

Chapter 6 Light: Reflection of Light

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Solution 1:

Light may be defined as the radiant energy which produces in us the sensation of sight. Light itself is invisible but makes other objects visible.

Solution 2:

Yes, light is a form of energy that produces the sensation of vision in our eyes.

Solution 3:

The velocity of light in vacuum is 3×10^8 m/s.

Solution 4:

Two sources of light are

- Natural, for e.g. Sun
- Artificial, for e.g. Light bulb.

Solution 5:

Four characteristics of light are :-

- Light waves can travel through vacuum
- Light waves are transverse waves
- Wavelength of light waves is short so that their length is measured in centi-microns.
- The velocity of light in vacuum is 3×10^8 m/s.

Solution 6:

The Sun and the stars are the two luminous bodies.

Solution 7:

Two non-luminous bodies are moon, chair.

Solution 8:

Difference between convergent and divergent beam of light.

Convergent beam	Divergent beam
1. Rays of light converge to a point as the beam progresses	Rays of light diverge from each other as the beam progresses
2. The rays concentrate at a point	The rays emerge from a point source
3. A parallel beam of light converges on passing through a convex lens	A parallel beam of light diverges on passing through a concave lens

Solution 9:

A ray of light is the path along which light travels.

Solution 10:

Three distinctions between light and sound waves are

- Light waves can travel through vacuum while sound waves cannot.
- Light waves are transverse waves while sound waves are longitudinal waves.
- The velocity of light in air is 3×10^8 m/s while the speed of sound in air is just about 330 m/s.

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Solution 11:

- A ray of light
- Divergent beam of light
- Parallel beam of light

Solution 12:

The substance through which light is made to pass is called medium.

Solution 13:

Rectilinear propagation of light is that the light travels along a straight line.

Solution 14:

No, glass is a transparent medium.

Solution 15:

No, no metal is transparent by nature.

Solution 16:

Difference between a ray of light and a beam of light

Ray of light	Beam of light
1. Ray of light is the path along which the light travels	Many rays of light form a beam of light
2. A ray of light can be emitted from any source in any direction	A beam of light can be emitted from a laser source
3. A ray of light contains only one photon	A beam of light contains multiple photons

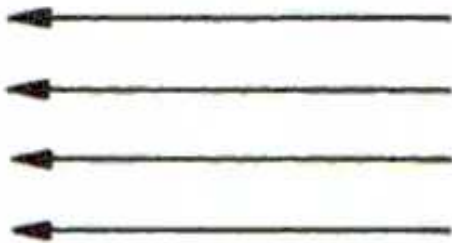
Solution 17:

Waxed paper is the translucent medium among the given substances.

Solution 18:

Parallel beam of light is the beam in which rays of light travel parallel to each other.

Divergent beam of light is the beam of light in which rays of light diverge from each other as the beam progresses



Parallel beam



Divergent beam

Solution 19:

Two observations that prove that light travels in a straight line are :-

- Sunlight coming through a hole in a dark room, we can easily see that light travels in a straight line
- Light coming from a laser light, used for presentation, can also be seen to travel in a straight line.

Solution 20:

When rays of light fall on a surface, they are turned back into the same medium in accordance with some definite laws. This process is known as reflection.

Solution 21:

A smooth and polished flat surface is the cause of regular surface.

Solution 22:

Reflection obeys following two laws

- The incident ray, the reflected ray, and the normal at the point of incidence, all lie in the same plane.
- The angle of incidence and the angle of reflection are always equal.

Solution 23:

The height of plane mirror should be half of the size of the object to get a full image of the object. So for a man of height 1.6 m tall should use a 0.8m tall plane mirror.

Solution 24:

Rectilinear propagation of light is that the light travels along a straight line.

Solution 25:

Lateral inversion is the reversal of image experienced in a plane mirror. The image is of the same size and equidistant from the object but the left and right sides are transposed.

Solution 26:

Formation of image is the phenomenon based on laws of reflection.

Solution 27:

The principle employed in a periscope is successive reflections from two plane mirrors.

Solution 28:

The point at which the light is incident on the reflecting surface is called the point of incidence.

Solution 29:

Any smooth, highly polished reflecting surface is called mirror.

Solution 30:

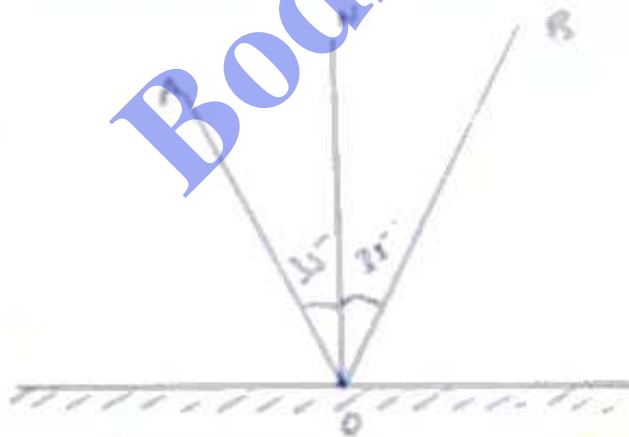
A smooth, highly polished plane surface is called plane mirror.

Solution 31:

The angle between the incident ray and the normal to the surface at the point of incidence is called the angle of incidence.

Solution 32:

Angle of reflection to the normal = angle of incidence to the normal = 20°
 So the angle between incident ray and reflected ray = Angle of incidence + Angle of reflection = $20 + 20 = 40^\circ$

**Solution 33:**

Given, angle between incident ray and mirror = 35°

- Angle of incidence = angle of mirror to the normal – angle between incident ray and mirror
 $= 90 - 35 = 55^\circ$
- Angle of reflection = angle of incidence = 55°

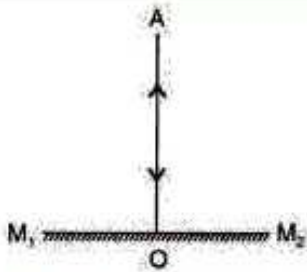
- Total angle turned = angle of incidence + angle of reflection
= $55 + 55 = 110^\circ$
- The angle between incident ray and reflected ray = Angle of incidence + Angle of reflection
= $55 + 55 = 110^\circ$

Solution 34:

Given, distance of boy from the mirror = 3 m

- Distance of image from mirror = distance of boy from the mirror = 3 m
Distance between boy and his image = distance of boy from the mirror + distance of image from mirror = $3+3 = 6$ m
- Now, distance of boy from the mirror = 4 m
Distance of image from mirror = 4 m
Distance between boy and his image = distance of boy from the mirror + distance of image from mirror = $4+4 = 8$ m.

Solution 35:



The angle of incidence = angle of reflection = 0° because the image is perpendicular to the surface of the plane mirror.

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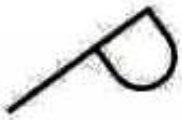
Solution 36:

Two characteristics of image formed by plane mirror are

- Image is erect and virtual
- Image and object are of same size.

Solution 37:

The answer diagram is:-

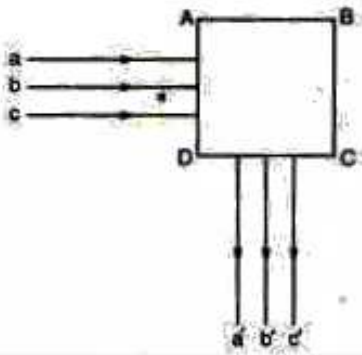


The reflection takes place at the surface of the plane mirror in accordance with the laws of reflection in which the angle of incidence is equal to angle of reflection.

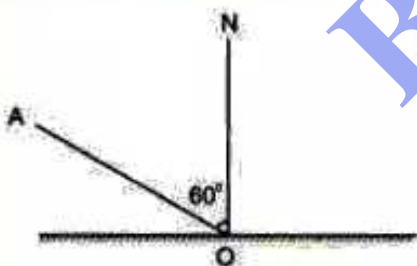
The light coming from the letter P is reflected from the surface of plane mirror. When these reflected rays are produced backwards, they form an inverted virtual image of letter P which is same in size of letter P.

Solution 38:

The answer diagram is:-

**Solution 39:**

The answer diagram is:-



Since the angle of incidence = 60°

From the diagram, Angle of reflection to the normal = angle of incidence to the normal = 60°

So the angle between incident ray and reflected ray = Angle of incidence + Angle of reflection = $60 + 60 = 120^\circ$