Chapter 14: Chemical Effects of Electric Current

Multiple Choice Questions **Page-154**

1. (b) 2. (c)

Multiple Choice Questions **Page-159**

1. (b) 2. (c)

EXERCISE

A. Tick (✓) the correct options.

1. (b) 2. (d) 3. (c) 4. (b) 5. (b) 6. (b)
7. (c) 8. (a)

B. Look at the figure [Fig. (a)] given alongside and tick (✓) the correct options.

1. (b) 2. (a)

C. Fill in the blanks.

1. electrolytic 2. Anions 3. chemical
4. electroplating 5. electrolysis 6. electrolytic cell
7. Graphite

D. Very Short Answer Questions.

1. Lemon juice and tap water 2. Voltameter
3. The three examples of electrolytes are–
   (i) aqueous solution of copper sulphate
   (ii) aqueous solution of hydrochloric acid
   (iii) aqueous solution of sodium chloride
4. Cation 5. LED and magnetic compass as current detectors
6. Gold and silver

E. Short Answer Type-I Questions.

1. A LED means Light Emitting Diode. It is similar to a bulb but it runs on very low voltage.
2. When an electric current is passed through an electrolyte, chemical reactions take place. This is called the chemical effect of electric current.
3. No, distilled water does not conduct electricity. We can make it conducting by adding
   (a) salts like common salt, copper sulphate, sodium nitrate, zinc chloride, etc.
   (b) acids like hydrochloric acid, nitric acid, sulphuric acid, etc.
   (c) bases like sodium hydroxide, ammonium hydroxide, potassium hydroxide, etc.
4. Materials that allow electricity to flow through them easily are called conductors. Iron and copper are two conductors.

5. The positively charged ions are called cations and the negatively charged ions are called anions.
6. Three effects of electric current are:
   (i) heating effect
   (ii) magnetic effect
   (iii) chemical effect

F. Short Answer Type-II Questions.

1. Non-electrolytes are chemical compounds which do not conduct electricity when dissolved in water.

   Glucose and alcohol are non-electrolytes.
2. The three applications of electrolysis are:
   (i) **Manufacture of chemicals:** For example, manufacture of oxygen gas, chlorine gas, hydrogen gas is done by electrolysis.
   (ii) **Refining of metals (electrolytic refining):** For example, many metals like copper, zinc, tin, silver, gold and nickel are refined by this method.
   (iii) **Electroplating:** The method of coating the metal's surface of a given article with a thin layer of superior metal with the help of electric current is called electroplating. For example, coating of iron with chromium or nickel or zinc to protect it from rusting.
3. Electrolytic refining means refining or purification by electrolysis. It is the most important and widely used method for refining of metals. Metals like copper, zinc, tin, silver, gold and nickel are refined by this method.
4. (a) The method of coating the metal's surface of a given article with a thin layer of superior metal with the help of electric current is called electroplating.
   (b) No, it is not right to cheat others and make profit because it shows dishonesty and is a crime. Such things create an obstacle in leading a good and honest life in future. Also, we should never be selfish.

G. Long Answer Questions.

1. Chemical effects of electric current are used in following ways :
   (a) **Extraction of metals from their ores**: Electrolysis is used in the extraction of metals from their ores. For example, when an electric current is passed through molten sodium chloride, sodium is deposited at the cathode and chlorine gas is evolved at the anode. Aluminium and potassium are also extracted from their ores by electrolysis.
   (b) **Manufacture of chemicals**: Electrolysis is used for the manufacture of chemicals which are used in industries in large quantities.

Manufacture of oxygen, chlorine and hydrogen gas is done by electrolysis.

(c) **Refining of metals (electrolytic refining)**: Electrolytic refining means refining (purification) by electrolysis. It is the most important and widely used method for refining of metals. Many metals, like copper, zinc, tin, silver, gold and nickel are refined by this method.

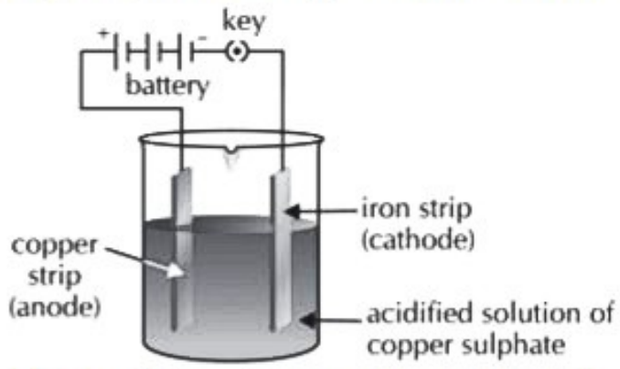
(d) **Electroplating**: The method of coating the metal's surface of a given article with a thin layer of superior metal with the help of electric current is called electroplating.

2. The method of electroplating of copper on an iron strip is as follows :

(a) The object to be electroplated, i.e., an iron strip is made cathode (negative electrode).

(b) A thin sheet of pure copper is made anode (positive electrode).

(c) An acidified solution of copper sulphate is used as an electrolyte, taken in an electrolytic tank.



Electroplating of copper on an iron strip

When electric current is passed through the acidified copper sulphate solution, copper from copper sulphate solution gets deposited on the surface of iron strip, forming a reddish layer of copper metal all over the iron strip. Thus, electroplating of copper on an iron strip is done.

H. HOTS (Higher Order Thinking Skills) Questions.

1. On interchanging the connections of the electrodes, the copper ions previously deposited on the iron strip (previously cathode now anode) will move towards the copper strip (previously anode now cathode).
2. The liquids that contain impurities which serve as free ions conduct electricity.