PYQs on REFLECTION AND REFRACTION (2014-2024)

Consider the following statements :

A real image

1. can be formed on a screen
2. is always magnified and inverted

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

If speed of light in air is 3×10^8 m/s, the speed of light in glass (with refractive index 1·5) would be

(a) 2×10^8 m/s

(b) $4 \cdot 5 \times 10^8$ m/s

(c) 3×10^8 m/s

(d) $1 \cdot 5 \times 10^8$ m/s

While looking at an image formed by a convex lens (one half of the lens is covered with a black paper), which one of the following will happen to the image?

(a) Half of the image will be visible

(b) Intensity of the image will be diminished

(c) Image will be inverted now

(d) One can see an image of smaller size

. In optical instruments, the lenses are used to form image by the phenomenon of

(a) reflection

(b) refraction

(c) scattering

(d) diffusion


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Statement I : Due to diffused or irregular reflection of light, a closed room gets light even if no direct sunlight falls inside the room.

Statement II : Irregular reflection, where the reflected rays are not parallel, does not follow the laws of reflection.

(a) Both the statements are individually true and Statement II is the correct explanation of Statement I

(b) Both the statements are individually true but Statement II is ***not*** the correct explanation of Statement I

(c) Statement I is true but Statement II is false

(d) Statement I is false but Statement II is true

Statement I : Diamond is very bright.

Statement II : Diamond has very low refractive index.

(a) Both the statements are individually true and Statement II is the correct explanation of Statement I

(b) Both the statements are individually true but Statement II is ***not*** the correct explanation of Statement I

(c) Statement I is true but Statement II is false

(d) Statement I is false but Statement II is true

. Optical fibres, though bent in any manner, allows light to pass through. What is the inference that one can draw from it ?

(a) The concept that light travels in straight path is wrong

(b) Light can flow through the optical fibres

(c) Light can travel through the fibres because of their ductility

(d) Light can travel through the fibres due to multiple total internal reflections

A ray of light when refracted suffers change in velocity. In this context, which one among the following statements is correct ?

(a) Velocity increases as the ray passes from a rarer to a denser medium

(b) Velocity decreases as the ray passes from a denser to a rarer medium

(c) Velocity decreases as the ray passes from a rarer to a denser medium

(d) Change of velocity does not depend on the nature of medium

. An object is placed 10 cm in front of a convex lens of focal length 15 cm. The image produced will be

(a) Real and magnified

(b) Virtual and magnified

(c) Virtual and reduced in size

(d) Real and reduced in size

A lady is standing in front of a plane mirror at a distance of 1 m from it. She walks 60 cm towards the mirror. The distance of her image now from herself (ignoring the thickness of the mirror) is

(a) 40 cm

(b) 60 cm

(c) 80 cm

(d) 120 cm

A pencil is placed upright at a distance of 10 cm from a convex lens of focal length 15 cm. The nature of the image of the pencil will be

(a) real, inverted and magnified

(b) real, erect and magnified

(c) virtual, erect and reduced

(d) virtual, erect and magnified

An object is placed at the centre of curvature of a concave mirror of focal length 16 cm. If the object is shifted by 8 cm towards the focus, the nature of the image would be

(a) real and magnified

(b) virtual and magnified

(c) real and reduced

(d) virtual and reduced

If the absolute refractive indices of glass and water are 3/2 and 4/3 respectively, what will be the ratio of velocity of light in glass and water ?

(a) 3 : 4

(b) 4 : 3

(c) 8 : 7

(d) 8 : 9

The radii of curvature of the faces of a double convex lens are 10 cm and 20 cm. The refractive index of the glass is 1·5. What is the power of this lens (in units of dioptre) ?

(a) +7·5 D

(b) –7·5 D

(c) +2·5 D

(d) +5·0 D

Which one of the following statements is correct about the magnification of an optical microscope ?

(a) Magnification increases with the increase in focal length of eyepiece

(b) Magnification increases with the increase in focal length of objective

(c) Magnification does not depend upon the focal length of eyepiece

(d) Magnification decreases with the increase in focal length of eyepiece

. Two convex lenses with power 2 dioptre are kept in contact with each other. The focal length of the combined lens system is

(a) 0·10 m

(b) 2 m

(c) 4 m

(d) 0·25 m

. Which one of the following is the natural phenomenon based on which a simple periscope works ?

(a) Reflection of light

(b) Refraction of light

(c) Dispersion of light

(d) Total internal reflection of light

. When a beam of white light passes through a glass prism, the colour of light beam that deviates the least is

(a) Blue

(b) Red

(c) Green

(d) Violet

. The Sun is seen little before it rises and for a short while after it sets. This is because of

(a) total internal reflection

(b) atmospheric refraction

(c) apparent shift in the direction of Sun

(d) dispersion

. Light waves are

(a) electro-mechanical waves

(b) electro-magnetic waves

(c) electro-optical waves

(d) magneto-optical waves

Which one of the following processes explains the splitting of a beam of white light into its constituent colours?

(a) Dispersion

(b) Reflection

(c) Diffraction

(d) Polarization

. A ray of light travels from a medium of refractive index n_1 to a medium of refractive index n_2. If angle of incidence is i and angle of refraction is r, then $\frac{\sin i}{\sin r}$ is equal to

(a) n_1

(b) n_2

(c) $\frac{n_2}{n_1}$

(d) $\frac{n_1}{n_2}$

). Light waves projected on oil surface show seven colours due to the phenomenon of

(a) polarization

(b) refraction

(c) reflection

(d) interference

Which one of the following statements is correct?

(a) The image formed by a concave mirror for an object lying at infinity is at the principal focus, highly diminished, real and inverted

(b) A ray of light parallel to the principal axis after reflection from a concave mirror appears to diverge from the principal focus of the mirror

(c) The focal length of a spherical mirror is double of its radius of curvature

(d) A ray of light travelling from a rarer medium to a denser medium bends away from the normal

1. Which one of the following statements is ***not*** correct ?

(a) The longest wavelength of light visible to human eye is about 700 nm

(b) The shortest wavelength of light visible to human eye is about 400 nm

(c) The wavelength of gamma rays is longer than that of X-rays

(d) The ability of a telescope to form separable images of close objects is called its resolving power

If the image of an object, formed by a concave mirror is virtual, erect and magnified, then the object is placed

(a) at the principal focus

(b) at the centre of curvature

(c) beyond the centre of curvature

(d) between the pole of the mirror and the principal focus

. When a ray of light enters a glass slab, then

(a) only the frequency changes

(b) frequency and velocity change

(c) frequency does not change

(d) frequency and wavelength change

Which one of the following statements is correct for a plane mirror?

(a) Its focal length is zero.

(b) The size of the image of an object placed in front of the mirror is slightly less than that of the object.

(c) The image is virtual, erect and laterally inverted.

(d) Its focal length is 200 cm.

An object is placed in front of a convex mirror. Which one of the following statements is correct?

(a) It will never form an inverted image.

(b) The image moves towards the focus when the object moves towards the mirror.

(c) Depending on the position of the object with respect to the mirror, the image can be inverted and real.

(d) The size of the image becomes larger than that of the object when the object is placed at a distance equal to half the focal length.

). If the focal length of a convex lens is 50 cm, which one of the following is its power?

(a) +2 dioptre

(b) +0·02 dioptre

(c) –0·5 dioptre

(d) +0·5 dioptre

A rainbow is produced due to which one of the following phenomena ?

(a) Dispersion of light

(b) Interference of light

(c) Diffraction of light

(d) Scattering of light by atmospheric dust

In case of a concave mirror, if an object is kept between principal focus F and pole P of the mirror, then which one of the following statements about the image is NOT correct ?

(a) The image will be virtual

(b) The image will be enlarged or magnified

(c) The image will be formed at infinity

(d) The image will be erect

A lens has a power of +2·0 Dioptre. Which one of the following statements about the lens is true ?

(a) The lens is concave and has a focal length of 0·5 metre

(b) The lens is convex and has a focal length of 2·0 metre

(c) The lens is convex and has a focal length of 0·5 metre

(d) The lens is concave and has a focal length of 2·0 metre

1. The Sun appears reddish during sunrise and sunset. The phenomenon in optics which is responsible for this appearance of the Sun is

(a) Reflection

(b) Total internal reflection

(c) Scattering

(d) Interference

. A lemon kept in water in a glass tumbler appears to be larger than its actual size. It is because of

(a) reflection of light

(b) scattering of light

(c) refraction of light

(d) polarization of light

Name the scientist who first used a glass prism to obtain the spectrum of sunlight

(a) C. V. Raman

(b) Lord Rayleigh

(c) Isaac Newton

(d) S. Chandrasekhar

2. Power of a lens of focal length 25 cm is

(a) +2·5 Dioptre

(b) +3 Dioptre

(c) +4 Dioptre

(d) +5 Dioptre

Spherical mirror formula relating an object distance 'u', image distance 'v' and focal length of mirror 'f' may be applied to a plane mirror when

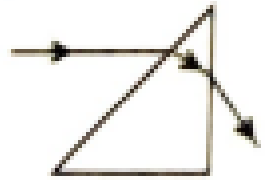
(a) focal length goes to infinity.

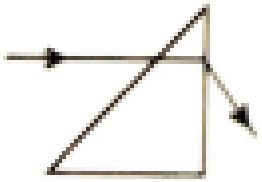
(b) focal length goes to zero.

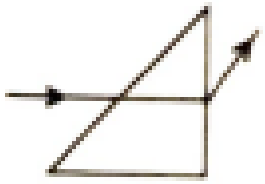
(c) image distance goes to zero.

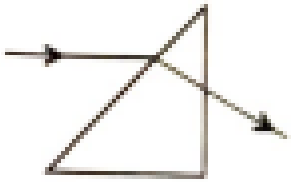
(d) image distance goes to infinity.

. Which one of the following figures correctly shows the path of a ray of light through a glass prism ?

(a) 

(b) 

(c) 

(d) 

When a light beam falls on a triangular glass prism, a band of colours is obtained. Which one of the following statements is correct in this regard ?

(a) Red light bends the most, as the refractive index of glass for red light is greatest.

(b) Red light bends the most, as the refractive index of glass for red light is lowest.

(c) Violet light bends the most, as the refractive index of glass for violet light is greatest.

(d) Violet light bends the most, as the refractive index of glass for violet light is lowest.

A lens has a power of +2·0 Dioptre. Which one of the following statements about the lens is true ?

(a) The lens is concave and has a focal length of 0·5 metre

(b) The lens is convex and has a focal length of 2·0 metre

(c) The lens is convex and has a focal length of 0·5 metre

(d) The lens is concave and has a focal length of 2·0 metre

Light rays move in straight lines. But through an optical fibre, they can move in any type of zigzag path because

(a) the holes through the fibre are extremely fine.

(b) light rays are absorbed at the entry end and relieved at the exit end of the fibre.

(c) scattering of light occurs inside the fibre.

(d) successive total internal reflections occur as a ray moves through the fibre.

Which one of the following statements regarding lenses is ***not*** correct ?

(a) A convex lens produces both real and virtual images.

(b) A concave lens produces both real and virtual images.

(c) A convex lens can produce images equal, greater and smaller than the size of the object.

(d) A concave lens always produces images smaller than the size of the object.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