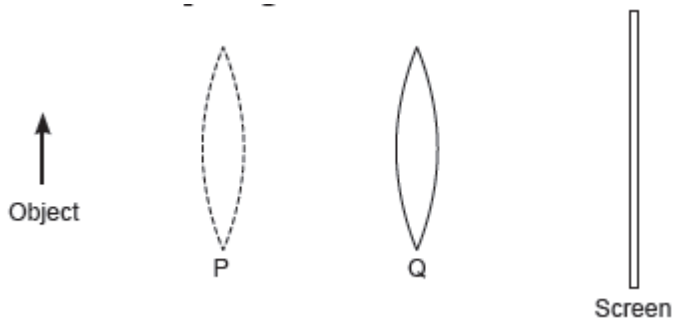
(b) Image formed is enlarged

(c) Image is formed at a distance equal to double the focal length.

(d) Image formed is inverted.

Ans :(b)

2 When a lens in placed at Q, a sharp image is formed on the screen. The image formed is real, inverted and diminished. When the lens is moved to P, another sharp image is formed on the screen. **1**



What is the nature of the image formed when the lens is at P?

(a) Magnified and inverted

(b) Magnified and upright

(c) Diminished and upright

(d) Diminished and inverted

Ans :

(a) When the distance between the convex lens and an object is decreased, then the size of image is increased. The sharp image is continuously formed on the screen that is real and inverted. On decreasing the distance further in such a may that the object comes between the principal focus and optical centre of the lens, then virtual, upright and the magnified image is formed and this virtual image cannot be taken on the screen.

3 An object is placed at a distance of 0.25 m in front of a plane mirror. The distance between the object and image will be **1**
(a) 0.25 m (b) 1.0 m
(c) 0.5 m (d) 0.125 m

Ans :(c) Distance between object and image = 0.25 + 0.25 = 0.5 m

4 The angle of incidence for a ray of light having zero reflection angle is **1**
(a) 0 (b) 30°
(c) 45° (d) 90°

Ans :(a) For reflecting surface $\angle i = \angle r$

5 For a real object, which of the following can produce a real image? **1**
(a) Plane mirror (b) Concave mirror
(c) Concave lens (d) Convex mirror

Ans :
(b) Only concave mirror can produces a real image for the any position of object between its focus and infinity.

6 Which of the following mirror is used by a dentist to examine a small cavity? **1**
(a) Convex mirror
(b) Plane mirror
(c) Concave mirror
(d) Combination of convex and concave mirror

Ans :
(c) Concave mirror forms erect and enlarged image when held close to the cavity.

7 An object at a distance of 30 cm from a concave mirror gets its image at the same point. The focal length of the mirror is **1**

(a) – 30 cm (b) 30 cm
(c) – 15 cm (d) +15 cm

Ans :
(c) When object is placed at 2F, the image formed by concave mirror is also at 2F. So 2F = –30 or F = –15 cm.

8 An object at a distance of +15 cm is slowly moved towards the pole of a convex mirror. The image will get **1**
(a) shortened and real
(b) enlarged and real
(c) enlarge and virtual
(d) diminished and virtual

Ans :(d) Convex mirror always formed virtual and diminished image.

9 A concave mirror of radius 30 cm is placed in water. It's focal length in air and water differ by **1**
(a) 15 (b) 20
(c) 30 (d) 0

Ans :
(d) The focal length of spherical mirror does not depends on the surrounding medium.

10 A concave mirror of focal length 20 cm forms an image having twice the size of object. For the virtual position of object, the position of object will be at **1**
(a) 25 cm (b) 40 cm
(c) 10 cm (d) At infinity

Ans :

(c) For virtual image,

$$m = -\frac{v}{u} = +2 \Rightarrow v = -2u$$

As $\quad \frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

$$\therefore \quad \frac{1}{u} + \frac{1}{-2u} = \frac{1}{-20} \Rightarrow \frac{1}{2u} = \frac{1}{-20}$$

$$\Rightarrow \quad u = -10 \text{ cm}$$

11 The image formed by concave mirror is real, inverted and of the same size as that of the object. The position of object should be **1**

(a) at the focus

(b) at the centre of curvature

(c) between focus and centre of curvature

(d) beyond centre of curvature

Ans :

(c) When object lies at C of a concave mirror, image is also formed at 'C' and having same size real and inverted.

12 The nature of the image formed by concave mirror when the object is placed between the focus (F) and centre of curvature (C) of the mirror observed by us is **1**

(a) real, inverted and diminished

(b) virtual, erect and smaller in size

(c) real, inverted and enlarged

(d) virtual, upright and enlarged

Ans :

(c) When object lies between C and F, the real, inverted and enlarged image is formed beyond C.

13 The nature of image formed by a convex mirror when the object distance from the mirror is less than the distance between pole and focal point (F) of the mirror would be **1**

(a) real, inverted and diminished in size

(b) real, inverted and enlarged in size

(c) virtual, upright and diminished in size

(d) virtual, upright and enlarged in size

Ans :

(c) Convex mirror always forms a virtual, erect diminished image irrespective of the position of object in front of it.

14 If a man's face is 25 cm in front of concave shaving mirror producing erect image 1.5 times the size of face, focal length of the mirror would be **1**

(a) 75 cm (b) 25 cm

(c) 15 cm (d) 60 cm

Ans :

(a) In concave shaving mirror, virtual erect and large size image, behind the mirror is obtained, using

$$m = -\frac{v}{u} \Rightarrow 1.5 = -\frac{v}{-25}$$

$$\Rightarrow v = \frac{75}{2} \text{ cm}$$

Now, from mirror formula,

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u} = \frac{1}{75/2} + \frac{1}{-25} = -\frac{1}{75}$$

$$\therefore f = -75 \text{ cm}$$

Hence, focal length of concave mirror is 75 cm.

15 As light travels from a rarer to a denser medium it will have **1**

(a) increased velocity

(b) decreased velocity

(c) decreased wavelength

(d) both (b) and (c)

Ans :

(d) When light ray travel from rarer to denser medium, its velocity and wavelength both decrease as $v = v\lambda$.

16 The angle of incidence i and refraction r are equal in a transparent slab when the value of i is **1**

(a) 0°

(b) 45°

(c) 90°

(d) depend on the material of the slab

Ans :

(a) When the incident ray falls normally on the glass slab, it will refracted without deviation, i.e. along the normal in the glass slab. So, $\angle i = \angle r = 0$

17 The refractive index of transparent medium is greater than one because **1**

(a) Speed of light in vacuum < speed of light in tansparent medium

(b) Speed of light in vacuum > speed of light in tansparent medium

(c) Speed flight in vacuum = speed of light in tansparent medium

(d) Frequency of light wave changes when it moves from rarer to denser medium

Ans : (b) $\mu = \frac{\text{Speed of light in vacuum}}{\text{Speed of light in medium}}$

As $c > v$ so, $\mu > 1$.

18 The refractive index of water is 1.33. The speed of light in water will be **1**

(a) 1.33×10^8 m/s (b) 3×10^8 m/s

(c) 2.26×10^8 m/s (d) 2.66×10^8 m/s

Ans : (c) As $\mu = \frac{c}{\mu} \Rightarrow v = \frac{c}{\mu} = \frac{3 \times 10^8}{1.33} = 2.26 \times 10^8$ m/s

19 You are given three media A, B and C of refractive index 1.33, 1.65 and 1.46. The medium in which the light will travel fastest is **1**

(a) A

(b) B

(c) C

(d) equal in all three media

Ans :

(a) As, ${}_a\mu_m = \frac{v_a}{v_m}$ or $v_m = \frac{v_a}{{}_a\mu_m}$

So, the light will travel faster in a medium having lower refractive index.

20 Light from the Sun falling on a convex lens will converge at a point called **1**

(a) centre of curvature

(b) focus

(c) radius of curvature

(d) optical centre

Ans :

(b) The parallel ray coming from the sun, after refraction through the convex lens converge at its focus.

21 Large number of thin stripes of black paint are made on the surface of a convex lens of focal length 20 cm to catch the image of a white horse. The image will be **1**

(a) a zebra of black stripes

(b) a horse of black stripes

(c) a horse of less brightness

(d) a zebra of less brightness

Ans :

(c) Complete image of the white horse is formed but of less intensity, the light falling on the curved portion will not react at the image position.

22 When object moves closer to convex lens, the image formed by it shift **1**

(a) away from the lens

(b) towards the lens

(c) first towards and then away from the lens

(d) first away and then towards the lens

Ans :

(a) As object moves from infinity towards optical centre of the convex lens image is shifted away from its focal point and towards infinity.

23 A magnified real image is formed by a convex lens when the object is at **1**

(a) F

(b) between F and 2F

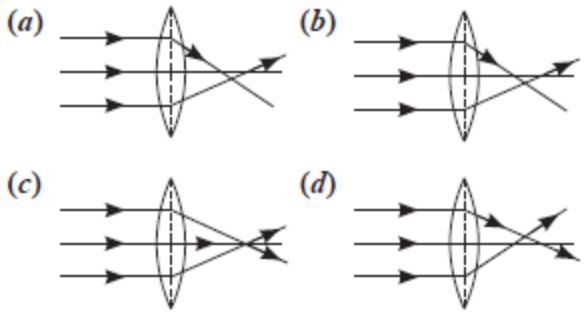
(c) 2F

(d) only (a) and (b) both

Ans :

(d) When object is at 2F, real inverted and same size image is formed by convex lens. So, according to question option (a) and (b) both are correct.

24 The distance between the potical centre and point of convergence is called focal length in which of the following cases? **1**



Ans :(c) Parallel rays after refiracting meet at the focus of a convex lens.

25 A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5 mm long image of the awl pin is formed at 30 cm in front of the mirror. The focal length of this mirror is **1**

(a) – 30 cm (b) – 20 cm

(c) – 40 cm (d) – 60 cm

Ans :

b) Given h_o = +10 mm = + 0.1 cm

h_2 = – 5 mm = –0.5 cm

for real image, v = – 30 cm

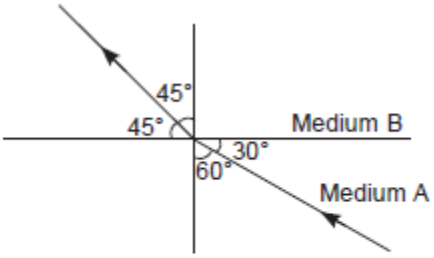
Now, magnification, $m = \frac{h_i}{h_o} = -\frac{v}{u}$

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u} = \frac{1}{-30} + \frac{1}{-60} = \frac{-2-1}{60} = -\frac{1}{20}$$

$$\therefore \quad f = -20 \text{ cm}$$

26 Figure shows a ray of light as it travels from medium A to medium B. **1**

Refractive index of the medium B relative to medium A is



(a) $\frac{\sqrt{3}}{\sqrt{2}}$ (b) $\frac{\sqrt{2}}{\sqrt{3}}$

(c) $\frac{1}{\sqrt{2}}$ (d) $\sqrt{2}$

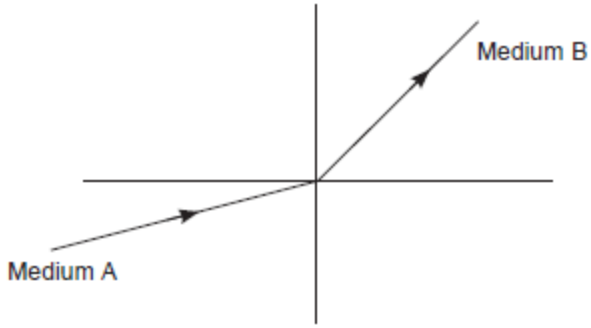
Ans :

(a) Here, ∠i = 60°, ∠r = 45°

Using Snell's law of refraction, refractive index of medium B with respect to medium A.

$$_{A}n_{B} = \frac{\sin i}{\sin r} = \frac{\sin 60°}{\sin 45°} = \frac{(\sqrt{3}/2)}{(1/\sqrt{2})} = \frac{\sqrt{3}}{\sqrt{2}}$$

27 A light ray enters from medium A to medium B as shown in figure. The refractive index of medium B relative to A will be **1**



(a) greater than unity

(b) less than unity

(c) equal to unity

(d) zero

Ans :

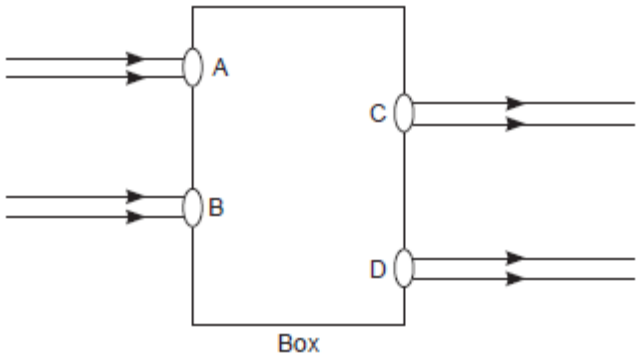
(b) In medium B, light ray bends away from the normal. It indicates that medium B is optically rarer than medium A. Hence speed of light in medium B is more than that in medium A. Now, refractive index

$${}_{A}n_{B} = \frac{v_A}{v_B}$$

$$\text{As } v_B > v_A \Rightarrow \frac{v_B}{v_A}$$

$$\therefore \quad {}_{A}n_{B} < 1$$

28 Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in the figure. Which of the following could be inside the box? **1**



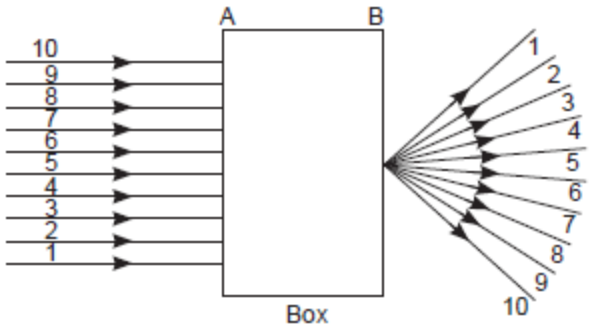
(a) A rectangular glass slab
(b) A convex lens
(c) A concave lens
(d) A prism

Ans :

(a) Figure shows that emergent ray are parallel to the incedent ray and shifted side ward slightly. This can be done by the rectangular glass slab only.

29 A beam of light is incident through the holes on side A and emerges out of the hole on the other face of the box as shown in the figure. Which of the following could be inside the box? **1**

(a) Concave lens
(b) Rectangular glass slab
(c) Prism
(d) Convex lens



Ans :

(d) From figure, it is clear that parallel rays converge at a point and emerges from face B. So convex lens would be possible inside the box.

30 Which of the following statements is/are true? **1**

(a) A convex lens has 4 dioptre power having a focal length 0.25 m

(b) A convex lens has –4 dioptre power having a focal length 0.25 m

(c) A concave lens has 4 dioptre power having a focal length 0.25 m

(d) A concave lens has – 4 dioptre having a focal 0.25 m

Ans :

(a) Positive sign with power and focal length indicates that the given lens is convex.

$$\text{Also } f = \frac{1}{P} = \frac{1}{4} = 0.25\text{m}$$

31 Magnification produced by a rear view mirror fitted in vehicles **1**

(a) is less than one

(b) is more than one

(c) is equal to one

(d) can be more than or less than one depending upon the position of the object in front of it.

Ans :

(a) Convex mirror is used as rear view mirror and alway forms virtual, erect and diminished inage. So magnification produced by a rear view mirror is less than one.

32 A full length image of a distant tall building can definitely be seen by using **1**

(a) a concave mirror

(b) a convex mirror

(c) a plane mirror

(d) both concave as well as plane mirror

Ans :

(b) Convex mirror has a wide field of view as it forms virtual, erect and diminished image. Hence, fall length of image of distance tall building can definitely be seen by using it.

33 In torches, search lights and headlights of vehicles the bulb is placed **1**

(a) between the pole and the focus of the reflector

(b) very near to the focus of the reflector

(c) between the focus and centre of curvature of the reflector

(d) at the centre of curvature of the

Ans :

(b) When source of light is placed verg near to the focus of the reflector which are concave in shape, the reflected light becomes parallel to the principal axis.

34 The laws of reflection hold good for **1**

(a) plane mirror only

(b) concave mirror only

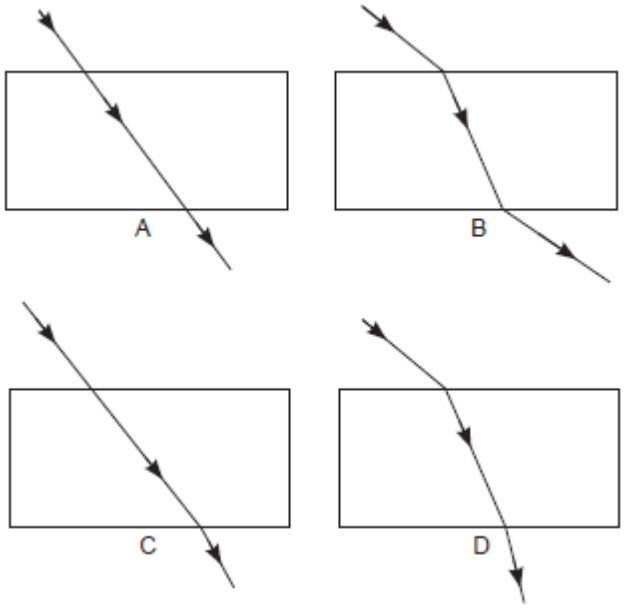
(c) convex mirror only

(d) all mirrors irrespective of their shape

Ans :

(d) The laws of reflection hold good for light reflected from any smooth surface irrespective of their shapes.

35 The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in figure. Which one of them is correct? **1**



(a) A (b) B
(c) C (d) D

Ans :
(b) When a light ray is incident oblikely on one face of rectangular glass slab, the emergent ray will be parallel to the incident ray and shifted sideward slightly.

36 In which of the following, the image of an object placed at infinity will be highly diminished and point sized? **1**
(a) Concave mirror only
(b) Convex mirror only
(c) Convex lens only
(d) Concave mirror, convex mirror, concave lens and convex lens.

Ans :
(d) The incident ray coming from the object placed at infinity will be parallel to the principal axis. When the parallel beam of light incident on a mirror or lens, irrespective of their nature, after reflection/refraction, will pass or appear to pass through their principal focus. Hence highly diminished and point size image will be formed at their focus.

37 The things visible to us due to the presence of **1**
(a) object
(b) light
(c) dark
(d) none of these

Ans :(b)

38 Which of the following phenomenon is not associated with light? **1**
(a) Image formation by mirror
(b) Twinkling of stars
(c) Formation of rainbow
(d) Magnetic field lines

Ans :(d)

39 Which of the following is incorrect about the properties of light? **1**

(a) Straight-line propagation of light

(b) Light is a form of energy

(c) Light needs a medium to propagate

(d) It has a finite speed

Ans :

(c) Light is an electromagnetic wave in nature which do not require any medium for its propagation.

40 The light incident on a highly polished surface rebound into the same medium in same or different direction, is called **1**

(a) reflection of light

(b) refraction of light

(c) scattering of light

(d) none of these

Ans :(a)

41 Image formed by the plane mirror is **1**

(a) virtual, diminished and behind the mirror

(b) virtual, erect, same size and behind the mirror

(c) real, same size, formed on the same side of the object.

(d) virtual, erect, enlarged and behind the mirror

Ans :(b)

42 Which type of mirror is used to get a virtual, erect, laterally inverted and same size image as that of object? **1**

(a) Convex mirror

(b) Concave mirror

(c) Plane mirror

(d) All of these

Ans :(c)

43 The angle between the incident ray and reflected ray is 60°, the angle of incidence is **1**

(a) 60°

(b) 45°

(c) 30°

(d) 90°

Ans :(c) ∠i + ∠r = 60°, but ∠i = ∠r ∴ ∠i = 30°

44 A ray of light is incident on a plane reflecting surface at angle of incidence of 30°. Then the reflected ray is deviated by an angle equal to **1**

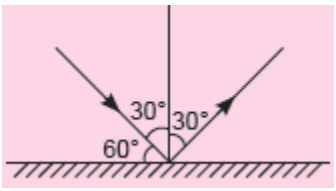
(a) 30°

(b) 150°

(c) 60°

(d) 120°

Ans :

(d) From figure 

Angle of deviation of reflected ray

= 60° + 30° + 30° = 120°

45 The surface of the spoon curved inwards can be approximated to **1**

(a) convex mirror

(b) concave mirror

(c) plane mirror

(d) concavo convex mirror

Ans :(b)

46 The centre of the reflecting surface of a spherical mirror is a point called **1**

(a) centre of curvature

(b) focus

(c) pole

(d) none of the above

Ans :(c)

47 Centre of curvature of a convex mirror lies **1**

(a) behind the mirror

(b) infront of the mirror

(c) at the surface of the mirror any where

(d) at infinity

Ans :(a)

48 Principal axis of a spherical mirror is always normal to the mirror at its **1**

(a) focus

(b) pole
(c) centre of curvature
(d) both (a) and (c)

Ans :(b)

49 Diameter of the reflecting surface of spherical mirror is called **1**
(a) radius of curvature
(b) focal length
(c) aperture
(d) both (a) and (b)

Ans :(c)

50 When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. This image is: **1**
(a) real
(b) inverted
(c) virtual and inverted
(d) virtual and erect

Ans :(d) virtual and erect

51 The image below shows a student demonstrating that sun-rays concentrated to a point using a spherical mirror can burn a paper as a science project **1**

What is the term used for the distance between the mirror and the paper?
(a) radius of curvature
(b) principal focus
(c) principal axis
(d) focal length

Ans :(d) focal length

52 The image below shows a student demonstrating that sun-rays concentrated to a point using a spherical mirror can burn a paper as a science project **1**

What kind of image would be formed on the paper?

(a) Real and diminished

(b) Real and enlarged

(c) Virtual and diminished

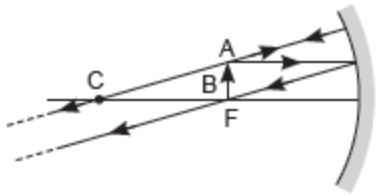
(d) Virtual and enlarged

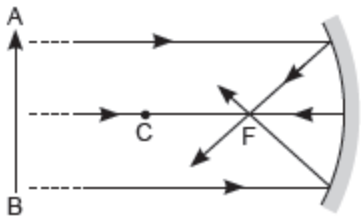
Ans :

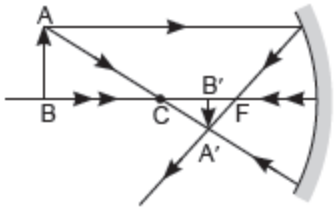
(a) Real and inverted because rays actually intersect after reflection and image can be taken on the screen.

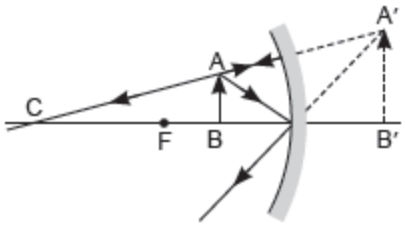
53 The image below shows a student demonstrating that sun-rays concentrated to a point using a spherical mirror can burn a paper as a science project **1**

The student wants to depict the above experiment as a ray diagram. Which of the following diagram should he draw?

(a)


(b)


(c)


(d)


Ans :(b)

54 The image below shows a student demonstrating that sun-rays concentrated to a point using a spherical mirror can burn a paper as a science project **1**

If the student wishes to point the mirror to another object so as to obtain a virtual enlarged image, what should be the position of object with respect to the mirror?

(a) At principal focus

(b) At centre of curvature

(c) Between pole and principal focus

(d) Between centre of curvature and principal focus

Ans :(c)

55 On moving the object from infinity towards the pole of the convex mirror, the image moves from **1**

(a) focus towards pole

(b) focus towards centre of curvature

(c) pole to infinity on the same side of object

(d) focus to infinity behind the mirror

Ans :(a)

56 If the object moves away from the pole of a convex mirror, then, the size of image gradually changes from **1**

(a) highly enlarged to enlarged

(b) diminished to point size

(c) highly diminished to diminished

(d) highly diminished to same size of object

Ans :(b)

57An object is placed in front of a convex mirror at infinity. According to the New Cartesian Sign Convention, the sign of the focal length and the sign of image distance in this case are respectively: **1**

(a) +, –

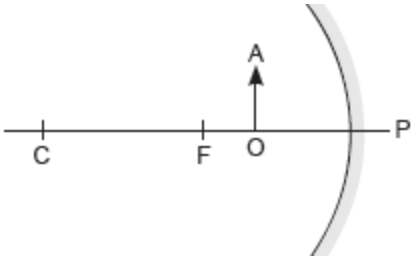
(b) –, +

(c) –, –

(d) +, +

Ans :(d) Both lies on +ve x-axis.

58 **1**



For the diagram shown, according to the New Cartesian Sign convention the magnification of the image formed will have the following specifications:

(a) Sign – Positive, Value – Less than 1

(b) Sign – Positive, Value – More than 1

(c) Sign – Negative, Value – Less than 1

(d) Sign – Negative, Value – More than 1

Ans :(b)

59 What is the position of the object placed on the side of reflecting surface of a concave mirror of focal length 15 cm if the image is formed at the distance of 30 cm from the mirror? **1**

(a) 15 cm
(b) 30 cm
(c) 25 cm
(d) 40 cm

Ans :
(b) When an object is placed at the centre of curvature in front of a concave mirror, image is also formed at the centre of curvature, so u = – 2f = v = 30 cm.

60 An object of height 4 cm is kept at a distance of 30 cm from the pole of a diverging mirror. If the focal length of the mirror is 10 cm, the height of the image formed is **1**

(a) + 3.0 cm
(b) + 2.5 cm
(c) + 1.0 cm
(d) + 0.75 cm

Ans :
(c) Mirror formula, $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ gives

$v = +7.5$ cm and

Magnification, $m = \frac{h_i}{h_o} = -\frac{v}{u}$

$\Rightarrow h_i = +1.0$ cm

61 In which of the following is a concave mirror used? **1**

(a) A solar cooker.
(b) A rear view mirror in vehicles.
(c) A safety mirror in shopping malls.
(d) In viewing full size image of distant tall buildings.

Ans :(a)

62 Magnification produced by the rear-view mirror fitted in vehicles **1**

(a) is equal to one
(b) is greater than one
(c) is less than one

(d) depends on distance and height of the vehicle behind the driver's vehicles.

Ans :
(c) A rear-view mirror fitted in vehicles is convex in nature. Convex mirror always forms virtual, erect and diminished image irrespective of the object distance, i.e. v < u. So, magnification produced by it is always less than 1.

63 A full length image of the Taj Mahal can definitely be seen by using **1**
(a) a plane mirror
(b) a concave mirror
(c) a convex mirror
(d) all of these

Ans :(c)

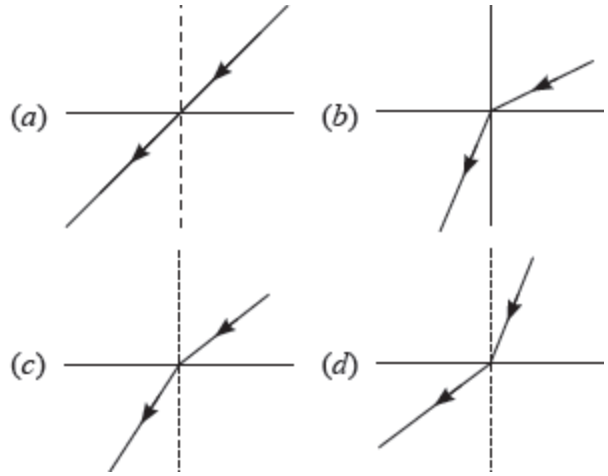
64 The phenomenon of light exhibit in the case of apparent displacement of a pencil, partly immersed in water is **1**
(a) refraction
(b) reflection
(c) dispersion
(d) scattering

Ans :(a)

65 As light travels from optically rarer medium to an optically denser medium, it will have **1**
(a) increase in velocity
(b) decrease in velocity
(c) no change in velocity
(d) cannot say

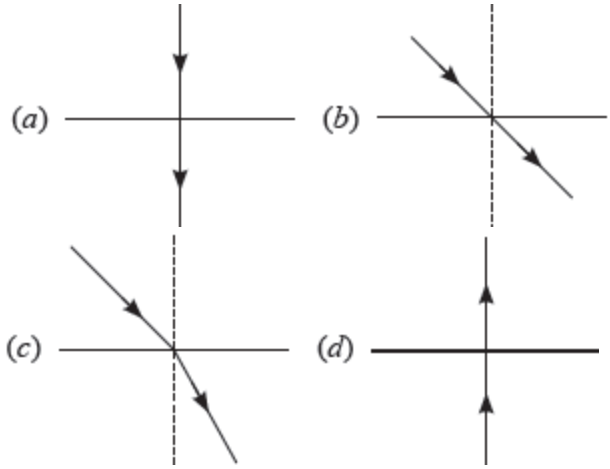
Ans :
(b) When the optical density of the medium increases, its refractive index value also increases, and the speed of light in that medium decreases as both are inversely proportional to each other.

66 Which of the following figures shows refraction of light while going from denser to rarer medium? **1**



Ans :(d)

67 Which of the following figure shows no refraction of light when it is incident normally on a boundary of the two interfacing medium? **1**



Ans :(a)

68 A light ray incident on a rectangular glass slab, after emerging from the opposite parallel faces, it is found that the **1**

(a) ∠i > ∠e

(b) ∠i < ∠e

(c) ∠i = ∠e

(d) ∠i ≠ ∠e

where ∠i = angle of incidence

∠e = angle of emergence

Ans :(c)

69 Choose the correct statement for a rectangular glass slab. **1**

(a) The emergent ray is not shifted sidewards slightly

(b) The emergent ray is perpendicular to the incident ray.

(c) The ray emerges parallel to the incident ray.
(d) The incident and emergent rays are inclined towards each other.

Ans :(c)

70 A ray of light falling on a glass slab at 90°. The angle of incidence is **1**
(a) 90°
(b) zero
(c) < 90° ≠ 0
(d) greater then 90°

Ans :
(b) When light rays incident along the normal, then by definition the angle of incidence is zero.

71 Mohit took a thick glass slab whose one opposite parallel face is silvered. He observed that it formed multiple images. This happened on account of **1**
(a) refraction of light
(b) reflection of light
(c) dispersion of light
(d) both (a) and (b)

Ans :(d) Silvered face acts as a smooth reflecting surface.

72 A student suggested the following 'guidelines' to his friend for doing the experiment on tracing the path of a ray of light passing through a rectangular glass slab for three different angles of incidence: **1**
A. Draw the 'outline' of the glass slab at three positions on the drawing sheet.
B. Draw 'normals' on the top side of these 'outlines' near their left end.
C. Draw the incident rays on the three 'outlines' in directions making angles of 30°, 45°, 60° with the normals drawn.
D. Fix two pins vertically on each of these incident rays at two points nearly 1 cm apart.
E. Look for the images of the 'heads' of these pins while fixing two pins from the other side, to get the refracted rays.
When he showed these 'guidelines' to his teacher, the teacher corrected and modified the 'guidelines' labelled as
(a) B, C, E
(b) B, D, E

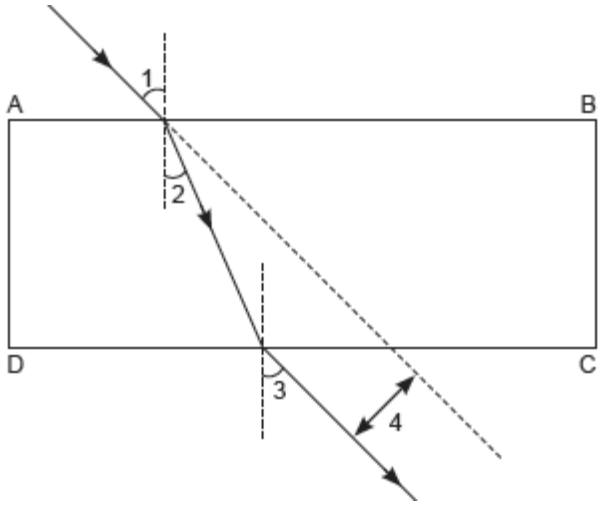
(c) B, C, D

(d) C, D, E

Ans :

(b) The normals are not generally at the ends. While fixing pins, the foot has to be taken as reference. The pins should be far off from each other.

73 A student has traced the path of ray of light through a glass slab as follows. If you are asked to label 1, 2, 3 and 4, the correct sequence of labelling ∠i, ∠e, ∠r and lateral displacement respectively is **1**



(a) 2, 1, 3, 4

(b) 1, 2, 3, 4

(c) 1, 3, 2, 4

(d) 1, 3, 4, 2

Ans :(c)

74 Select the correct statement(s) from the following regarding refraction of light when light is incident from the optically denser medium A on a optically rarer medium B. **1**

I. Light will bend towards the normal in medium B.

II. Speed of light will be more in medium B as compared to medium A.

III. Angle of refraction will be more than angle of incidence.

IV. Angle of refraction will be less than angle of incidence.

(a) Both I and II

(b) Both II and III

(c) Both II and IV

(d) Only I, II and IV

Ans :(b)

75 Which of the following represents correctly Snell's law of refraction? **1**

(a) $\frac{\sin r}{\sin i} = \frac{1}{n}$ (b) $\frac{\sin i}{\sin r} = \frac{n_2}{n_1}$

(c) $n_2 \sin i = \text{constant}$ (d) All of these

Ans :(b)

76 When an incident ray of light enters a medium from air, it bends towards the normal. Which of the following is TRUE about the refractive index of the medium (n_m) as compared to the refractive index of air (n_a)? **1**

(a) n_m is equal to n_a

(b) n_m is less than n_a

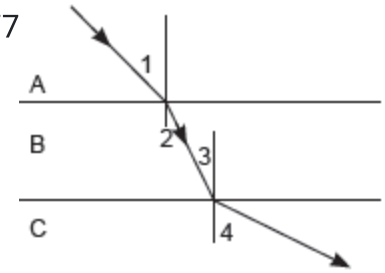
(c) n_m is more than n_a

(d) The refractive indices cannot be compared based on the given information.

Ans :

(c) The bending of the ray of light towards the normal indicates that the second medium is an optically denser medium whose refractive index is higher than that of air.

77 **1**



A ray of light is incident as shown. If A, B and C are three different transparent media, then which among the following options is true for the given diagram?

(a) ∠ 1 > ∠ 4

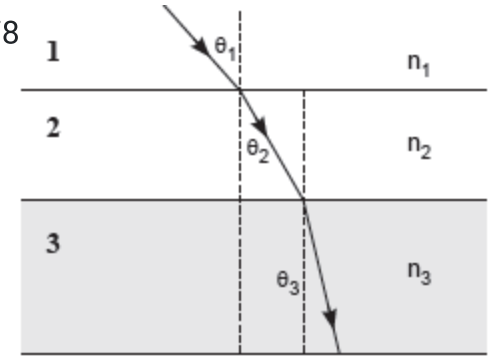
(b) ∠ 1 < ∠ 2

(c) ∠ 3 = ∠ 2

(d) ∠ 3 > ∠ 4

Ans :(c)

78 **1**



In the diagram shown above n1, n2 and n3 are refractive indices of the media 1, 2 and 3 respectively. Which one of the following is true in this case?

(a) $n_1 = n_2$

(b) $n_1 > n_2$

(c) $n_2 > n_3$

(d) $n_3 > n_1$

Ans :

(d) Bending of light ray in medium 3 is more that in medium 1, i.e. $q_3 < q^1$ so, $n_3 > n_1$.

79 The refractive index of medium A is 1.5 and that of medium B is 1.33. If the speed of light in air is 3×10^8 m/s, what is the speed of light in medium A and B respectively? **1**

(a) 2×10^8 m/s and 1.33×10^8 m/s

(b) 1.33×10^8 m/s and 2×10^8 m/s

(c) 2.25×10^8 m/s and 2×10^8 m/s

(d) 2×10^8 m/s and 2.25×10^8 m/s

Ans : (d) Use $v = \frac{c}{n}$.

80 You are given three media A, B and C of refractive index 1.33, 1.65 and 1.46. The medium in which the light will travel fastest is **1**

(a) A

(b) B

(c) C

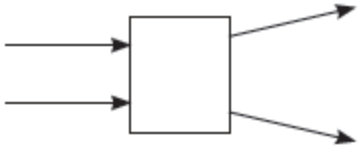
(d) equal in all three media

Ans :

(a) As, $_an_m = \frac{v_a}{v_m}$ or $v_m = \frac{v_a}{_an_m}$

So, the light will travel faster in a medium having lower refractive index.

81 The following diagram shows the use of an optical device to perform an experiment of light. As per the arrangement shown, the optical device is likely to be a; **1**



(a) Concave mirror

(b) Concave lens
(c) Convex mirror
(d) Convex lens

Ans :
(b) Rays are refracted and diverse, so the optical device is concave lens.

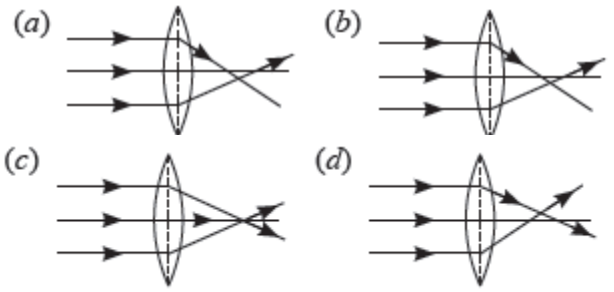
82 A divergent lens will produce **1**
(a) always real image
(b) always virtual image
(c) both real and virtual image
(d) none of these

Ans :
(b) Diverging (concave) lens will always forms a virtual, erect and diminished image.

83 When object moves closer to a concave lens the image formed by it shifts **1**
(a) away from the lens on the same side of object
(b) toward the lens
(c) away from the lens on the other side of lens
(d) first towards and then away from the lens

Ans :
(b) When object is at infinity, image is formed at the focus of concave lens. When object is moved towards lens, the image is also moved towards lens from its focus and its size increases.

84 The distance between the optical centre and point of convergence is called focal length in which of the following cases? **1**



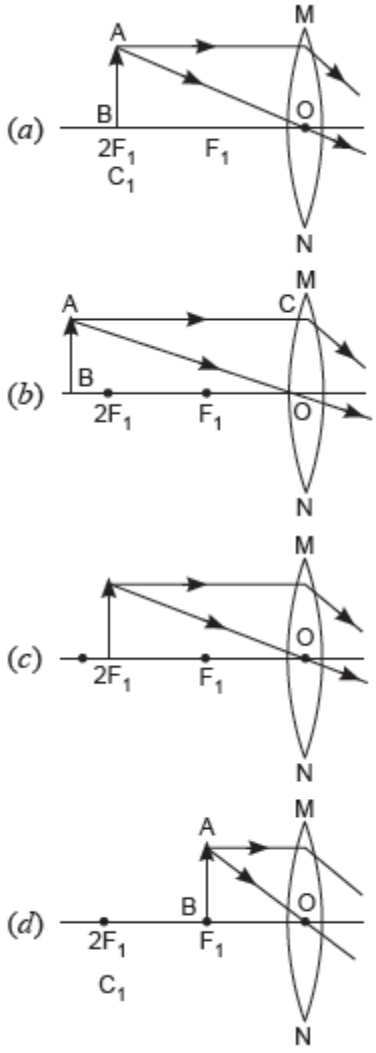
Ans :(c) Parallel rays after refracting meet at the focus of a convex lens

85 When sun rays are focused with the help of a convex lens, a sharp bright spot is observed on a sheet of paper at its focus. What does this bright spot indicate? **1**

(a) Bright image of the sun
(b) Virtual image of the sun
(c) Real image of the sun
(d) Magnified image of the sun

Ans :(c)

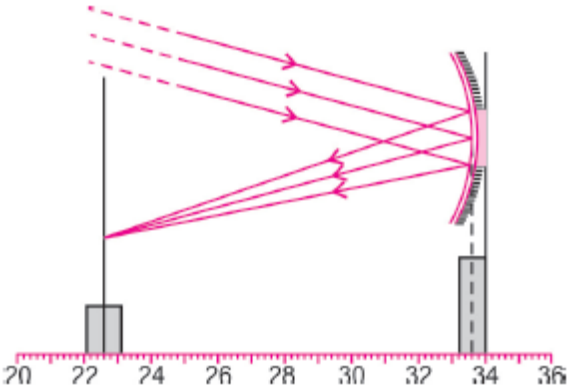
86 A student wants to obtain magnified image of an object AB as on a screen. Which one of the following arrangements shows the correct position of AB for him/her to be successful? **1**



a

Ans :(c)

87 The focal length of the concave mirror in the experimental set up shown below, is : **1**

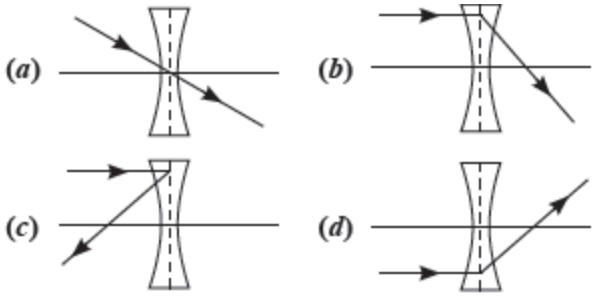


(*a*) 10.2 cm (*b*) 11.0 cm
(*c*) 11.4 cm (*d*) 12.2 cm

Ans :

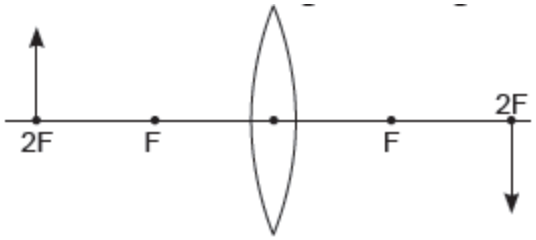
(b) f = separation between the screen and pole = 33.6 – 22.6 = 11.0 cm.

88 Which of the following correctly shows refraction of light from a concave lens? **1**



Ans :(a)

89For the diagram shown, according to New Cartesian Sign Convention, the sign of object distance, image distance and focal length for the given lens will be **1**



(a) – , + , +
(b) – , – , +
(c) – , – , –
(d) + , – , +

Ans :(a)

90 If the magnification produced by lens has a negative value, the image will be **1**

(a) real and erect

(b) virtual and erect
(c) real and inverted
(d) virtual and inverted

Ans :(c)

91 Linear magnification of a concave lens is always positive but less than one. This is because it forms **1**
(a) real image only
(b) virtual and erect image on the other side of lens
(c) virtual and diminished image on the same side of object irrespective of its position.
(d) virtual, erect and enlarged image

Ans :(c)

92 A converging lens forms a three times magnified image of an object, which can be taken on a screen. If the focal length of the lens is 30 cm, then the distance of the object from the lens is **1**
(a) −55 cm
b) −50 cm
(c) −45 cm
(d) −40 cm

Ans :

(d) For real image, m = −3 = $\frac{v}{u}$ $\Rightarrow$ v = − 3u By lens formula, we get u = − 40 cm

93 The condition for which the spherical lens has equal focal length on either side of the lens is **1**
(a) same medium on either side of lens
(b) same radius of curvature of both curved surface
(c) independent of medium on either side of lens.
(d) both (a) and (b)

Ans :(d)

94 An object is placed at distance of 15 cm in front of a concave lens of focal length 15 cm. The position of image formed will be at a distance of **1**
(a) − 15 cm
(b) + 15 cm

(c) – 7.5 cm
(d) + 7.5 cm

Ans :
(c) Substitute u = –15 cm, f = –15 cm in lens formula, we get, v = –7.5 cm.

95 A teacher sets up the stand carrying a convex lens of focal length 21 cm placed at 42 cm mark on the optical bench. He asks four students A, B, C and D to suggest the position of screen on the optical bench so that a distinct image of a distance tree obtained on it. The correct position of the screen on the optical bench suggested by one of the student is **1**
(a) 63 cm
(b) 32 cm
(c) 21 cm
(d) 84 cm

Ans :
(a) The parallel rays coming from the distant tree are focused by the convex lens at its focal point. Therefore, the position of screen on optical bench is 42 + 21 = 63 cm.

96 If the power of lens is –4.0D, then it means that the lens is a **1**
(a) concave lens of focal length –50 m
(b) convex lens of focal length +50 cm
(c) concave lens of focal length –25 cm
(d) convex lens of focal length –25 cm

Ans : (c) P = –4D, therefore P = $\frac{100}{f(\text{cm})}$ $\Rightarrow$ f = –25 cm

97 In which of the following devices, convex lens is not used? **1**
(a) Magnifying glass
(b) Microscope
(c) Flashlights
(d) Telescope

Ans :
(c) Concave lens is used in flashlights to widen the beam produced by the bulb.

98 Two convex lens P and Q have focal length 0.50 m and 0.40 m respectively. **1**

Which of the following is TRUE about the combined power of the two lenses?

(a) P is equal to 4.5 D.

(b) P is less than 4.5 D.

(c) P is more than 4.5 D.

(d) P cannot be determined from the information given.

Ans : (a) $P = P_1 + P_2 = \frac{1}{f_1(\text{m})} + \frac{1}{f_2/\text{m}} = \frac{1}{0.5} + \frac{1}{0.4} = 2 + 2.5 = 4.5\text{D}$

99 The combination of spherical lens of power +3D and –3D acts as a **1**

(a) bifocal lens of power 6D

(b) plane glass sheet/slab

(c) convex lens having no power

(d) concave lens of power – 6D

Ans :

(b) $P = P_1 + P_2 = +3\text{D} - 3\text{D} = 0\text{D}$

∴ The combination will behave as a plane glass sheet/slab.

100 The focal length of four convex lens P, Q, R and S are 20 cm, 15 cm, 5 cm and 10 cm respectively. The lens having lowest power is **1**

(a) P

(b) Q

(c) R

(d) S

Ans : $(a)\ P \propto \frac{1}{f}$