

Class : 8<sup>th</sup>

Subject : Physics & Chemistry

Chapters : a) Light

b) Chemical Effects of Electric Current



# Light

## Definition of light

**Q.1:** Define Light?

**Ans:** Light is the form of energy which enables us to see the objects or which gives us the sensation of sight.

**Q.2:** Suppose you are in a dark room. Can you see objects in the room? Can you see objects outside the room? Explain. **(Text book Q.1;p157)**

**Ans:** We can see any object, when light reflected by that object reaches our eyes. But in the dark room, no light is reflected by the object. Hence, we are unable to see the objects in dark room. But if there is light outside the room, we can see the objects lying there.

**Q.3:** Give any three phenomena shown by light.

**Ans:** Light shows the phenomena of reflection, refraction and dispersion.

## Reflection and laws of reflection (Activity based)

**Q.4:** Define reflection of light. Name the types of reflection.

**Ans:** The return of light into the same medium after striking a surface is called reflection. There are usually two kinds of reflection:

(i) Regular reflection. (ii) Irregular reflection.

**Q.5:** State the laws of reflection. **(Text book Q.4;p157)**

**Ans:** The two laws of reflection are:

- The angle of incidence is equal to the angle of reflection. i.e.  $\angle i = \angle r$
- The incident ray, the reflected ray and the normal to the surface at the point of incidence lie in the same plane.

**Q.6:** 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 **(Text book Q.5;p157)**

**Ans:** Place a plane mirror on the table. Take a paper sheet and make a small hole in its centre. Make sure that the light in the room is not bright. Hold the sheet normal to the table. Take another sheet and place it on the table in contact with the vertical mirror. Draw a normal line on the second sheet from the mirror. Now, light a torch on the mirror through the small hole such that the ray of light falls on the normal at the bottom of the mirror. When the ray from this hole is incident on the mirror, it gets reflected in a certain direction. You can easily observe the incident ray, reflected ray and the normal to the mirror at the point of incidence on the sheet placed on the table. This shows that the





incident ray, the reflected ray, and the normal to the surface at the point of incidence all lie in the same plane.

**Q.7:** Describe the construction of a kaleidoscope.

(Text book Q.9;p157)

**Ans:** The kaleidoscope is a simple toy that uses the idea of multiple images formed by the combination of plane mirrors. It forms many beautiful and fascinating coloured patterns. It is made by taking three plane mirror strips and joining them to form a triangle. A piece of cardboard is wrapped around the mirrors. On one side of the tube so formed, we place pieces of glass of different colours between two transparent sheets. The other side is closed with a plane transparent sheet. When we see through this end, and rotate the kaleidoscope, we see beautiful coloured patterns.



**Q.8:** What is the angle of incidence of a ray if the reflected ray is at an angle of  $90^\circ$  to the incident ray?

(Textbook Q.13;p158)

**Ans:** According to the laws of reflection, angle of incidence = angle of reflection.

As given,  $\angle i + \angle r = 90$

It implies  $\angle i = \angle r = 90/2 = 45$  degrees.

Angle of incidence = 45 degrees.

**Q.9:** How many images of a candle will be formed if it is placed between two parallel plane mirrors separated by 40 cm?

(Textbook Q.14;p158)

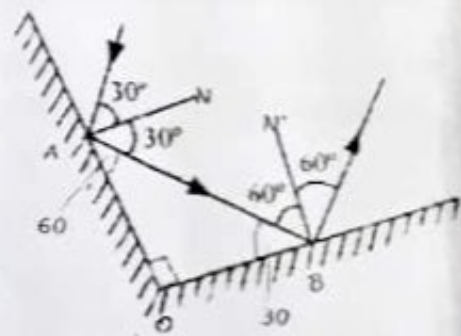
**Ans:** Infinite number of images will be formed if a candle is placed between two parallel plane mirrors.

**Q.10:** Two mirrors meet at right angles. A ray of light is incident on one at an angle of  $30^\circ$  as shown in Fig. Draw the reflected ray from the second mirror.

(Textbook Q.15;p157)



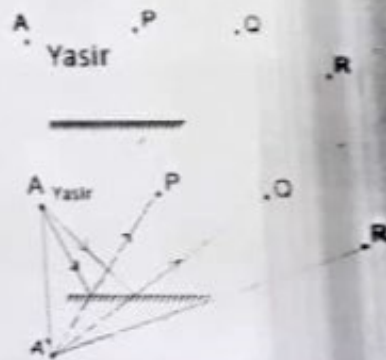
**Ans:** Laws of reflection will apply here. Applying triangle law properties, we can easily find out, the emergent ray from mirror B, will reflect at 60 degrees.



**Q.11:** Yasir stands at A just on the side of a plane mirror as shown in Fig. Can he see himself in the mirror? Also can he see the image of objects situated at P, Q and R?

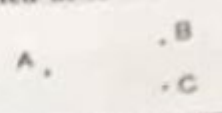
(Textbook Q.16;p158)

**Ans:** Yasir himself can't see his image because he is not standing in front of the mirror. However, he is able to see objects at P and Q because the reflected rays from P and Q reach his eyes. If the ray from object R does not reflect and reaches Yasir, he cannot see object R as well.



Q12

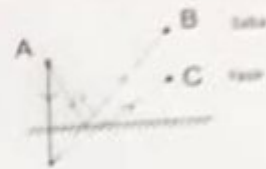
- (a) Find out the position of the image of an object situated at A in the plane mirror.
- (b) Can Saba at B see this image?
- (c) Can Yasir at C see this image?
- (d) When Saba moves from B to C, where does the image of A move?



(Textbook Q.17:p157)

Ans:

- (a) The image of the object at position A will be formed behind the mirror. It will be at the same distance away from mirror as the object is.
- (b) Yes Saba at B can see the object because reflected ray from A will reach B.
- (c) Yasir can also see the image because his eyes receives the reflected ray from A.
- (d) If we trace the reflected rays from B and C backwards, they converge at point behind the mirror. Position of image A remains fixed even if Saba moves from B to C.



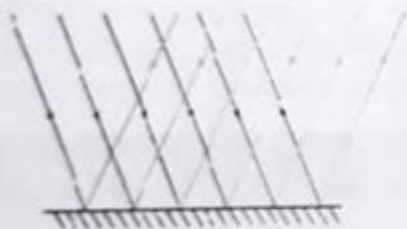
### Regular and diffused reflection

Q13

Differentiate between regular and diffused reflection. Does diffused reflection mean the failure of the laws of reflection? (Text book Q.2:p157)

Ans:

Regular reflection	Diffused reflection
1. It takes place from a smooth or regular surface.	It takes place from a rough surface.
2. All reflected rays are parallel to each other.	The reflected rays are not parallel to each other.
3. Reflected rays go in one direction.	Reflected rays are scattered in different directions.
4. e.g. it is caused by smooth surfaces such as mirror.	e.g. it is caused by the irregularities in the reflecting surface, like that of a cardboard.



In diffused reflection, each ray obeys the laws of reflection. Therefore, laws of reflections are not violated.

Q14

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

(Text book Q.3:p157)

Ans:

- (a) A polished wooden table is an example of smooth surface. So, regular reflection will take place.
- (b) Chalk powder has irregular surface. So, when a beam of light reflects from it, diffused reflection will take place.
- (c) A cardboard has irregular surface. So, when a beam of light reflects from it, diffused reflection will take place.

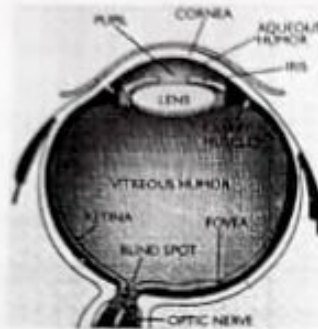
- (d) A marble floor with water spread over it provides a smooth surface. So, regular reflection will take place.
- (e) A mirror has a smooth surface. So, regular reflection will take place.
- (f) A piece of paper may appear smooth but it has many minor irregularities. So, when a beam of light reflects from it, diffused reflection will take place.

## Human eye, (brief)

**Q.15** Draw a labeled sketch of the human eye.

(Textbook Q.10;p157)

Ans:



## Care of eyes

**Q.16** Gurmit wanted to perform Activity 12.8 (to observe pupil) using a laser torch. Her teacher advised her not to do so. Can you explain the basis of the teachers advise?

(Textbook Q.11;p157)

Ans: Intensity of laser beam is very high, as it carries large amount of energy. It is harmful for eyes and can cause permanent damage. One should not look laser beam directly or for a longer period.

**Q.17** Explain how you can take care of your eyes.

(Textbook Q.12;p157)

Ans: We should take the following precautionary measures for our eyes:

1. We should wash our eyes two or three times a day.
2. We should never touch our eyes with dirty hands.
3. We should never rub our eyes.
4. We should read books and watch TV at proper distance.
5. We should consult eye specialist in case of any redness or irritation in the eyes.

## Braille System

**Q.18** What is Braille system?

Ans: Braille is a system of raised dots that can be read with the fingers by people who are blind or who have low vision. Teachers, parents, and others who are not visually impaired ordinarily read braille with their eyes. Braille is not a language.

## Dispersion-spectrum

**Q.19** Define dispersion of light.

Ans: The splitting of white light into seven colours on passing through a transparent medium, like a glass prism is called dispersion of light.

**Q.20:** Give some examples of dispersion of light.  
**Ans:** When light falls on CD it splits into its constituent colours.  
 Rainbow appears coloured due to dispersion.  
 Soap bubbles appear coloured due to dispersion.  
 Light through prism appears coloured due to dispersion.

**Q.21:** What are constituent colours of light?  
**Ans:** V-violet, I-indigo, B-blue, G-green, Y-yellow, O-orange, R-red, collectively called as VIBGYOR.

**Q.22:** Light appears white. Why?  
**Ans:** When violet, indigo, blue, green, yellow, orange and red are mixed in a fixed proportion they give white colour.

**Q.23:** Soap bubble is transparent, but seems to be coloured in presence of light. Why?  
**Ans:** White light consists of seven colours. When light falls on soap bubble it splits in to its constituent colours. This phenomenon is called dispersion of light. That's why when light falls on the bubble, bubble seems to be coloured.

### Objective Type Questions

**Q.1:** Fill in the blanks in the following:

(Text book Q.6:p157)

- (a) A person 1 m in front of a plane mirror seems to be \_\_\_\_\_ 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.

**Ans:** (a) 2 m (Distance of the object and its image from the plane mirror is same. When the person is standing 1m away from the mirror, its image is also 1 m away. So, the distance between the person and its image appears to be 2 m.)  
 (b) Left, left hand (The image formed by plane mirror is laterally inverted)  
 (c) large (The pupil expands to increase the amount of light which is entering into our eyes in dim light.)  
 (d) less (Night bird has on its retina a large number of rods and only a few cones. The day birds on the other hand, have more cones and fewer rods.)

**Q.2:** Angle of incidence is equal to the angle of reflection:

(Text book Q.7:p157)

- (a) Always
- (b) Sometimes
- (c) Under special conditions
- (d) Never

**Ans:** (a) Always.

**Q.3:** Image formed by a plane mirror is:

(Text book Q.8:p157)

- (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.

**Ans:** (b)

# Chemical effects of electric current

## Electrolyte and non-electrolyte

**Q.1** Define electrolysis.

**Ans:** The chemical reaction (decomposition) of an electrolyte (conducting liquid) into its components when electricity is passed through it is called electrolysis.

**Q.2** What do you understand by electrolyte?

**Ans:** An electrolyte is a liquid substance that acts as medium to conduct electricity.

## Conduction of current through liquids

**Q.3** Does pure water conduct electricity? If not, what can we do to make it conducting? **(Textbook Q.6;p100)**

**Ans:** No. Pure water does not conduct electricity. This is because pure water is devoid of any salts. Pure water can conduct electricity when a pinch of common salt is added to it, as salt solution is conducting in nature.

**Q.4** In case of a fire, before the firemen use the water hoses, they shut off the main electrical supply for the area. Explain why they do this. **(Textbook Q.7;p100)**

**Ans:** Water may conduct electricity. If the electrical supply for the area is not shut off and water is poured over electrical appliances, then electricity may pass through water and harm the firemen. That is why, in case of a fire, the firemen shut off the main electrical supply for the area before they use the water hoses.

**Q.5** A child staying in a coastal region tests the drinking water and also the seawater with his tester. He finds that the compass needle deflects more in the case of seawater. Can you explain the reason? **(Textbook Q.8;p100)**

**Ans:** Sea water contains more dissolved salts than the drinking water. Hence, it is more conducting than the drinking water. Because of this reason, the compass needle deflects more in seawater than in the drinking water.

**Q.6** Is it safe for the electrician to carry out electrical repairs outdoors during heavy downpour? Explain. **(Textbook Q.9;p100)**

**Ans:** No. It is not safe to repair electrical appliances outdoors during heavy downpour. This is because rain water contains dissolved salts. Therefore, rain water can conduct electricity. The electrician may get electrical shocks while working outdoors during rain.

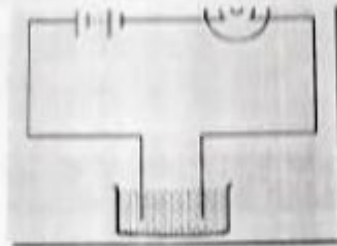


**Q.7:** Name three liquids, which when tested in the manner shown in Fig., may cause the magnetic needle to deflect. (Textbook Q.7;p99)



**Ans:** Liquids like lemon juice, salt water and vegetable oil allow electricity to pass through them. Hence, these liquids can be used as in the beaker to show the given effect.

**Q.8:** The bulb does not glow in the setup shown in Fig. List the possible reasons. Explain your answer. (Textbook Q.8;p99)



**Ans:** The bulb may not glow because of the following reasons:

- Liquid in the beaker is non-conducting. In such case, the electric current would not be able to pass through the liquid. Hence, the circuit is not complete.
- Electric current in the circuit is very weak. This can happen if the material used for making the circuit is not a good conductor of electricity or the battery does not have sufficient energy to generate electricity.

**Q.9:** A tester is used to check the conduction of electricity through two liquids, labelled A and B. It is found that the bulb of the tester glows brightly for liquid A while it glows very dimly for liquid B. You would conclude that

- liquid A is a better conductor than liquid B.
- liquid B is a better conductor than liquid A.
- both liquids are equally conducting.
- conducting properties of liquid cannot be compared in this manner.

(Textbook Q.9;p99)

**Ans:** (i) Liquid A is a better conductor than liquid B.

The amount of current flowing through a conducting solution depends on the conductivity of the solution. With more conductivity, more current passes through the solution and vice-versa. Hence, the conductivity of liquid A is more than the conductivity of liquid B.

**Q.10:** Paheli had heard that rain water is as good as distilled water. So, she collected some rain water in a clean glass tumbler and tested it using a tester. To her surprise, she found that the compass needle showed deflection. What could be the reasons? (Textbook Q.10;p100)

**Ans:** Rain water contains dissolved salts. This makes it a conducting solution. There are no dissolved salts present in the distilled water. Hence, rain water can allow electricity to pass through it while distilled water cannot.



## Conductors and insulators

**Q.11** What is a conductor? Give two examples.

**Ans:** A conductor is made up of material which allows electric current to pass through it.  
Examples 1. Copper 2. Iron

**Q.12** What is an insulator? Give two examples.

**Ans:** Materials, which do not allow electric current to pass through them, are called as insulator. Examples 1. Wood 2. rubber

**Q.13** When the free ends of a tester are dipped into a solution, the magnetic needle shows deflection. Can you explain the reason? **(Textbook Q.2;p99)**

**Ans:** The deflection in the compass needle shows that current is flowing through the wounded wire and hence, through the circuit. The circuit is complete since free ends of the tester are dipped in a solution. The solution is certainly a conducting solution.  
*This is the reason why the compass needle shows a deflection.*

## Chemical effects of current

**Q.14** Explain the term chemical effects of an electric current.

**Ans:** When an electric current is passed through a conducting liquid, chemical reaction takes place (like change in colour, etc). This effect is called chemical effects of an electric current.

**Q.15** Give some applications of the chemical effect of current.

**Ans:** The chemical effect of current is used in

1. electroplating,
2. the extraction of metals,
3. the purification of metals, and
4. the productions of compounds.

## LEDS

**Q.16** What is LED?

**Ans:** Light emitting diode is called LED. It is a small indicator light. It glows even when a weak electric current flows through it. It is used in electric circuits.

## Electrodes, Anode, Cathode,

**Q.17** Define an electrode. Also define cathode and anode.

**Ans:** Electrodes are conductors which conduct electric current through a conducting liquid in an electric circuit.

**Cathode:** The electrode, which is connected to the negative terminal of the battery or cell, is called cathode.

**Anode:** The electrode, which is connected to the positive terminal of the battery or cell is called anode.

**Q.18** The process that you saw in Activity 8.7 is used for purification of copper. A thin plate of pure copper and a thick rod of impure copper are used as electrodes. Copper from impure rod is sought to be transferred to the thin copper plate. Which electrode should be attached to the positive terminal of the battery and why? **(Textbook Q.12;p100)**

**Ans:** Copper ion is positively charged. It is attracted towards the plate which is connected to the negative terminal of the battery. As copper ions are transferred to the thin copper plate, this

thin pure copper plate must be connected to the negative terminal of the battery. Consequently, impure copper rod is connected to the positive terminal of the battery.

## Ionization

**Q.19:** Define ionization.

**Ans:** Ionization is the process by which an atom or a molecule acquires a negative or positive charge by gaining or losing electrons to form ions, often in conjunction with other chemical changes.

## Electroplating

**Q.20:** Define electroplating.

**Ans:** It is process of deposition of a thin layer of one metal over another metal by passing electric current through conducting liquid i.e. electrolysis.

**Q.21:** Prepare a list of objects around you that are electroplated. **(Textbook Q.19/20)**

- Ans:**
1. Chromium plating is done on different parts of cars, buses and motor cycles to give them shiny appearance.
  2. A fine layer of gold is deposited on the silver ornaments and they are called gold-plated ornaments.
  3. Iron used in constructing a building is coated with a layer of zinc. This protects iron from corrosion and rusting.

## Process of electroplating

**Q.22:** Write some points that should be remember while electroplating.

**Ans:** The following points should be remembered while electroplating:

1. The metal article on which electroplating is to be done is made the negative electrode (cathode), i.e. it is connected to the negative terminal of the battery.
2. The metal to be deposited is made the positive electrode (anode), i.e. it is connected to the positive terminal of the battery.
3. A water-soluble salt of the metal to be deposited is taken as the electrolyte (conducting liquid).

**Q.23:** Write some uses of electroplating.

**Ans:** An important use of electroplating is to protect the inner metal and at the same time give the object an attractive looks.

Some examples are as follows

1. The bumpers of car are chromium-plated to protect them from corrosion.
2. Water taps are plated with nickel or chromium for the same reason.
3. Iron plated with tin to prevent rusting.
4. A steel spoon is plated with silver for decoration.

**Q.24:** List the necessary conditions that help to ensure a smooth and firm deposit during electroplating.

**Ans:** The necessary conditions to ensure a smooth and firm deposit are:

1. a direct current should be used.
2. a small current should be applied for a longer time.
3. the surface of the article should be free from dirt like oil or grease.
4. appropriate temperature should be maintained during electrolysis.



**Q.1:** Fill in the blanks.

- (a) Most liquids that conduct electricity are solutions of \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- (b) The passage of an electric current through a solution causes \_\_\_\_\_ effects.
- (c) If you pass current through copper sulphate solution, copper gets deposited on the plate connected to the \_\_\_\_\_ terminal of the battery.
- (d) The process of depositing a layer of any desired metal on another material means of electricity is called \_\_\_\_\_.

**Ans:** (a) acids, bases and salts. (b) chemical (c) negative (d) electroplating

