

NDA-CDS 1 2025

GS

LIVE

PHYSICS

REFRACTION OF LIGHT

MCQS



NAVJYOTI SIR

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23 Jan 2025 Live Classes Schedule

9:00AM --- 23 JANUARY 2025 DAILY DEFENCE UPDATES --- DIVYANSHU SIR

10:00AM --- 23 JANUARY 2025 DAILY CURRENT AFFAIRS --- RUBY MA'AM

SSB INTERVIEW LIVE CLASSES

9:30AM --- COMPLETE PSYCHOLOGICAL TESTS --- ANURADHA MA'AM

AFCAT 1 2025 LIVE CLASSES

12:30PM --- REASONING - VENN DIAGRAMS --- RUBY MA'AM

3:00PM --- STATIC GK - BOOKS & AUTHORS --- DIVYANSHU SIR

4:30PM --- ENGLISH - SYNONYMS - CLASS 1 --- ANURADHA MA'AM

5:30PM --- MATHS - SI & CI --- NAVJYOTI SIR

NDA 1 2025 LIVE CLASSES

10:00AM --- MATHS - TRIGONOMETRY - CLASS 1 --- NAVJYOTI SIR

11:30AM --- MEDIEVAL HISTORY - CLASS 1 --- RUBY MA'AM

1:00PM --- PHYSICS - REFRACTION OF LIGHT --- NAVJYOTI SIR

4:30PM --- ENGLISH - SYNONYMS - CLASS 1 --- ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM --- MEDIEVAL HISTORY - CLASS 1 --- RUBY MA'AM

1:00PM --- PHYSICS - REFRACTION OF LIGHT --- NAVJYOTI SIR

4:30PM --- ENGLISH - SYNONYMS - CLASS 1 --- ANURADHA MA'AM

5:30PM --- MATHS - SI & CI --- NAVJYOTI SIR

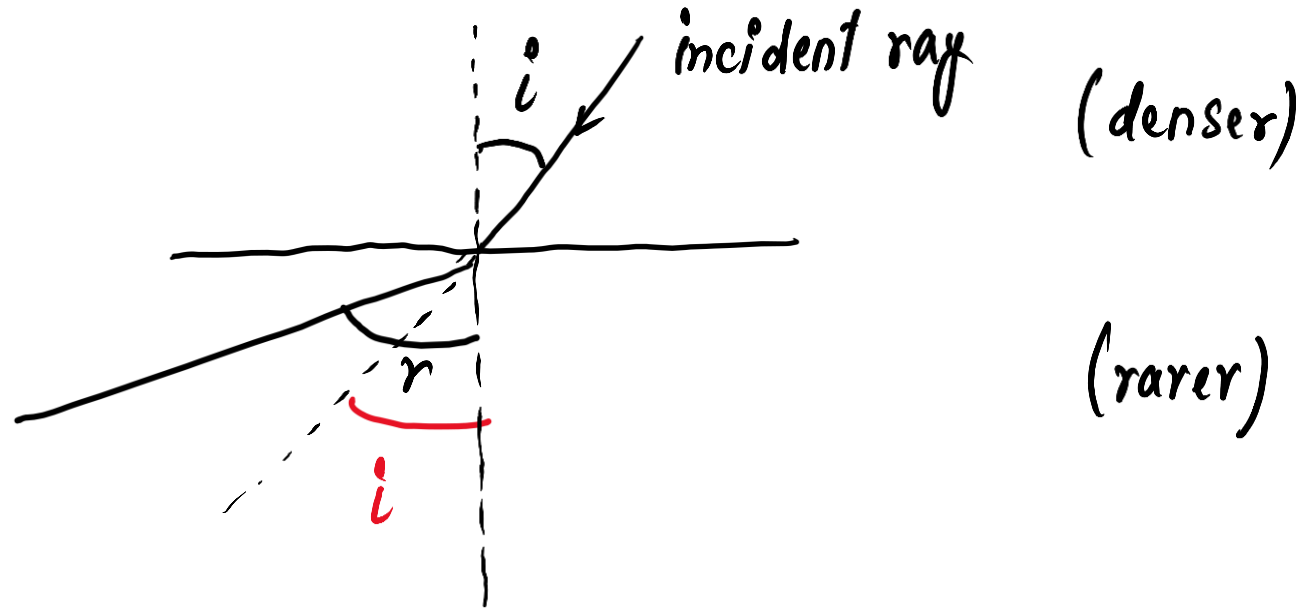


LIGHT – REFRACTION – PRACTISE MCQs



When A Light Ray Passes From A Denser Medium To A Rarer Medium , Which Angle Is Greater ?

- A. Angle Of Incidence
- B. Angle Of Refraction
- C. Both
- D. None Of The Above



When A Light Ray Passes From A Denser Medium To A Rarer Medium , Which Angle Is Greater ?

- A. Angle Of Incidence
- B. Angle Of Refraction**
- C. Both
- D. None Of The Above

The Power Of A Lens Is - 4.0 D. Which Lens Is It ?

A. Convex

B. Concave

C. Both

D. None Of The Above

$$\text{power, } P = \frac{1}{\text{focal length (f)}}$$

$$f = -ve \Rightarrow \underline{\text{concave lens}}$$

The Power Of A Lens Is -4.0 D. Which Lens Is It ?

A. Convex

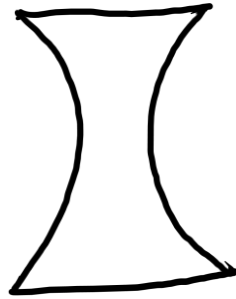
B. Concave

C. Both

D. None Of The Above

A Lens That Is Thinner At The Middle Than Edges Is

- A. Concave
- B. Convex
- C. Plano-concave
- D. Plano-convex



(concave lens)

A Lens That Is Thinner At The Middle Than Edges Is

A. Concave

B. Convex

C. Plano-concave

D. Plano-convex

Formula To Find The Refractive Index Of A Medium Is

- A. $n = \text{Speed Of Light In Medium} / \text{Speed Of Light In Air}$
- B. $n = 1 / \text{Speed Of Light In Medium}$
- C. $n = \text{Speed Of Light In Air} / \text{Speed Of Light In Medium}$ ✓
- D. $n = 1 / \text{Speed Of Light In Air}$

Formula To Find The Refractive Index Of A Medium Is

A. $n = \text{Speed Of Light In Medium} / \text{Speed Of Light In Air}$

B. $n = 1 / \text{Speed Of Light In Medium}$

C. $n = \text{Speed Of Light In Air} / \text{Speed Of Light In Medium}$

D. $n = 1 / \text{Speed Of Light In Air}$

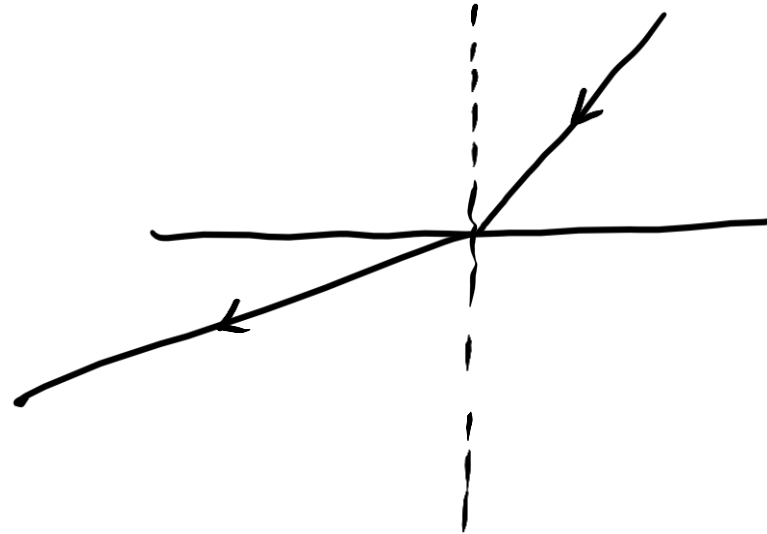
$$\left(n = \frac{c}{v} \right)$$

If A Light Ray Passes From Glass Into Air

- A. It Does Not Bend
- B. It Bends Away From The Normal ✓
- C. It Continues Along The Normal
- D. It Bends Towards The Normal

Glass - denser

Air - rarer



If A Light Ray Passes From Glass Into Air

- A. It Does Not Bend
- B. It Bends Away From The Normal**
- C. It Continues Along The Normal
- D. It Bends Towards The Normal

What Is The Unit Of Refractive Index ?

- A. m/s
- B. cm/s
- C. No units
- D. None of the above

$$n = \frac{\text{speed } (c)}{\text{speed } (v)}$$

What Is The Unit Of Refractive Index ?

A. m/s

B. cm/s

C. No units

D. None of the above

The refractive indices of two media are denoted by n_1 and n_2 , and the velocities of light in these two media are respectively v_1 and v_2 . If n_2/n_1 is 1.5, which one of the following statements is correct?

- (a) v_1 is 1.5 times v_2 .
- (b) v_2 is 1.5 times v_1 .
- (c) v_1 is equal to v_2 .
- (d) v_1 is 3 times v_2 .

$$\frac{n_2}{n_1} = 1.5$$

$$\frac{\left(\frac{c}{v_2}\right)}{\left(\frac{c}{v_1}\right)} = 1.5$$

$$\frac{v_1}{v_2} = 1.5 \Rightarrow v_1 = 1.5 v_2$$

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- (b) v_2 is 1.5 times v_1 .
- (c) v_1 is equal to v_2 .
- (d) v_1 is 3 times v_2 .

ANSWER : (A)

Which one of the following statements about the refractive index of a material medium with respect to air is correct?

- (a) It can be either positive or negative ✗
- (b) It can have zero value ✗
- (c) It is unity for all materials ✗
- (d) It is always greater than one ✓

$$\frac{n}{1}$$

→ cannot be negative

→ $n = \frac{c}{v} = 0 \Rightarrow c = 0 \rightarrow$ not possible

→ unity only for air/vacuum.

$$c > v$$

$$\frac{c}{v} > 1 \Rightarrow n > 1$$

Which one of the following statements about the refractive index of a material medium with respect to air is correct ?

- (a) It can be either positive or negative
- (b) It can have zero value
- (c) It is unity for all materials
- (d) It is always greater than one

ANSWER : (D)

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

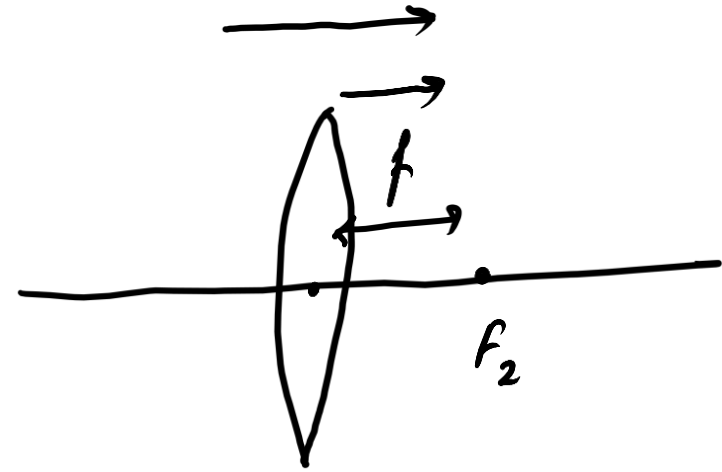
(c) -0.5 dioptre

(d) +0.5 dioptre

$$f = +50 \text{ cm}$$

$$P = \frac{100}{f(\text{in cm})} = \frac{100}{50}$$

$$= \underline{\underline{+2 \text{ D}}}$$



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

ANSWER : (A)

- (a) +2 dioptre
- (b) +0.02 dioptre
- (c) -0.5 dioptre
- (d) +0.5 dioptre

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

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

ANSWER : (B)

- (a) total internal reflection
- (b) atmospheric refraction
- (c) apparent shift in the direction of Sun
- (d) dispersion

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.

X (virtual & erect images always)

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

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- (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.

ANSWER : (B)

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.

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- (c) scattering of light occurs inside the fibre.
- (d) successive total internal reflections occur as a ray moves through the fibre.

ANSWER : (D)

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

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

ANSWER : (C)

- (a) reflection of light
- (b) scattering of light
- (c) refraction of light
- (d) polarization of light

A lens has a power of +2.0 Dioptr. 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

+2.0 D



Convex lens

$$(P = +ve \Rightarrow f = +ve)$$

$$P = \frac{1}{f}$$

$$f = \frac{1}{P} = \frac{1}{2} = 0.5 \text{ metres}$$

A lens has a power of +2.0 Dioptré. Which one of the following statements about the lens is true ?

ANSWER : (C)

- (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

The refractive index of fused quartz is 1.46 and that of sapphire is 1.77. If v_q is the speed of light in quartz and v_s is the speed of light in sapphire, then which one of the following relations is correct?

(a) $v_q > v_s$

(b) $v_s > v_q$

(c) $v_s = v_q$

(d) $v_s = \frac{v_q}{2}$

$$n_q = 1.46$$

$$n_s = 1.77$$

$$n_s > n_q$$

$$v_s < v_q$$

n and v have inverse relation.

The refractive index of fused quartz is 1.46 and that of sapphire is 1.77. If v_q is the speed of light in quartz and v_s is the speed of light in sapphire, then which one of the following relations is correct ?

(a) $v_q > v_s$

(b) $v_s > v_q$

(c) $v_s = v_q$

(d) $v_s = \frac{v_q}{2}$

ANSWER : (A)

Twinkling of stars is due to

- (a) particular frequencies of the starlight.
- (b) reflection of starlight from the oceanic surface.
- (c) atmospheric refraction of starlight.
- (d) magnetic field of Earth.

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ANSWER : (C)

Power of a lens of focal length 25 cm is

- (a) +2.5 Dioptre
- (b) +3 Dioptre
- (c) +4 Dioptre
- (d) +5 Dioptre

$$P = \frac{100}{f(\text{in cm})} \quad \left. \vphantom{P = \frac{100}{f(\text{in cm})}} \right\} P = \frac{1}{f(\text{m})}$$
$$= \frac{100}{25} = \underline{\underline{+4D}}$$

Power of a lens of focal length 25 cm is

- (a) +2.5 Dioptre
- (b) +3 Dioptre
- (c) +4 Dioptre
- (d) +5 Dioptre

ANSWER : (C)

When A Ray Of Light Enters From One Medium To Another , Which Of The Following Does Not Change ?

- A. Speed**
- B. Frequency**
- C. Both**
- D. None Of The Above**

When A Ray Of Light Enters From One Medium To Another , Which Of The Following Does Not Change ?

A. Speed

B. Frequency

C. Both

D. None Of The Above

Which of the following materials cannot be used to make a lens ?

A. Glass ✓

B. Water ✓

C. Clay ✗

D. Plastic ✓

↓
transparent material

Which of the following materials cannot be used to make a lens ?

A. Glass

B. Water

C. Clay

D. Plastic

The Refraction Of Light Is Commonly Known As ?

- A. Bending**
- B. Scattering**
- C. Reflection**
- D. Interference**

The Refraction Of Light Is Commonly Known As ?

- A. Bending**
- B. Scattering**
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Mirage is an illustration of

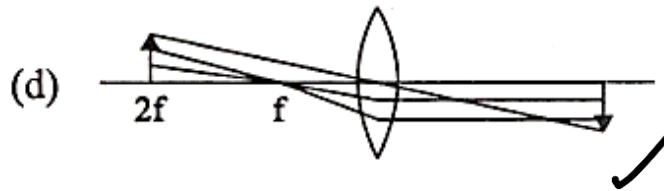
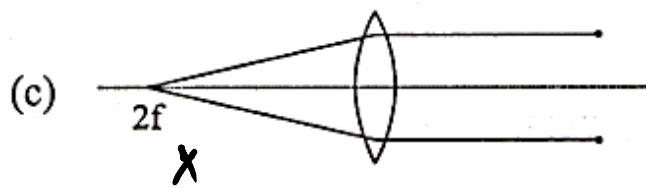
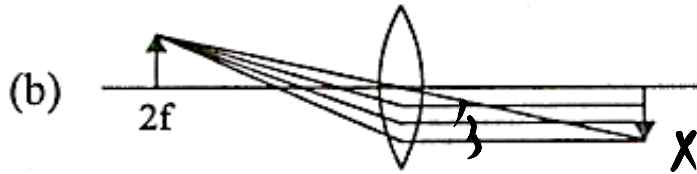
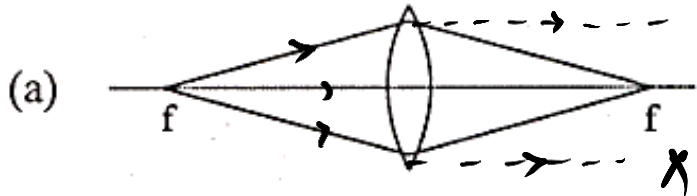
- (a) only dispersion of light.
- (b) only reflection of light.
- (c) only total internal reflection of light.
- (d) both refraction and total internal reflection of light.

Mirage is an illustration of

- (a) only dispersion of light.
- (b) only reflection of light.
- (c) only total internal reflection of light.
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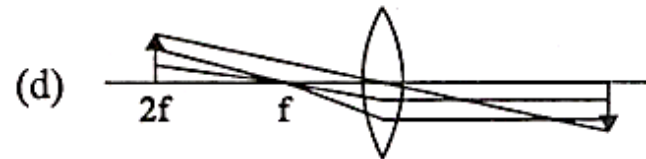
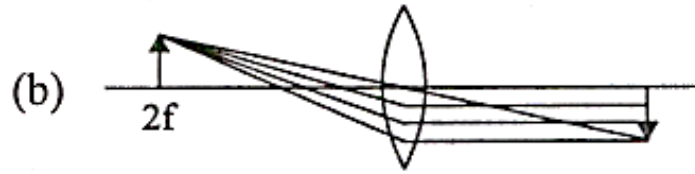
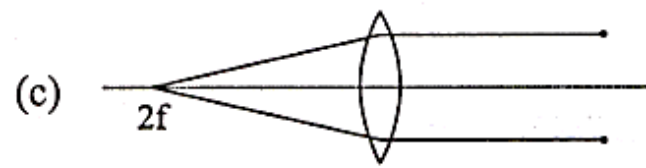
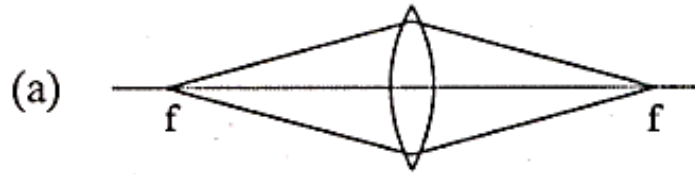
ANSWER : (D)

Which one among the following figures correctly represents the ray diagram? (Consider the lens to be thin)



Rays from f should go parallel after passing the lens,

Which one among the following figures correctly represents the ray diagram? (Consider the lens to be thin)



ANSWER : (D)

Which one among the following is the correct focal length of a combination of lenses of power 2.5 D and -2.0 D ?

- (a) +0.5 m
- (b) -0.5 m
- (c) +2.0 m
- (d) -2.0 m

$$\begin{aligned} \text{combined power} &= P_1 + P_2 \\ &= 2.5D - 2.0D = \underline{+0.5D} \end{aligned}$$

$$f = \frac{1}{P} = \frac{1}{0.5} = \underline{+2\text{ m}}$$

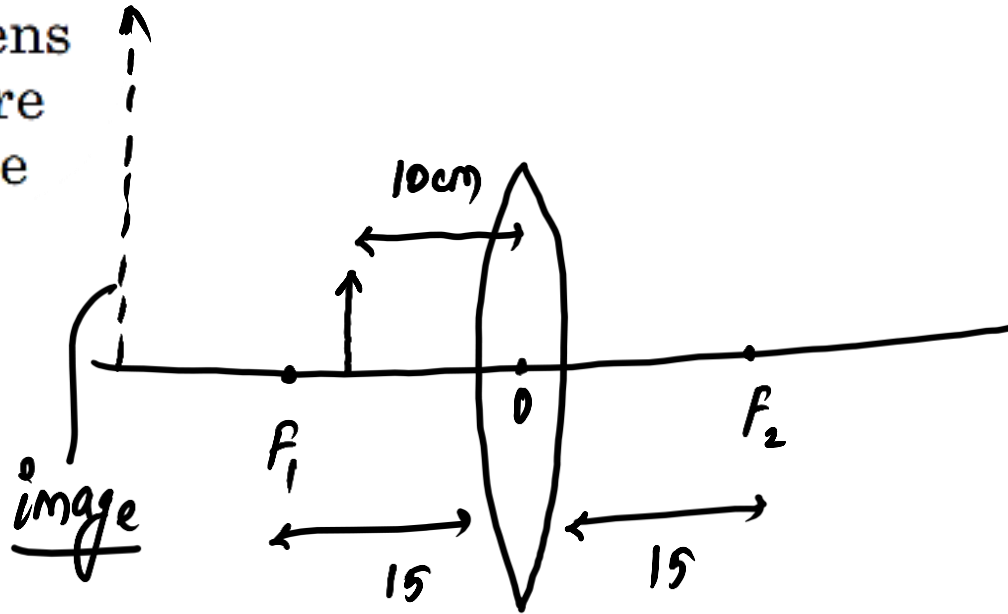
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- (a) $+0.5\text{ m}$
- (b) -0.5 m
- (c) $+2.0\text{ m}$
- (d) -2.0 m

ANSWER : (C)

A pencil is placed upright at a distance 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 ✓



Object is placed in between F_1 and O .

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- (a) real, inverted and magnified
- (b) real, erect and magnified
- (c) virtual, erect and reduced
- (d) virtual, erect and magnified

ANSWER : (D)

Which one of the following statements is not correct?

- (a) The radius of curvature of a concave mirror is twice its focal length ✓
- (b) Power of a convex lens is negative and that of a concave lens is positive ✗
- (c) The radius of curvature of a plane mirror is infinity
- (d) When a ray of light passes from an optically denser medium to an optically rarer medium, then the angle of refraction is greater than the corresponding angle of incidence

$$R = 2f$$

$$\left. \begin{array}{l} \text{convex lens} \Rightarrow f = +ve \Rightarrow P = +ve \\ \text{concave lens} \Rightarrow f = -ve \Rightarrow P = -ve \end{array} \right\}$$

Which one of the following statements is not correct?

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- (b) Power of a convex lens is negative and that of a concave lens is positive
- (c) The radius of curvature of a plane mirror is infinity
- (d) When a ray of light passes from an optically denser medium to an optically rarer medium, then the angle of refraction is greater than the corresponding angle of incidence

ANSWER : (B)

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

Which one of the following statements is correct?

ANSWER : (A)

- (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

Statement I Diamond is very bright.

Statement II Diamond has very low refractive index.

Total internal 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.

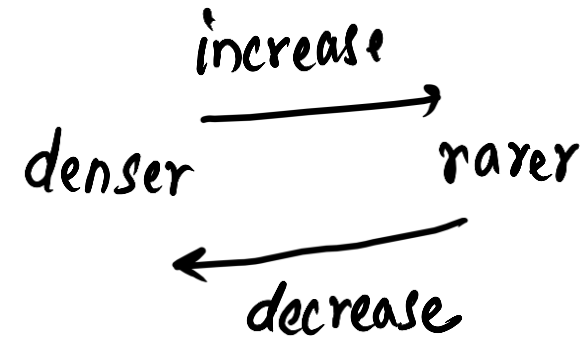
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- (d) Statement I is false but Statement II is true

ANSWER : (C)

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



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
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- (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

ANSWER : (C)

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

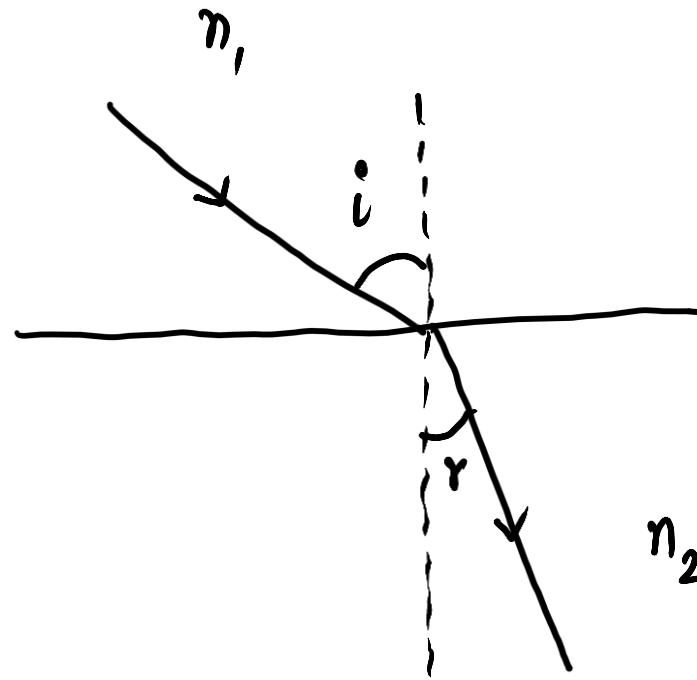
equal to

(a) n_1

(b) n_2

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

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



$$n_1 \cdot \sin i = n_2 \cdot \sin r \quad (\text{Snell's law of refraction})$$

$$\frac{\sin i}{\sin r} = \frac{n_2}{n_1}$$

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) $\frac{n_1}{n_2}$

ANSWER : (C)

If speed of light in air is 3×10^8 m/s, then the speed of light in glass (with refractive index 1.5) would be

$$n = \frac{c}{v}$$

(a) 2×10^8 m/s (b) 4.5×10^8 m/s

(c) 3×10^8 m/s (d) 1.5×10^8 m/s

$$1.5 = \frac{3 \times 10^8 \text{ m/s}}{v}$$

$$v = \frac{3 \times 10^8}{1.5} = 2 \times 10^8 \text{ m/s}$$

If speed of light in air is 3×10^8 m/s, then the speed of light in glass (with refractive index 1.5) would be

- (a) 2×10^8 m/s (b) 4.5×10^8 m/s
(c) 3×10^8 m/s (d) 1.5×10^8 m/s

ANSWER : (A)

Rays of light get refracted while passing from air to glass because

- (a) density of glass is higher than that of air ✗
- (b) they cannot be reflected from a glass surface ✗
- (c) glass absorbs energy from the light rays ✗
- (d) speed of light in glass is less than the speed of light in air ✓

Rays of light get refracted while passing from air to glass because

- (a) density of glass is higher than that of air
- (b) they cannot be reflected from a glass surface
- (c) glass absorbs energy from the light rays
- (d) speed of light in glass is less than the speed of light in air

ANSWER : (D)

An optician prescribes a power
 $= -0.5 \text{ D}$. The corresponding lens
must be a _____

- (a) convex lens of focal length 2 m
- (b) convex lens of focal length 50 cm
- (c) concave lens of focal length 2 m
- (d) concave lens of focal length 50 cm

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 $= -0.5 \text{ D}$. The corresponding lens
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- (a) convex lens of focal length 2 m
- (b) convex lens of focal length 50 cm
- (c) concave lens of focal length 2 m
- (d) concave lens of focal length 50 cm

ANSWER : (C)

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HUMAN EYE & COLOURFUL WORLD

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