

NCERT QUESTIONS AND ANSWERS

Class: 8

Topic: **Chapter 16 : LIGHT**
(Content to be written in notebook)

Subject: SCIENCE

Q 1. Suppose you are in a dark room. Can you see objects in the room? Can you see objects outside the room? Explain.

ANSWER:

If we are in a dark room, then it is not possible for us to see objects in the room. However, objects outside the room are visible to us.

An object becomes visible when light reaches our eye after being reflected from the object. If there is no light in the room, then the objects inside the room cannot reflect any light. Hence, we cannot see in a dark room. If there is light present outside the room, then we can see the objects outside the room.

Q 2. Differentiate between regular and diffused reflection. Does diffused reflection mean the failure of the laws of reflection?

Answer:

Regular Reflection	Diffused Reflection
(i) All the reflected rays are parallel.	(i) The reflected rays are not parallel.
(ii) It occurs on a smooth and polished surface.	(ii) It occurs on the rough surface.
(iii) Reflected rays are in one direction.	(iii) Reflected rays are scattered in different directions.

No, diffuse reflection doesn't mean the failure of laws of reflection. The laws of reflection have not failed because each ray obeys the law of reflection. In regular reflection all the reflected rays are parallel to each other, whereas in diffused reflection the rays aren't parallel to each other.

Q3. Mention against each of the following whether regular or diffused reflection will take place when a beam of light strikes. Justify your answer in each case.

- (a) Polished wooden table
- (b) Chalk powder
- (c) Cardboard surface
- (d) Marble floor with water spread over it
- (e) Mirror
- (f) Piece of paper

Soln:

a) The wooden table that has been a polished-Regular reflection

The surface that has been recently polished can be a good example of a smooth surface. The wooden table that has been polished has a surface that is smooth.

b) White Chalk powder that is used in school- Diffused reflection

Chalk powder spread on a surface is an example of an irregular surface. Hence, it is rough. Therefore, the diffused reflection will appear from chalk powder.

c) Cardboard surface- Diffused reflection

The surface of the cardboard is a kind of irregular surface. Hence, the diffused reflection will take place from a cardboard surface.

d) Marble floor – Regular reflection

Marble floor can be a good example of a surface that is regular. Since water makes the ceramic glossy, thus, the reflections that are regular occur on this surface.

e) Mirror- Regular reflection

A mirror has a very smooth surface hence it gives a regular reflection.

f) Piece of paper- Diffused reflection

Although a piece of paper may look smooth, it has many irregularities on its surface. Due to this reason, it will give a diffused reflection.

Q4. State the laws of reflection.

Soln:

The law of reflection states that

- a) The angle of reflection and the angle of incidence both are always equal to one another.
- b) The reflected ray, the incident ray, and the normal to the reflective surface at the point of incidence all come on the same plane.

Q5. Describe an activity to show that the incident ray, the reflected ray and the normal at the point of incidence lie in the same plane.

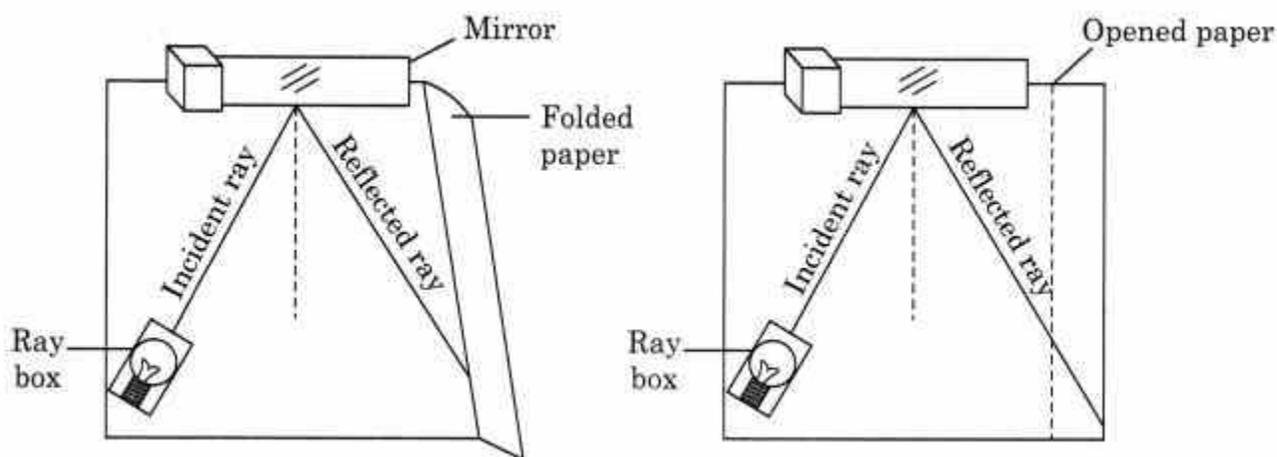
Soln-

Activity: To show that the incident ray, reflected ray and the normal at the point of incidence lie in the same plane.

Materials Required: Plane mirror, holder, ray box, etc.

Procedure: Fix sheet of white paper, a little beyond the edge of the board. Place a plane mirror strip vertically to the paper using a stand. Throw light from a ray box on the mirror. Look at the reflected ray. Mark the incident ray, normal ray and reflected ray. Fold the paper which is beyond the edge of the board. You will observe that the reflected ray is not seen in the folded portion of the chart paper. Now bring the folded portion back to its original position. The reflected ray of light is again seen on the page.

Conclusion: The sheet on the board can be considered as a plane. The incident ray, the reflected ray, the normal at the point of incidence lie in the same plane.



Incident ray, reflected ray and normal at the point of incidence lie in the same plane.

Q6. Fill in the blanks in the following.

- (a) A person 1 m in front of a plane mirror seems to be _____m away from his image.
- (b) If you touch your _____ear with right hand in front of a plane mirror it will be seen in the mirror that your right ear is touched with_____.
- (c) The size of the pupil becomes _____when you see in dim light.

(d) Night birds have _____ cones than rods in their eyes.

Soln:

(a) A person 1 m in front of a plane mirror seems to be **2m** away from his image.

(b) If you touch your **left** ear with right hand in front of a plane mirror it will be seen in the mirror that your right ear is touched with the **left** hand.

(c) The size of the pupil becomes **large** when you see in dim light.

(d) Night birds have **fewer** cones than rods in their eyes.

Choose the correct option in Questions 7 – 8

Q7. The angle of incidence is equal to the angle of reflection.

(a) Always

(b) Sometimes

(c) Under special conditions d) Never

Answer - (a) Always

Q 8. Image formed by a plane mirror is

(a) virtual, behind the mirror and enlarged.

(b) virtual, behind the mirror and of the same size as the object.

(c) real at the surface of the mirror and enlarged.

(d) real, behind the mirror and of the same size as the object.

Soln:

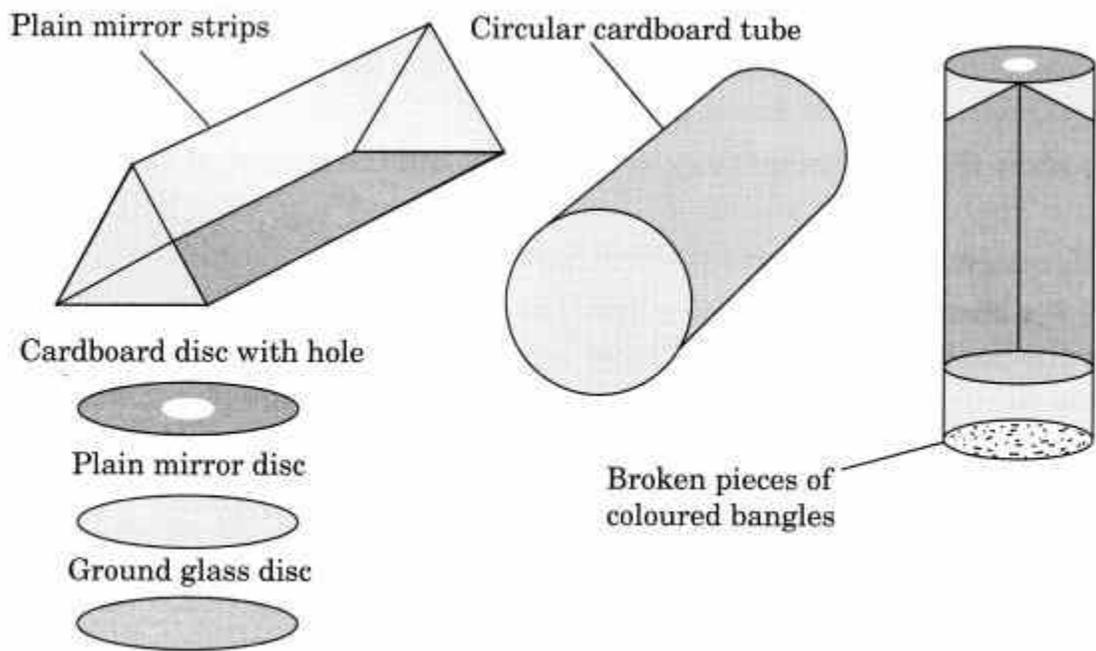
Answer –

(b) virtual, behind the mirror and of the same size as the object.

Q9. Describe the construction of a kaleidoscope.

Soln:

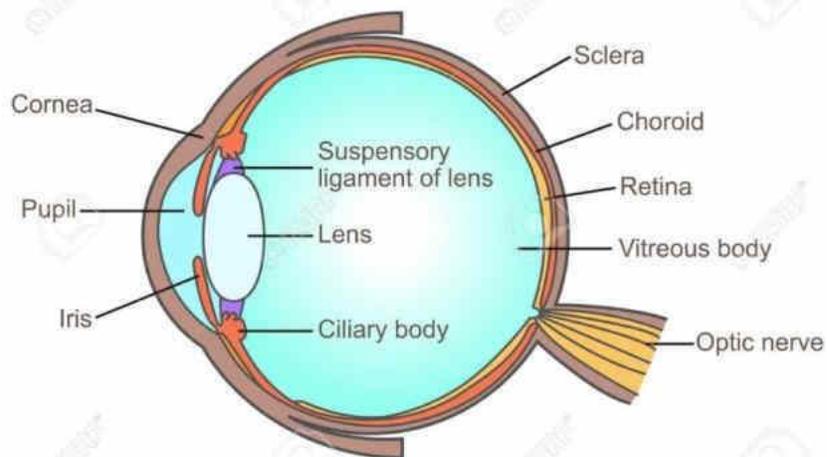
Kaleidoscope is a device based on the principle of multiple reflections. It consists of three long and narrow strips of plane mirrors inclined at an angle of 60° to one another forming prism. This is fitted in a tube. One end of this tube is closed by a cardboard disc having a hole at its centre. To the other end touching the mirrors plane glass plate is fixed on which broken pieces of coloured bangles are placed. This end of the tube is closed by a ground glass plate.



Construction of Kaleidoscope

Q10. Draw a labelled sketch of the human eye.

Structure Of The Human Eye



Q11. Gurmit wanted to perform Activity 16.8 using a laser torch. Her teacher advised her not to do so. Can you explain the basis of the teacher's advise?

Soln:

Her teacher advised her not to do so because of the intensity of the laser light is very high, it is harmful to the human eyes. It can cause damage to the retina and leads to blindness. Hence, it is advisable not to look at a laser beam directly.

Q12. Explain how you can take care of your eyes.

Soln:

We can take care of our eyes in following ways.

- a) Reading should not be done in bright light as well as in dim light.
 - b) One should visit an eye specialist on a regular interval of time.
 - c) If any small insects or dust particles enters our eyes, do not rub them but clean them immediately with cold water.
 - d) we should avoid direct exposure of sunlight to the eye.
- While reading, there should be a distance of at least 25 cm between the eyes and the book.

Q13. What is the angle of incidence of a ray if the reflected ray is at an angle of 90° to the incident ray?

Soln:

Here, the angle of reflection is 90° . As we know, according to the laws of reflection that angle of incidence is equal to angle of reflection.

Here, the angle between the incident ray and reflected ray is 90° . i.e., $\angle i + \angle r = 90^\circ$

Since, $\angle i = \angle r$

We can write, $\angle i + \angle i = 90^\circ$

$$\Rightarrow 2\angle i = 90^\circ$$

$$\Rightarrow \angle i = 45^\circ$$

Angle of incidence = 45° .

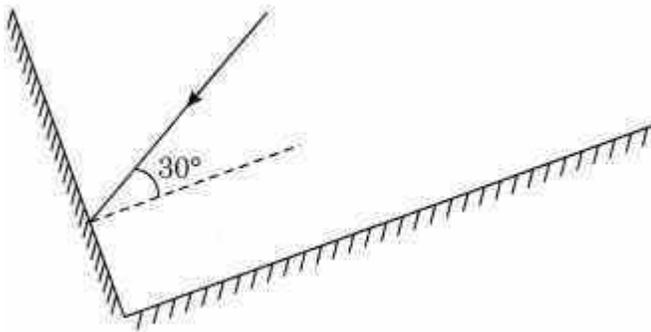
Q 14. How many images of a candle will be formed if it is placed between two parallel plane mirrors separated by 40 cm?

Soln:

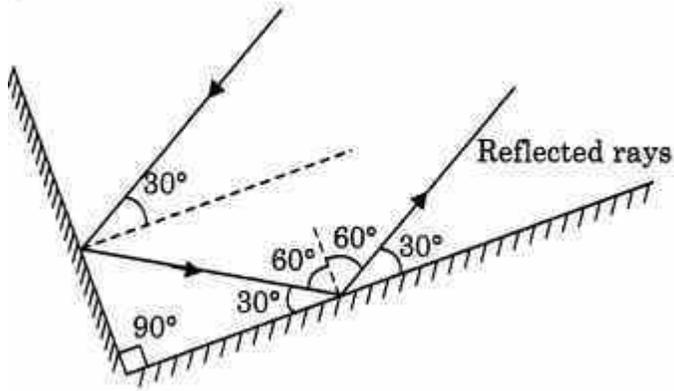
If a candle is placed between two parallel plane mirror separated by 40 cm, then the multiple and infinite images will be formed due to the multiple reflections between the mirrors. The infinite numbers of images are formed when two mirrors are placed parallel to each other.

Q 15.

Two mirrors meet at right angles. A ray of light is incident on one at an angle of 30° as shown in Fig. 16.19. Draw the reflected ray from the second mirror.



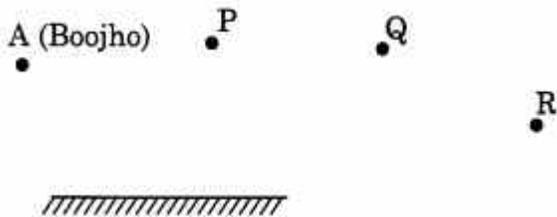
Answer:



Soln:

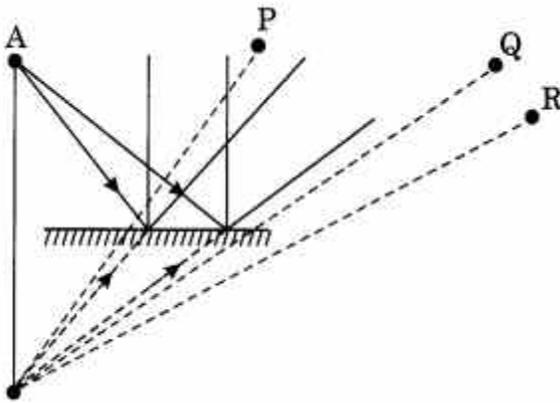
The first law of reflection is used to obtain the path of reflected light. It can be observed that the given ray of light will reflect from the second mirror at an angle of 60° .

Q 16. Boojho stands at A just on the side of a plane mirror as shown in Fig. 16.21. Can he see himself in the mirror? Also, can he see the image of objects situated at P, Q, and R?



Answer:

No, Boojho can't see himself in the mirror. He can see the image of the object at P and Q but not of R.



Q 17

(a) Find out the position of the image of an object situated at A in the plane mirror (Fig. 16.23). (b) Can Paheli at B see this image?

(c) Can Boojho at C see this image?

(d) When Paheli moves from B to C, where does the image of A move?

