# PHYSICS

# BOOKS - MCGROW HILL EDUCATION PHYSICS (HINGLISH)

# REFLECTION OF LIGHT

**Elementary Questions**

**1.** An incident ray strikes a plane mirror at an angle of $15°$ with the mirror. The angle

between the incident ray and reflected ray is

A. $15°$

B. $30°$

C. $150°$

D. none of these

Answer: C

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**2.** An incident ray strikes a plane mirror at an angle of $15°$ with the mirror. The angle between the reflected ray and the mirror is

    A. $15°$

    B. $30°$

    C. $75°$

    D. none of these

**Answer: A**

**3.** If a mirror has a focal length of + 15 cm, it is a

    A. convex mirror

    B. concave mirror

    C. plane mirror

    D. none of these

**Answer: A**

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**4.** What kind of mirror can have a focal length of, -20 cm ?

A. convex mirror

B. concave mirror

C. plane mirror

D. none of these

**Answer: B**

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**5.** In case of a virtual and erect image, the magnification of a mirror is

A. positive

B. negative

C. unity

D. infinity

**Answer: A**

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**6.** In case of a real and inverted image, the magnification of a mirror is

A. positive

B. negative

C. zero

D. infinity

**Answer: B**

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**7.** The sum of the reciprocals of object distance and image distance is equal to the _____ of a mirror.

A. focal length

B. reciprocal of the focal length

C. radius of curvature

D. reciprocal of the radius of curvature

**Answer: B**

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**8.** Focal length of a plane mirror is

A. positive

B. negative

C. zero

D. infinity

**Answer: D**

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**9.** A virtual, erect and magnified image of an object is to be produced with a concave mirror of focal length 12 cm. Which of the following object distance should be chosen for this purpose?

    A. 10 cm

    B. 14 cm

    C. 18 cm

    D. 24 cm

**Answer: A**

**10.** For an object at infintiy, a concave mirror produces an image at its focus which is

    A. enlarged

    B. virtual

    C. erect

    D. real, inverted and diminished

**Answer: D**

**11.** The mirror used in automobiles to see the rear field of view is

A. concave

B. convex

C. plane

D. none of these

**Answer: B**

**12.** A mirror having a very wide field of view must be

    A. concave

    B. convex

    C. plane

    D. none of these

**Answer: B**

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**13.** The mirror used in search lights is

A. concave

B. convex

C. plane

D. none of these

**Answer: A**

**14.** A real image, equal in size to the object, is obtained when the object is placed at the centre of curvature in front of a

    A. concave mirror

    B. convex mirror

    C. plane mirror

    D. none of these

**Answer: A**

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**15.** The angle between the two refracting surfaces of a total reflecting prism is

A. $90°$

B. $60°$

C. $45°$

D. $30°$

**Answer: A**

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**16.** Shaving mirrors are

A. convex mirrors

B. concave mirrors

C. plane mirrors

D. none of these

**Answer: B**

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**17.** The relation between u, v and f for a mirror given by:

A. $f = \dfrac{uv}{u - v}$

B. $f = \dfrac{2u \times v}{u + v}$

C. $f = \dfrac{u \times v}{u + v}$

D. none of these

**Answer: C**

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**18.** If we say that the focal length of a spherical mirror is n times its radius of curvature, then n must be

A. $2.0$

B. $1.5$

C. $0.2$

D. none of these

**Answer: D**

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**19.** The magnification produced by a concave mirror

    A. is always more than one

    B. is always less than one

    C. is always equal to one

    D. may be less than equal to or greater than one

**Answer: D**

**20.** Choose the correct relation between u, v and r for a spherical mirror:

A. $R = \dfrac{2uv}{u+v}$

B. $R = \dfrac{2}{u+v}$

C. $R = \dfrac{2(u+v)}{(uv)}$

D. none of these

**Answer: A**

**21.** Which is the wrong statement out of the following?

A. A concave mirror can give a virtual image.

B. A convex mirror can give a virtual image.

C. A concave mirror can give a diminished virtual image.

D. A convex mirror cannot give a real image.

**Answer: C**

**22.** An inverted image can be seen in a convex mirror,

    A. under no circumstances

    B. when the object is very far from the mirror

    C. when the object is at a distance equal to the radius of curvature of the mirror

D. when the distance of the object from the

mirror is equal to the focal length of the

mirror

**Answer: A**

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**23.** The ratio of the size of the image to the

size of the object is known as

A. the focal plane

B. the transformation ratio

C. the efficiency

D. none of these

**Answer: D**

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**24.** The unit of magnification is

A. m

B. $m^2$

C. $m^{-1}$

D. none of these

**Answer: D**

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25. The laws of reflection are true for

A. the plane mirror only

B. the concave mirror only

C. the convex mirror only

D. all reflecting surfaces

**Answer: D**

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**26.** A virtual image is one which

    A. can he taken on a screen

    B. cannot be taken on a screen

    C. sometimes    can    be    and    sometimes

      cannot be taken on a screen

D. is formed only by a concave mirror

**Answer: B**

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**27.** When an object is placed between the focus and the pole of a concave mirror, the image formed is

A. real, inverted and small

B. real, inverted and same size

C. real, inverted and enlarged

D. virtual, erect and enlarged

**Answer: D**

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**28.** The line joining the pole and the centre of

curvature of a mirror is called the

A. aperture

B. principal section

C. principal axis

D. pole

**Answer: C**

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**29.** In order to get a diminished virtual image, the object can be placed anywhere in front of a

A. concave mirror

B. plane mirror

C. convex mirror

D. none of these

**Answer: C**

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**30.** The mirror used by dentists to concentrate light on the tooth to be examined is a _____ mirror.

A. concave

B. plane or concave

C. convex

D. plane

**Answer: A**

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**31.** When an object is at infinity from a concave mirror, the image formed is

A. at the focus

B. virtual and erect

C. highly enlarged

D. none of these

**Answer: A**

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**32.** When the object is at focus of a concave mirror, the image is formed at

A. focus

B. centre of curvature

C. within focus

D. infinity

**Answer: D**

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**33.** Which of the following ray diagrams is not

correct?

A.



A ray of light passing through focus F — Concave mirror

B.



A ray of light passing through the centre of curvature — Convex mirror

C.



A ray of light passing through the centre of curvature C — Concave mirror

D.



A ray of light parallel to the axis — Concave mirror
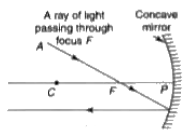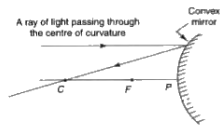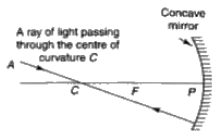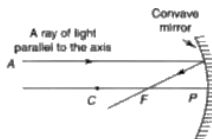
**Answer: B**

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**34.** When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. The nature of the image is

A. real

B. inverted

C. virtual and inverted

D. virtual and eract

**Answer: D**

**35.** Which of the following is a non-luminous body?

A. Fire

B. Sun

C. Stars

D. Earth

**Answer: D**

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**36.** Which of the following is a luminous body?

A. Fire

B. Earth

C. Moon

D. Tree

**Answer: A**

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**37.** Light year is the unit of

A. time

B. distance

C. intensity of light

D. none of these

**Answer: B**

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**38.** A substance through which light can pass is called a/an

A. optical medium

B. transparent body

C. opaque body

D. translucent body

Answer: A

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**39.** A body which allows most of the light to pass through it is called a/an

A. transparent body

B. opaque body

C. translucent body

D. none of these

**Answer: A**

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**40.** Choose the only correct option in case of a

concave mirror:

| Object distance | Image distance | Image size | Nature of image |
|---|---|---|---|
| (a) At C | At C | Equal to object | Real and inverted |
| (b) Beyond C | Between F and C | Diminished | Virtual and erect |
| (c) Between F and C | At infinity | Enlarged | Real and inverted |
| (d) At F | At infinity | Highly diminished | Virtual and erect |

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41. When light falls on matter, it can produce

A. mechanical effect only

B. chemical effect only

C. heating effect only

D. all the above

**Answer: D**

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**42.** The medium having same chemical properties in all directions is called

A. isotropic medium

B. anisotropic medium

C. optically denser medium

D. none of these

**Answer: A**

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**43.** Which of the following body allows only a part of the light to pass through it?

A. Oiled paper

B. Brick

C. Wood

D. Air

**Answer: A**

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**44.** The path along which light travels in a homogenous medium is called the

    A. beam of light

    B. ray of light

    C. pencil of light

D. none of these

**Answer: B**

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**45.** A thin layer of water is transparent but a very thick layer of water is

    A. translucent

    B. opaque

    C. most transparent

D. none of these

**Answer: A**

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**46.** The amount of light reflected depends upon

A. the nature of material of the object only

B. the nature of the surface only

C. the smoothness of the surface only

D. all the above

**Answer: D**

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**47.** Air is not visible because it

A. is nearly a perfectly transparent substance

B. neither absorbs nor reflects light

C. transmits whole of light

D. all the above are correct

**Answer: D**

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**48.** A real image is formed when two or more

A. reflected rays meet

B. refracted rays meet

C. reflected rays appear to meet

D. none of these

**Answer: A::B**

**49.** The image of our face in a plane mirror is

A. real

B. magnified

C. diminished

D. none of these

**Answer: D**

**50.** The nature of the image formed by a plane mirror is

    A. virtual and erect

    B. of the same size as the object

    C. laterally inverted

    D. all the above are correct

**Answer: D**

**51.** The sideways reversal of the image by plane mirror is called

A. lateral inversion

B. parallex

C. optical illusion

D. none of these

**Answer: A**

**52.** The middle point of the mirror is called

A. pole

B. centre of sphere

C. centre of curvature

D. none of these

Answer: A

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**53.** A person looks into the mirror by placing it close to his face. The image of his face was erect, laterally inverted and of the same size. Then, the mirror must be

A. plane

B. concave

C. convex

D. plane or concave

Answer: A

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**54.** A person looks into the mirror by placing it close to his face. if the image of the face was found erect and magnified, then the mirror must be

A. plane

B. concave

C. convex

D. plane or concave

**Answer: B**

55. The angle between the original path of the incident ray and the emergent ray coming out of a prism is called angle of

A. incidence

B. reflection

C. prism

D. deviation

Answer: D

**56.** Which of the following is employed to clearly view objects which cannot be seen directly due to obstruction?

A. Laser

B. Periscope

C. Kaleidoscope

D. None of these

**Answer: B**

**57.** A device for producing intense and coherent (waves in step) beam of light is called

A. laser

B. maser

C. search light

D. None of these

**Answer: A**

**58.** Which of the following correctly depicts reflec tions in case of plane mirrors inclined at $40°$?

A. 

B. 

C. 

D. 
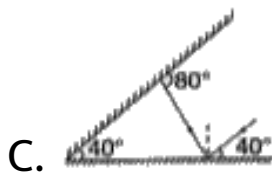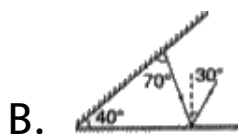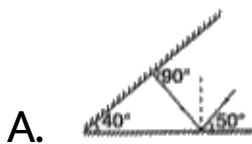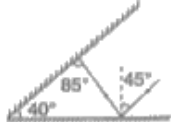
**Answer: A**

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**59.** A ray of light incident on a plane mirror at an angle $\theta$. If the angle between the incident and reflected rays is $80°$, what is the value of $\theta$ ?

A. $40°$

B. $50°$

C. $45°$

D. $55°$

**Answer: B**

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**60.** A ray of light is incident at an angle of $35°$

on a plane mirror. What is angle $\theta$ ?

35°

Plane mirror

Incident ray
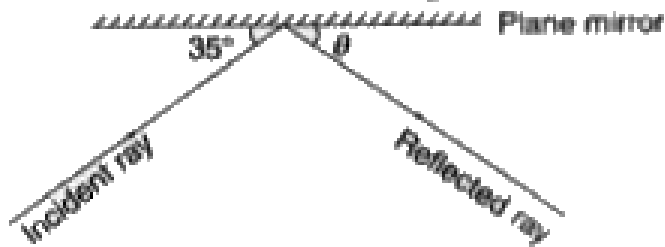
Reflected ray

A. $35°$

B. $45°$

C. $55°$

D. none of these

**Answer: A**

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**61.** A ray of light is incident at an angle of $35°$ on a plane mirror. What is the angle between the incident and the reflected rays ?

A. $90°$

B. $100°$

C. $110°$

D. none of these

**Answer: C**

**62.** If a ray of light incident on a plane mirror is such that it makes an angle of $30°$ with the mirror, then the angle of reflection is

A. $30°$

B. $45°$

C. $55°$

D. $60°$

**Answer: D**

**63.** If a ray of light incident on a plane mirror is such that it makes an angle of $30°$ with the mirror, then the angle made by the reflected ray with the mirror is

A. $30°$

B. $45°$

C. $55°$

D. $60°$

**Answer: A**

**64.** When a ray of light strikes a plane mirror at an angle of $15°$ with the mirror, what will be the angle through which the ray gets deviated?



A. $15°$

B. $30°$

C. $75°$
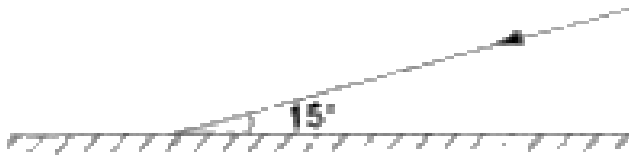
D. none of these

Answer: D

**65.** A boy is standing in front of a plane mirror at a distance of 3 m from it. What is the distance between the boy and his image?

A. 3 m

B. 4.5 m

C. 6 m

D. none of these

**Answer: C**

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66. A boy is standing in front of a plane mirror at a distance of 3 m from it. if the boy moves 1 m backward, the distance between the image and the boy is

A. 2 m

B. 4 m

C. 8 m

D. none of these

Answer: C

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**67.** The distance between the extreme points on the periphery of the mirror is called
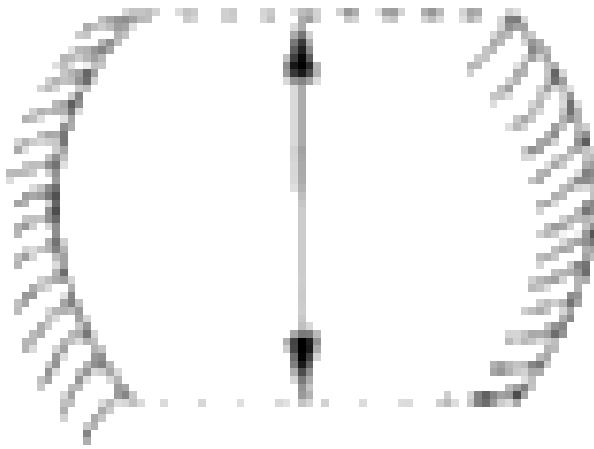
A. focal length

B. radius of curvature

C. principal section

D. none of these

**Answer: C**

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**68.** The centre of curvature of a _____ mirror is in front of it.

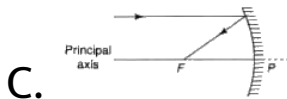    A. convex

    B. concave

    C. convex or concave

    D. none of these

**Answer: B**

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**69.** The centre of curvature of a _____ mirror is behind it.
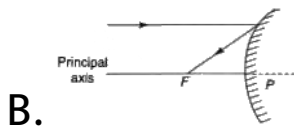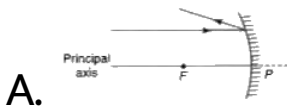
A. convex

B. concave

C. convex or concave

D. none of these

**Answer: A**

**70.** Which of the following correctly depicts the reflection of a ray of light on a spherical mirror?
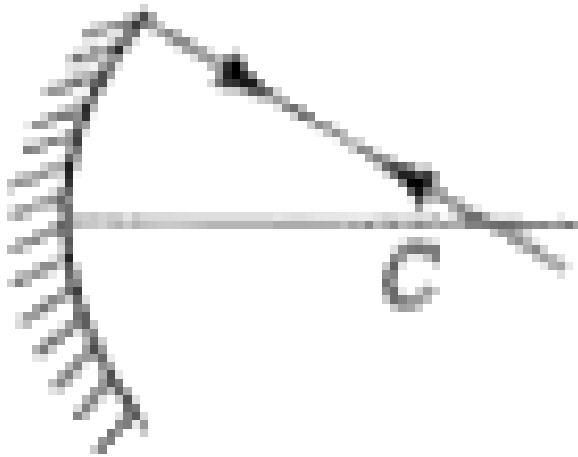
A. 

B. 

C. 

D. 
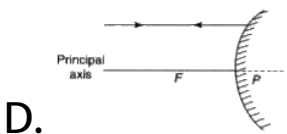
Answer: C

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## 71. A ray, emerging from a point on the object, passing through the centre of curvature C strikes the mirror normally i.e. at $90°$. Then, the angle of incidence is equal to
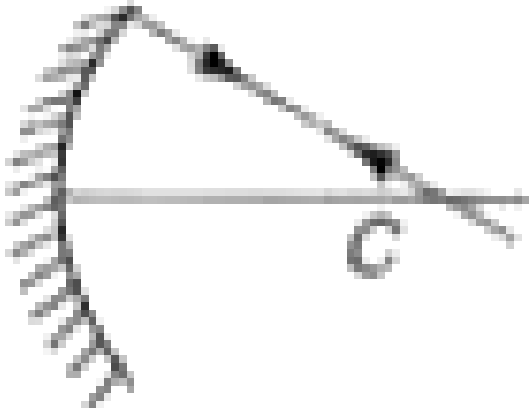


A. $0°$

B. $45°$

C. $90°$

D. $180°$

**Answer: A**

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**72.** A ray, emerging from a point on the object, passing through the centre of curvature C strikes the mirror normally i.e. at $90°$. Then,

the angle of reflection is equal to



A. $0°$

B. $45°$

C. $90°$

D. $180°$

**Answer: A**

**73.** Which of the following mirrors is used to concentrate light on a given spot?

A. Concave mirror

B. Convex mirror

C. Plane mirror

D. None of these

**Answer: A**

**74.** The concave mirrors are used in

    A. reflecting telescopes only
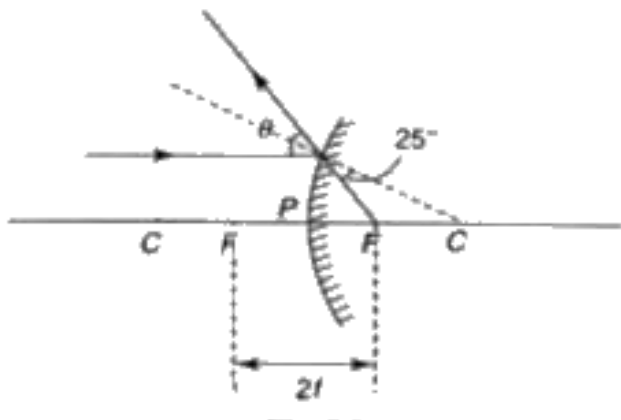
    B. magic-lanterns only

    C. cinema projectors only

    D. all the above

**Answer: D**

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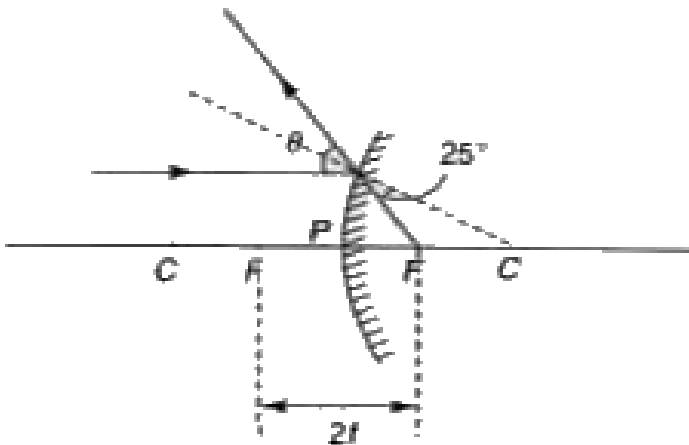**75.** What is the value of $\theta$ in the following ray diagram?



A. $25°$

B. $35°$

C. $50°$

D. None of these

**Answer: C**

**76.** The angle of reflection in the following ray

diagram ?



A. $25°$

B. $12.5^\circ$

C. $50^\circ$

D. none of these

**Answer: A**

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**77.** Velocity of electromagnetic waves in vacuum depends upon

A. frequency of waves

B. velocity of source

C. amplitude of waves

D. none of these

**Answer: D**

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**78.** The number of images observable between

two parallel plane mirrors is

A. 2

B. 4

C. 11

D. Infinite

**Answer: D**

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**79.** Light travels through a glass plate of thickness d and having refractive index $\mu$. If c is velocity of light in vacuum, the time taken by light to travel this thickness of glass is

A. $\dfrac{\mu d}{c}$

B. $\dfrac{t}{\mu c}$

C. $\mu c d$

D. $\dfrac{c d}{\mu}$

**Answer: A**

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**80.** Choose the wrong statement:

A. Speed of sound is much less than speed of light

B. Sound travels about 330 metres in one second

C. Light travels faster in vacuum than in air

D. Wavelength of light is longer than the wavelength of sound

**Answer: D**

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**81.** A plane mirror is approaching you at 8 cm/s. You are able to see your image in it. At what speed will your image approach you?

A. 4 cm/s

B. 8 cm/s

C. 16 cm/s

D. 24 cm/s

**Answer: D**

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**82.** A plane mirror is approaching you at 8 cm/s. You are able to see your image in it. At what speed will your image approach you?

A. 4 cm/s

B. 8 cm/s

C. 16 cm/s

D. 24 cm/s

**Answer: C**

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**83.** A plane mirror reflecting a ray of incident light is rotated through an angle of $30°$ about an axis through the point of incidence in the plane of the mirror and perpendicular to the plane of incidence then

    A. the incident ray is fixed

    B. the reflected ray rotates through an angle $\theta$

    C. the reflected ray rotates through an angle $\theta/2$

D. the reflected ray rotates through an angle of $2\theta$

**Answer: D**

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84. Laws of reflection hold good in case of

A. plane mirror only

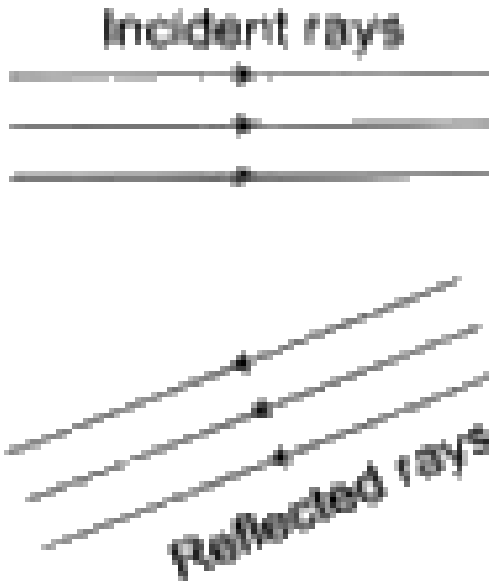B. convex mirror only

C. concave mirror only

D. all of the above

**Answer: D**

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**85.** Figure shows parallel rays incident on a

mirror. They are reflected as parallel rays. What

is the nature of the mirror?

Incident rays

Reflected rays

A. Plane

B. Concave

C. Convex

D. Parabolic

**Answer: A**

**86.** If an object is 40 cm away from a concave mirror of focal length 20 cm, the image will be

A. virtual

B. erect

C. diminished

D. of same size

**Answer: D**

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**87.** A ray is incident at an angle $40°$ with a mirror. The angle between the normal and reflected ray is

A. $40°$

B. $50°$

C. $60°$

D. $80°$

**Answer: B**

**88.** A convex mirror has a focal length f. A real object is placed at a distance f in front of it from the pole produces an image at

A. f

B. f/2

C. 2f

D. ∞

**Answer: B**

**89.** The frequency of incident light is $3 \times 10^{18}$

Hz. The frequency after reflection will

A. increase

B. decrease

C. remain same

D. either (a) or (b)

Answer: C

**90.** If a ray of light is incident on a plane mirror at an angle of incidence of $30°$, then deviation produced by the mirror is

A. $15°$

B. $30°$

C. $60°$

D. $120°$

**Answer: D**

**91.** A ray of light incident on the first mirror and parallel to the second mirror in reflected from the second mirror parallel to the first mirror .The angle between the two mirrors is

    A. $30°$

    B. $60°$

    C. $70°$

D. $90^\circ$

**Answer: B**

**92.** A convex mirror of focal length f produces an image $\left(\dfrac{1}{n}\right)^{th}$ of the size of the object. Then the distance of the object from the mirror is

A. nf

B. (n+1)f

C. (n-1)f

D. $\left(\dfrac{n}{n+1}\right)f$

**Answer: C**

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93. A concave mirror of focal length produces an image m times the size of the object. If image is real, then the distance of the object from mirror is

A. (m+1)f

B. $\left(\dfrac{m+1}{m}\right)f$

C. $\left(\dfrac{m-1}{m}\right)f$

D. mf

**Answer: B**

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**94.** A plane mirror produces a magnification of

A. 1

B. $-1$

C. 0

D. between 0 and $\infty$

Answer: A

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**95.** A concave mirror gives an image three times as large as the object placed at a distance of 20 cm from it. For the image to be real, the focal length should be

A. 5 cm

B. 15 cm

C. 20 cm

D. 30 cm

Answer: B

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Higher Order Thinking Questions

**1.** If velocity of radio waves is $3 \times 10^8$ m/s, the frequency corresponding to wavelength of 300 m is

    A. 1 KHz

    B. 10 KHz

    C. 1 MHz

    D. 10 MHz

**Answer: C**

**2.** A concave mirror of focal length $f$ (in air) is immersed in water $(\mu = 4/3)$. The focal length of the mirror in water will be

A. $\dfrac{f}{3}$

B. $\dfrac{f}{2}$

C. $\dfrac{3f}{4}$

D. f

**Answer: D**

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**3.** Signal from a remote control to the device operated by it travels with the speed of
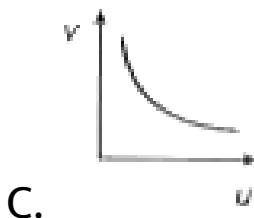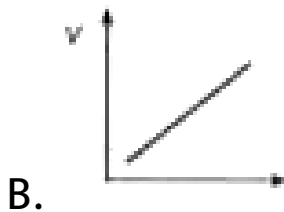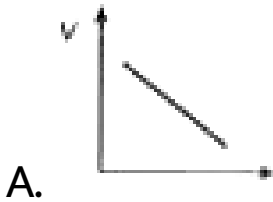
    A. light

    B. sound

    C. ultrasonics

    D. supersonics

**Answer: A**

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**4.** In case of a concave mirror, when we move the object from infinity to focus of the mirror (i.e., u decreases from ∞ to f), the image moves from focus to ∞. So, the correct graph is shown by

A. 

B. 

C. 

D.

**Answer: C**

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**5.** A ray of light is incident on a convex mirror at angle of incidence of $40°$. What is the ratio of angle of reflection to the angle of incidence?
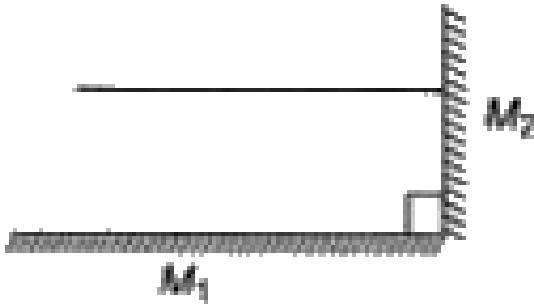
A. 1

B. $> 1$

C. $< 1$

D. $\infty$

**Answer: A**

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**6.** A ray of light strikes a silvered surface inclined to another one at an angle of $90°$.

Then the reflected ray will term through



A. $0°$

B. $45°$

C. $90°$

D. $180°$

**Answer: D**

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**7.** The focal length (f) of a spherical mirror of radius of curvature R is

A. R

B. $\dfrac{R}{2}$

C. $\dfrac{3R}{2}$

D. 2R

**Answer: B**

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**8.** A beam of light incident on a plane mirror forms a real image on reflection. The incident beam is

A. parallel

B. convergent

C. divergent

D. any of the above

**Answer: B**

**9.** A mirror produces magnified erect image of an object. The nature of the mirror is

A. convex

B. concave

C. plane

D. any of the above

Answer: B

**10.** A light ray is incident normally on a plane mirror. The angle of reflection will be

    A. $120°$

    B. $90°$

    C. $45°$

    D. $0°$

**Answer: D**

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