



PHYSICS

BOOKS - NAVNEET SCIENCE (HINGLISH)

REFRACTION OF LIGHT

Textbook 73

1. What is meant by reflection of light ?



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2. What are the laws of reflection ?



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Textbook 74

1. Will light travel through a glass slab with the same velocity as it travels in air ?



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2. Will the velocity of light be same in all media?



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Question Answers

1. The phenomenon of change in the of light when it passes obliquely from one transparent medium to another is called refraction.



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2. The refraction index depends upon theof propagation of lighting different media.



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3. The process of separation of light into its component colours while passing through a medium is called



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4. When a light ray travels obliquely from air to water, it bends..... the normal at the point of incidence.



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5. When a light ray travels obliquely from benzene to air, it bends the normal at the point of incidence.



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6. In glass, the speed of red ray is violet ray.



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7. The speed of light in glass is
in water.



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8. The speed of light in water is in benzene.



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9. Rainbow occurs due to refraction, dispersion, and again refraction of sunlight by water droplets.



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10. In dispersion of sunlight by a glass prism
..... ray is deviated the least.



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Fill In The Blanks

1. Refraction index depends on the
..... of light.



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2. The change in of light rays while going from one medium to another is called refraction

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Speed of light in the first medium (v_1)	Speed of light in the second medium (v_2)	Refractive index ${}_2n_1$	Refractive index ${}_2n_1$
3×10^8 m/s	1.2×10^8 m/s	-----	-----
-----	2.25×10^8 m/s	4/3	-----
2×10^8 m/s	-----	-----	1.5

3. Fill up

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Rewrite The Following Statements By Selecting The Correct Options

1. The change in the direction of propagation of light when it passes obliquely from one transparent medium to another is called

.....

A. dipersion

B. scattering

C. refraction

D. reflection

Answer: refraction



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2. When a ray of light travels from glass slab to air and strikes normally the surface of separation ,then it

A. bends towards the normal

B. bends away from the normal

C. passes unbent

D. passes in zizag way

Answer: passes unbent



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3. If a ray of light passes from a denser medium to a rarer medium in a straight line, the angle of incidence must be

A. 0°

B. 30°

C. 60°

D. 90°

Answer: 0°



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4. A ray of light strikes a glass slab at an angle of 50° with the normal to the surface of the slab. What is the angle of incidence?

A. 50°

B. 25°

C. 40°

D. 100°

Answer: A



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5. If a ray of light propagating in air strikes a glass slab at an angle of 60° with the surface

of the slab, the angle of refraction is

.....

A. more than 30°

B. less than 30°

C. 60°

D. 30°

Answer: less than 30°



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6. A ray of light gets deviated when it passes obliquely from one medium to another medium because

- A. the colour of light changes
- B. the frequency of light changes
- C. the speed of light changes
- D. the intensity of light changes

Answer: the speed of light changes



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7. The speed of light in turpentine oil is $2 \times 10^8 \text{ m/s}$. The absolute refractive index of turpentine oil is about [Speed of light in vacuum $\approx 3 \times 10^8 \text{ m/s}$]

A. 1.5

B. 2

C. 1.3

D. 0.67

Answer: 1.5



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8. LASER stands for

A. light application by stimulated emission
of radiation.

B. light and sound energy radiation

C. light and simulated energy radiation

D. light amplification by sound energy
radiation.

Answer:



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9. Out of the following has the highest absolute refractive index.

A. fused quartz

B. diamond

C. crown glass

D. ruby

Answer: diamond



10. The absolute refractive index

.

A. is expressed in diopetre

B. is expressed in m / s

C. of air is about $\frac{4}{3}$

D. has no unit.

Answer: has no unit



11. The speed of light in a medium of refractive index n is where c is the speed of light in vacuum.

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

B. nc

C. $\frac{n}{c}$

D. $\sqrt{\frac{c}{n}}$

Answer: $\frac{c}{n}$



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12. The speed of light in a transparent medium having absolute refraction index 1.25 is [Speed of light in vacuum $\approx 3 \times 10^8 m / s$]

A. $1.25 \times 10^8 m / s$

B. $2.4 \times 10^8 m / s$

C. $3.0 \times 10^8 m / s$

D. $1.5 \times 10^8 m / s$

Answer: $2.4 \times 10^8 m / s$



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13. light is deviated the maximum in the spectrum of white light obtained with a glass prism.

A. Red

B. Yellow

C. Violet

D. Blue

Answer: Violet



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14. light is deviated the least in the spectrum of white light obtained with a glass prism.

A. Red

B. Yellow

C. Violet

D. Blue

Answer: Red



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15. A ray of light makes an angle of 50° with the surface S_1 of the glass slab. Its angle of incidence will be ____

A. 50°

B. 40°

C. 140°

D. 0°

Answer: D



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16. A glass slab is placed in the path of a beam of convergent light. The point of convergence of light

- A. moves away from the slab
- B. moves towards the slab
- C. remains at the same point
- D. undergoes a latent shift

Answer: moves away from the slab



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17. In refraction of light through a glass slab ,
the directions of the incident ray and the
refracted ray are

A. perpendicular to each other

B. non-parallel to each other

C. parallel to each other

D. intersecting each other.

Answer: parallel to each other



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18. In the position of minimum deviation when a ray of yellow light passes through the prism, then its angle of incidence is

A. the angle of deviation goes on decreasing

B. the angle of deviation decreases but after certain value of incident angle,

deviation angle increases.

C. the angle of deviation goes on increasing

D.

Answer:



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Mark The Correct Answer In The Following Questions

1. What is the reason for the twinkling of stars

?

A. Explosions occurring in stars from time

to time

B. Absorption of light in the earth's

atmosphere

C. Motion of stars

D. Changing refractive index of the

atmospheric gases

Answer:



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2. We can see the Sun even when it is little below the horizon because of

- A. reflection of light
- B. refraction of light
- C. dispersion of light
- D. absorption of light

Answer: refraction of light



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3. If the refractive index of glass with respect to air is $\frac{3}{2}$, what is the refractive index of air with respect to glass ?

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

B. 3

C. $\frac{1}{3}$

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

Answer: $\frac{2}{3}$



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State Whether The Following Statements Are True Or False

1. The incident ray and the refracted ray of light are on the opposite sides of the normal at the point of incidence.



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2. The refractive index of a medium (such as glass) does not depend on the wavelength of light.



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3. When a light ray travels obliquely from an optically rarer medium to an optically denser medium, it bends away from the normal



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4. When a light ray travels obliquely from glass to air, it bends towards the normal.



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5. If the angle of incidence is 0° , the angle of refraction is 90° .



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6. In dispersion of light by a glass prism, yellow colour is deviated the least.



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7. In vacuum, the speed of light does not depend upon the frequency of light.



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8. In glass, the speed of violet ray is less than that of red ray.



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9. In a material medium, the speed of light depends on the frequency of light .



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10. The velocity of light is different in different media.



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11. The wavelength of red light is close to 700 nm.



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12. Wavelength of orange light is greater than that of blue light.



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Find The Odd One Out And Give The Reason

1. Reflection, Neutralization, Refraction, Dispersion.



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Answer The Question

1. Mention any two phenomena in nature where refraction of light takes place.



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2. What is the angle of refraction when the angle of incidence is 0° ?



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3. In refraction of light, $\frac{\sin i}{\sin r} = \text{constant}$ in a particular case. What is this constant called?



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4. If the refractive index of medium 2 with respect to medium 1 is $5/3$, what is the refractive index of medium 1 with respect to medium 2 ?



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5. In dispersion of sunlight by a glass prism, which colour is deviated the least ?



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6. In dispersion of sunlight by a glass prism, which colour is deviated the most ?



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7. What is the wavelength of violet light?



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8. State the relation between n_2 , n_1 and critical angle



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9. Material: Glass, 5 rupee coin, pencil, metallic vessel, etc.

Activity 1 :

1. Take a transparent glass and fill it with

water.

2. Dip some portion of a pencil vertically in water and observe the thickness of the portion of the pencil, in water.



3. Now keep the pencil inclined to water surface and observe its thickness.

In both cases, the portion of the pencil inside water appears to be thicker than the portion above water. In the second case, the pencil appears to be broken near the surface of water. Why does it happen?

Activity 2:

1. Keep a 5 rupee coin in a metallic vessel.
2. Slowly go away from the vessel.
3. Stop at the place when the coin disappears.



4. Keep looking in the direction of the coin :
5. Ask a friend to slowly fill water in the vessel .

You will be able to see the coin once the level of water reaches a certain height. Why does it happen ?

In both the above activities the observed effects are created due to the change in the direction of propagation of light while coming out of water. As light rays travel obliquely from

water to air,they bend away from the normal. Light changes its direction of propagation when going obliquely from one transparent medium to another transparent medium. This is called the refraction of light.

What is meant by refraction of light ?



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10. Material: Glass, 5 rupee coin, pencil, metallic vessel,etc.

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1. Take a transparent glass and fill it with water.

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out of water. As light rays travel obliquely from water to air, they bend away from the normal. Light changes its direction of propagation when going obliquely from one transparent medium to another transparent medium. This is called the refraction of light.

Why is there a change in the direction of propagation of light when it passes obliquely from one transparent medium to another ?



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1. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

4. Now remove the chip and the pins and draw a straight line going through points C and D so that it intersects SR at M.

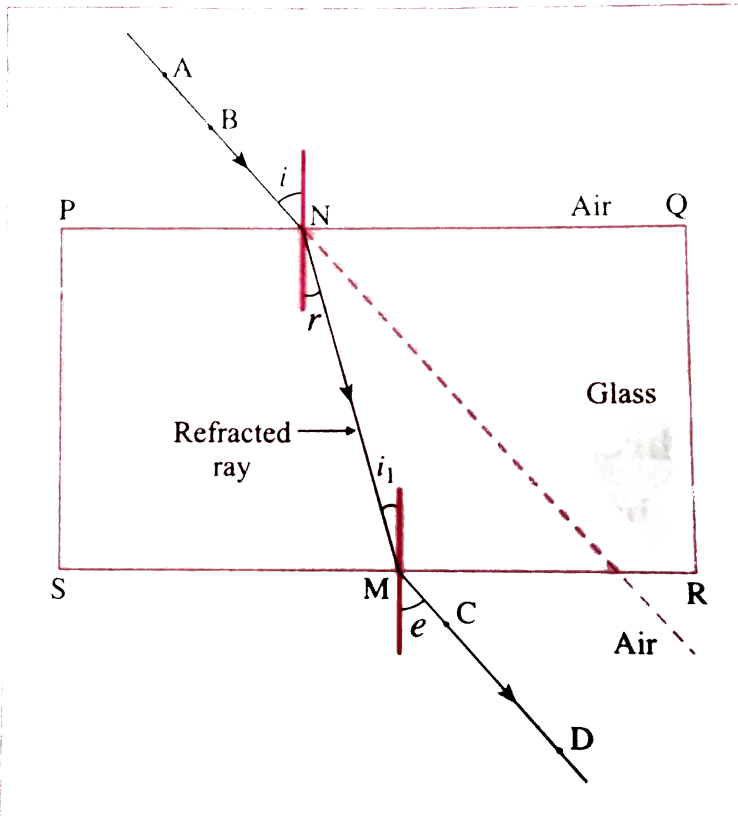
5. Join points M and N. Observe the incident ray AN and emergent ray MD.

The first refraction occurs when light ray enters the glass from air at N on the side PQ.

The second refraction occurs when light enters air through the glass at point M on the side SR. For the first refraction the angle of incidence is i while for the second it is i_1 . The angle of refraction at N is r .

Note that $i_1 = r$. In the second refraction, the

angle of refraction is e which is equal to i . On both parallel side PQ and RS of the glass slab, the change in direction of light ray is equal but in opposite directions.



Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on

the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

In the case of refraction of light through a glass slab, the emergent ray is parallel to the incident ray, but it is displaced sideways. Why does this happen ?



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2. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

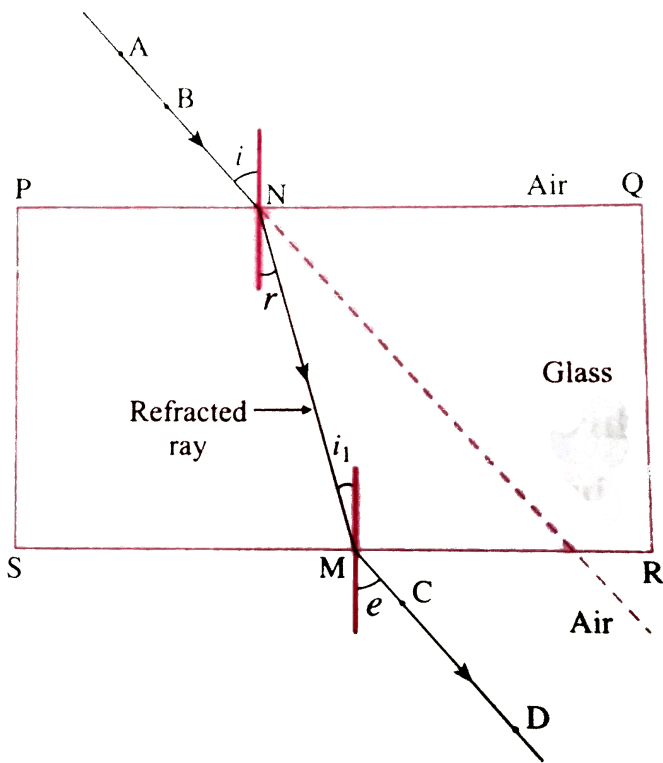
3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

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5. Join points M and N. Observe the incident ray AN and emergent ray MD.

The first refraction occurs when light ray enters the glass from air at N on the side PQ. The second refraction occurs when light enters air through the glass at point M on the side SR. For the first refraction the angle of incidence is i while for the second it is i_1 . The angle of refraction at N is r .

Note that $i_1 = r$. In the second refraction, the angle of refraction is e which is equal to i . On both parallel side PQ and RS of the glass slab, the change in direction of light ray is equal but in opposite directions.



Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

Define angle of incidence and angle of refraction.



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3. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line

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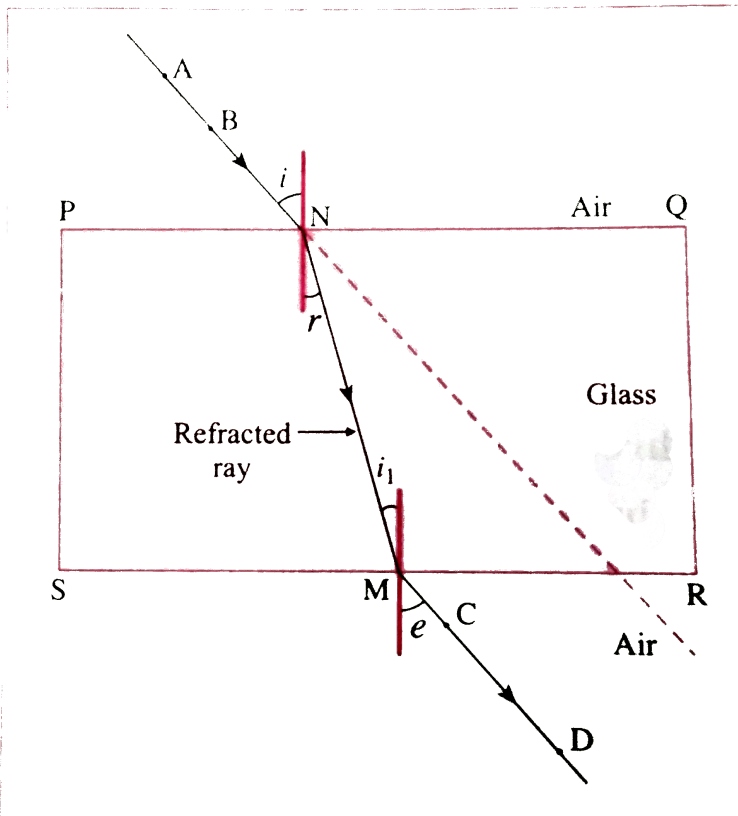
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Thus, the light ray MD emerging from the

glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

Repeat the activity "Refraction of light passing through a glass slab" by replacing the glass slab by a transparent plastic slab.

What is similarity do you observe?



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4. Activity 3 :

1. Keep a glass slab on a blank paper and draw

its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

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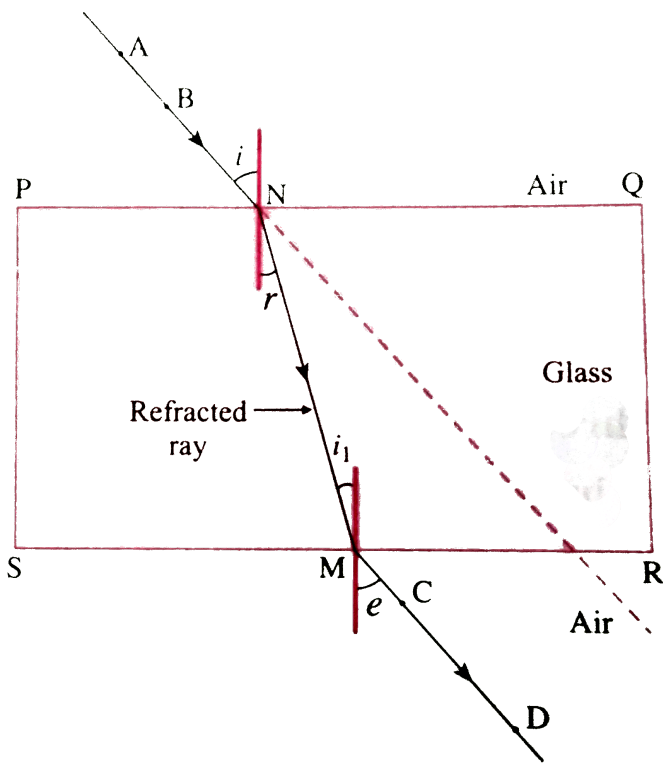
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ray AN and emergent ray MD.

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Note that $i_1 = r$. In the second refraction, the angle of refraction is e which is equal to i . On both parallel side PQ and RS of the glass slab, the change in direction of light ray is equal but in opposite directions.



Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

Repeat the activity "Refraction of light passing through a glass slab" by replacing the glass

slab by a transparent plastic slab.

What difference do you notice ?



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5. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.
2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

4. Now remove the chip and the pins and draw a straight line going through points C and D so that it intersects SR at M.

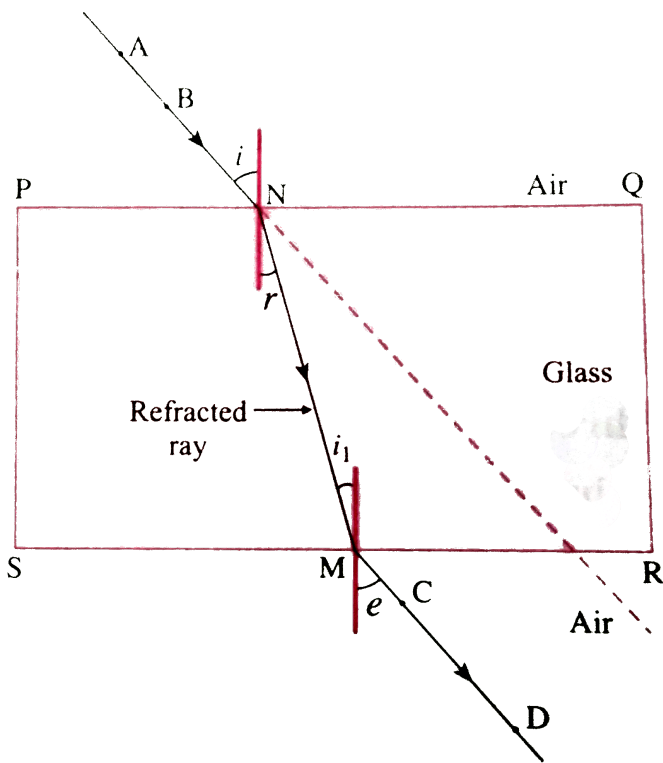
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Note that $i_1 = r$. In the second refraction, the angle of refraction is e which is equal to i . On both parallel side PQ and RS of the glass slab, the change in direction of light ray is equal but in opposite directions.



Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

State the laws of refraction of light.



6. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line

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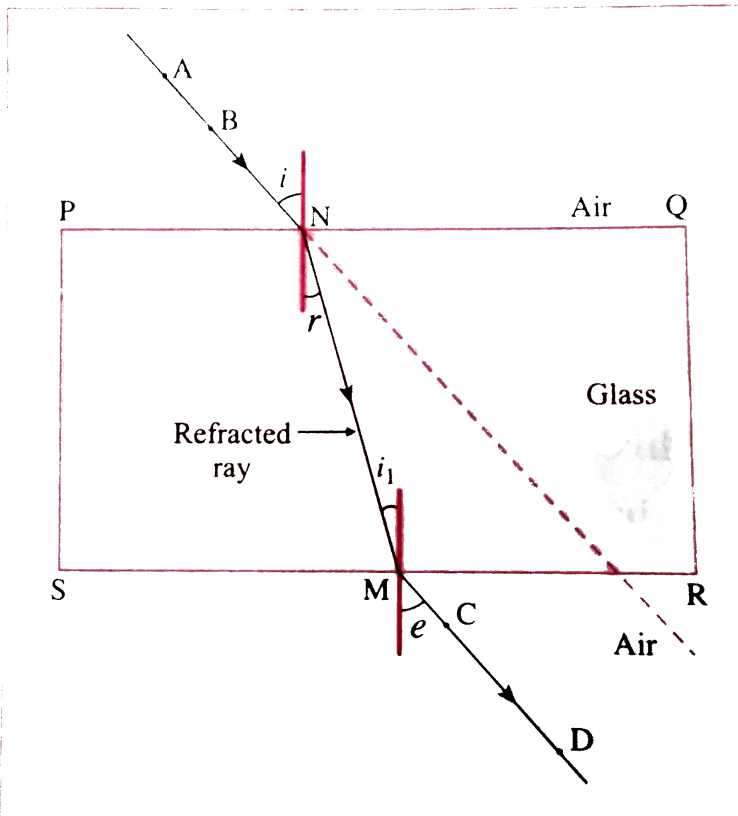
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Thus, the light ray MD emerging from the

glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

How is refraction of light related to refraction index ?



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7. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.
2. Draw an inclined straight line on the side of

PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

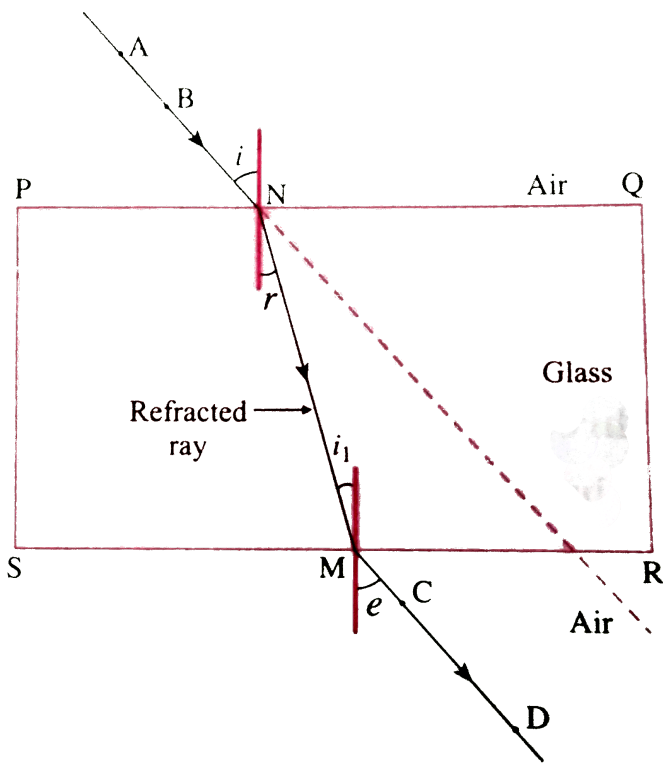
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Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

Define the refractive index of the second medium with respect to the first medium.

OR

What is meant by refractive index ?



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8. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

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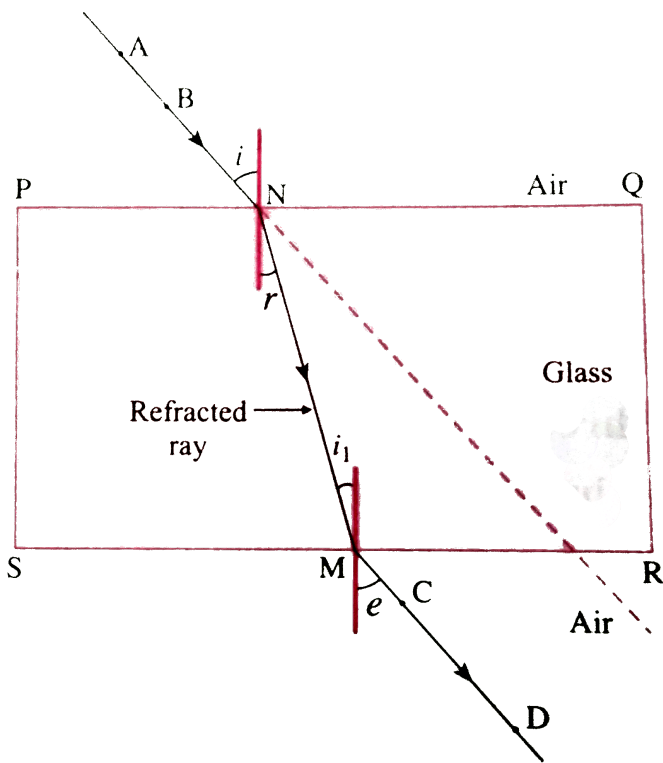
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Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

State the formulae for the refractive index of

the second medium with respect to the first medium.



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9. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

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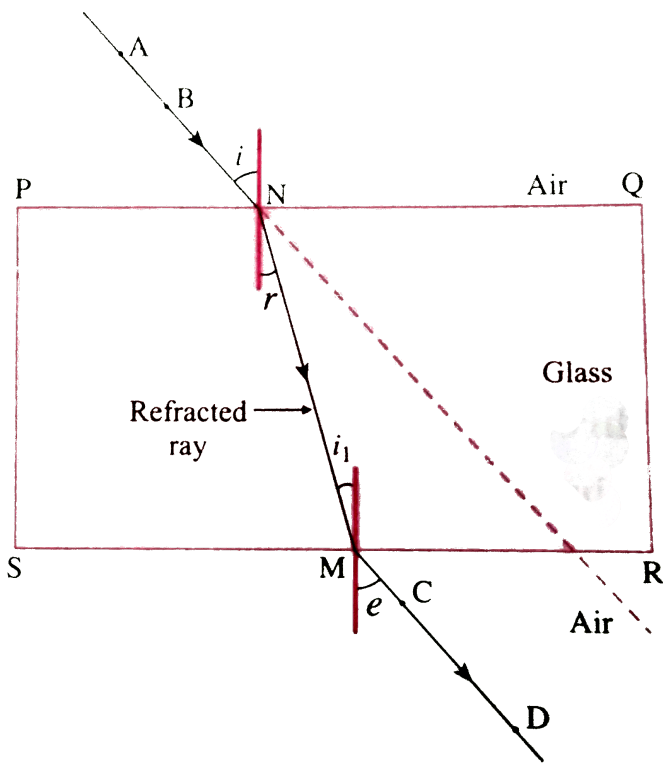
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Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

Define absolutely refractive index.



10. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

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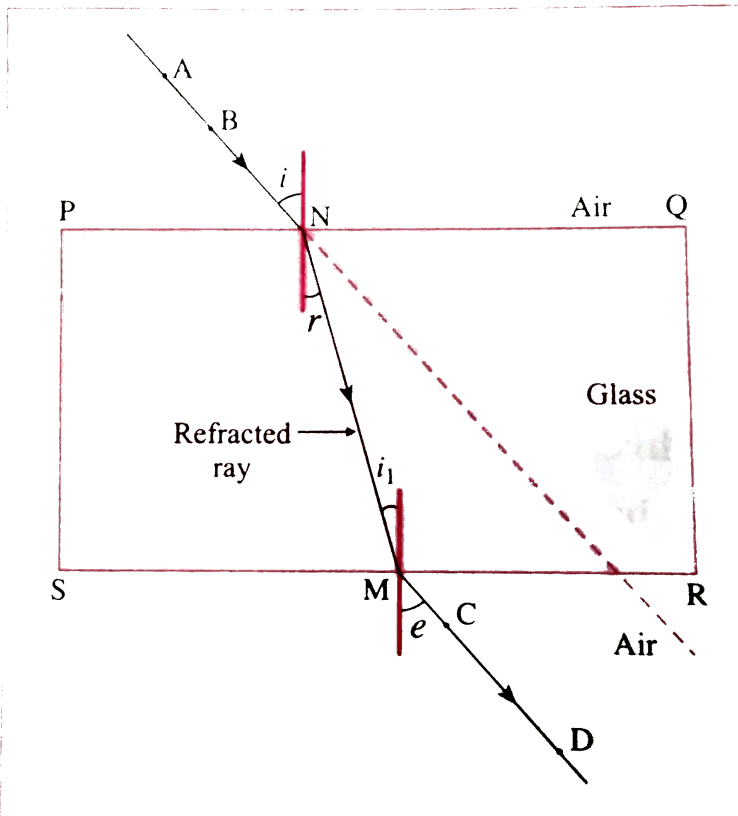
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Thus, the light ray MD emerging from the

glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

Obtain the relation between the refraction index of the second medium with respect to the first medium and the refraction index of the first medium with respect to the second medium.



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11. Activity 3 :

1. Keep a glass slab on a blank paper and draw its outline PQRS.

2. Draw an inclined straight line on the side of PQ so that it intersects PQ at n. Pierce two pins vertically at two points A and B along the line.

3. Look at the pins A and B from the opposite side of the slab and pierce pins C and D vertically so that the images of A and B in line with C and D.

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draw a straight line going through points C and D so that it intersects SR at M.

5. Join points M and N. Observe the incident ray AN and emergent ray MD.

The first refraction occurs when light ray enters the glass from air at N on the side PQ.

The second refraction occurs when light enters air through the glass at point M on the side SR. For the first refraction the angle of incidence is i while for the second it is i_1 . The angle of refraction at N is r .

Note that $i_1 = r$. In the second refraction, the angle of refraction is e which is equal to i . On

both parallel side PQ and RS of the glass slab, the change in direction of light ray is equal but in opposite directions.



Thus, the light ray MD emerging from the glass slab is parallel to the incident ray AN on the side PQ of the slab. But the emergent ray is displaced with respect to the incident ray.

If the refractive index of a certain material with respect to air is 1.5, what is the refractive index of air with respect to that material ?



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1. If the refractive index of the second medium with respect to the first medium is ${}_2 n_1$ and that of the third medium with respect to the second medium is ${}_3 n_2$, what and how much is ${}_3 n_1$?



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2. Prove that $i = e$, If the angle of incidence and angle of emergence subtended by a light ray

falling on a surface of glass slab are i and e respectively. How much angular deviation is suffered by the incident ray.



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3. Explain the terms optically rarer medium and optically denser medium with examples.



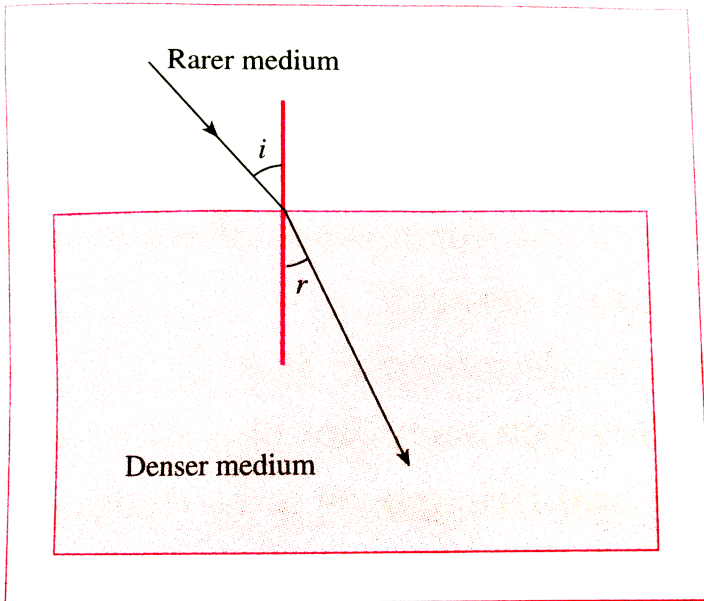
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4. A ray of light is incident obliquely at a boundary separating two media . What is its behaviour if (1) the refractive index of the second medium is greater than that of the first medium (2) the refractive index of the first medium is greater than that of the second medium ? Draw the corresponding neat and labelled diagrams.



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5. Observer the following figure and write accurate conclusion regarding refraction of light.



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6. What happens when a ray of light is incident normal to the interface between two media? Draw the corresponding neat and labelled diagram.



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7. Draw a neat and labelled diagram to show the path of a ray of light in air and glass when the ray is incident obliquely on a glass slab. Show the (i) incident ray (ii) refracted ray (iii)

emergent ray (iv) angle of incidence (i) angle of refraction (v) angle of emergence in the diagram.

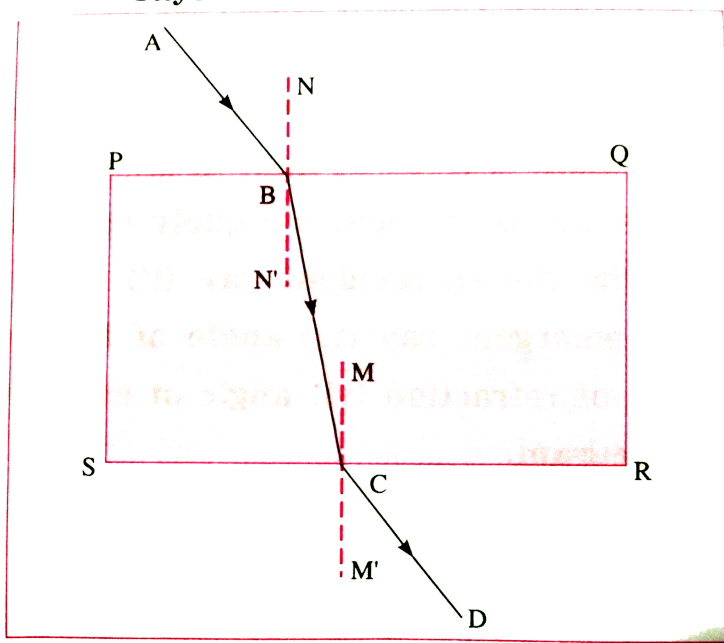
OR

Draw a neat and labelled diagram to show refraction of light through a glass slab.



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8. Observe the given figure and name the following rays :

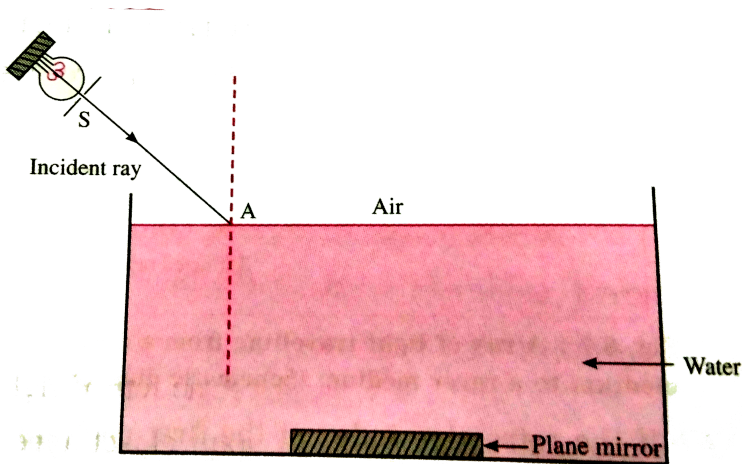


(i) ray AB (ii) ray BC (iii) ray CD

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9. A plane mirror is kept at the bottom of a trough with water in it . The ray of light

emerging from a source at the point S outside the trough, reaches the point A on the surface of water. Draw a neat ray diagram to show the subsequent path of light and complete the ray diagram.



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1. Have you seen a mirage which is an illusion of the appearance of water on a hot road or in a desert ?



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2. Have you seen that objects beyond and above a holi free appear to be shaking ? Why does this happen?



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3. Give two examples of the effect of atmospheric a refraction on a small scale in local environment.



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4. What is mirage? With a neat labelled diagram , explain the conditions under which it is seen.



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5. Explain in brief the flickering of an object seen through a turbulent stream of hot air rising above the Holi fire



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6. With a neat labelled diagram, explain twinkling of a star. Also explain why a planet does not twinkle.



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7. What is the correct reason for blinking / flickering of stars ? Explain it.

a. The blasts in the stars.

b. Absorption of star light by the atmosphere.

c. Motion of the stars.

d. Changing refractive index of gases in the atmosphere.



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8. With a neat labelled diagram, explain advanced sunrise and delayed sunset.



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9. Water in a swimming pool or water tank appears shallower than its depth. Why?



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10. Place a coin at the bottom of a glass jar containing water. Now tilt the jar suitably. When viewed at a suitable angle, the coin appears to be floating . Why ?



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11. State the wavelength range of electromagnetic radiation to which our eyes are sensitive.



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12. What do you mean by dispersion of light ?

What is a spectrum of light? Name the different colours of light in the proper sequence in the spectrum of white light.

OR

What do you mean by dispersion ? Name the different colours of light in the proper sequence in the spectrum of white light.



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13. What is a prism ?



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14. With a neat labelled diagram, describe the experiment to demonstrate dispersion of sunlight (white light) by a prism.



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15. How does the dispersion of white light take place when it passes through a glass prism ?



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16. What is a spectrum ? Why do we get a spectrum of seven when white light is dispersed by a prism ?

OR

Explain how a spectrum is formed.



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17. From incident white light how will you obtain white emergent light by making use of two prisms ?



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18. You must have seen chandeliers having glass prisms. The light from a tungsten bulb gets dispersed while passing through these prisms and we see a coloured spectrum. If we

use an LED light instead of a tungsten bulb, will we be able to see the same effect ?



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19. What is partial reflection of light ?



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20. With a neat labelled diagram, explain the terms total internal reflection and critical angle.



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21. Swarali has got the following observations while doing an experiment. Answer her questions with the help of observations.

Swarali observed that the light bent away from the normal , while travelling from a denser medium to a rarer medium. When Swarali increased the values of the angle of incidence (i), the values of the angle of refraction (r) went on increasing. But at a certain angle of incidence, the light rays

returned into the denser medium.

So, Swarali has some question. Answer them.

(a) Name this certain value of i . What is the value of r at that time ?

(b) Name this process of returning of light in the denser medium. Explain the process.



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22. The observations made by Swarali value doing the experiment are given below. Based on these write answers to the questions :

Swarali found that the light ray travelling from the denser medium to a rarer medium goes away from the normal. If the angle of incidence (i) is raised by Swarali, the angle of refraction (r) went on increasing. However, after certain value of the angle of incidence, the light ray is seen to return back into the denser medium.

(i) What is the specific value of $\angle i$ called ?

(ii) What is the process of reflection of incident ray into a denser medium called ?

(iii) Draw the diagrams of three observations made by Swarali.



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23. Define total internal reflection of light.



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24. Define critical angle.



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25. If the refractive index of a rarer medium with respect to a denser is 0.5, what is the critical angle ?



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26. Name the devices in which total internal reflection of light is used.



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27. Explain why an empty test tube held obliquely in water appears shiny to an observer looking down.



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28. Prove the following statement : A rainbow is the combined effect (an exhibition) of the refraction, dispersion , and total internal reflection of light (taken together).

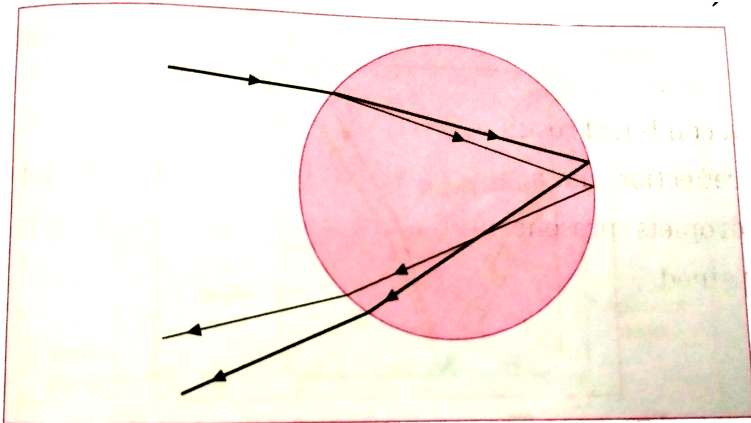
OR

With neat labelled diagram, explain how the formation of rainbow occurs.



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29. Observer the given figure and answer the following questions



(a) Identify and write the natural process

shown in the figure.

b. List the phenomena which are observed in this process.

c. Redraw the diagram and show the above phenomena in it.



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Write Short Notes

1. Refraction observed in the atmosphere.



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2. Dispersion of light



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Give Scientific Reasons

1. A coin kept in a bowl is not visible when seen from one side. But, when water is poured in the bowl, the coin becomes visible.



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2. A pencil dipped in water obliquely appears bent at the surface of water.

OR

When a pencil is partly immersed in water and held in a slanting position, it appears to be bent at the boundary separating water and air.



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3. The shadow of the edge of an empty vessel is formed due to the slanting rays of the sun.

When water is poured in the vessel, the shadow is shifted.



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4. The bottom of a pond appears raised.



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5. While shooting a fish in a lake, the gun is aimed below the apparent position of the fish.



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6. The sun is seen on the horizon a little before sunrise.

OR

The sun is seen on the horizon for sometime even after sunset.



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Distinguish Between

1. Reflection of light and Refraction of light .



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Solve The Following Examples Numerical Problems C 3 Xx 10 8 M S

1. What will be the refractive index of a transparent medium if the speed of light in the transparent medium is found to be $2.4 \times 10^8 \text{ m/s}$?



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2. The velocity of light in a medium is $2 \times 10^8 \text{ m/s}$. What is the refractive index of the medium with respect to air, if the velocity of light in air is $3 \times 10^8 \text{ m/s}$?



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3. If the speed of light in a medium is $1.5 \times 10^8 \text{ m/s}$, what is the absolute refractive index of the medium ?



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4. Light travels with a velocity $1.5 \times 10^8 \text{ m/s}$ in a medium. On entering second medium its velocity becomes $0.75 \times 10^8 \text{ m/s}$. What is the refractive index of the second medium with respect of the first medium ?



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5. The refractive index of water is $\frac{4}{3}$ and the speed of light in air is $3 \times 10^8 \text{ m/s}$. Find the speed of light in water.



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6. The speed of light in water and glass is $2.2 \times 10^8 \text{ m/s}$ and $2 \times 10^8 \text{ m/s}$ respectively.

What is the refractive index of (i) water with respect to glass (ii) glass with respect to water ?





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7. If the absolute refractive indices of glass and water are $\frac{3}{2}$ and $\frac{4}{3}$ respectively, what is the refractive index of glass with respect to water ?



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Numerical Problems For Practice

1. (Given : $C = 3 \times 10^8 m/s$)

The speed of light in a transparent medium is $2 \times 10^8 m/s$. Find the absolute refraction index of medium .



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2. The absolute refractive index of a transparent medium is $5/3$. Find the speed of light in the medium.



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3. The absolute refractive index of a transparent medium is 2.4 and the speed of light in that medium is $1.25 \times 10^8 \text{ m/s}$. Find the speed of light in air.



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4. The speed of light in water is $2.25 \times 10^8 \text{ m/s}$ and that in glass is $2 \times 10^8 \text{ m/s}$. Find the refractive index of (i) the glass with respect to water (ii) water with respect to the glass.



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5. If the refractive index of a certain glass with respect to water is 1.25 , find the refractive index of water with respect to the glass.



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6. If the absolute refractive index of glass is 1.5 and that of water is $\frac{4}{3}$, find the refractive index of water with respect to glass.



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