Chemical Effects Of Electric Current

Check point 1

Q. 1. Differentiate between good conductors and bad conductors along with the help of an example.

Answer:

Good Conductors	Bad Conductors
have free electrons or ions	no free electrons or ions are present
allow electricity to pass through them	do not allow electricity to pass through them
example: Copper, acidified water solution	example: rubber, plastic

Q. 2. The water which we get from sources such as taps, hand pumps, well and ponds is good conductor of electricity. Why?

Answer: The water which we get from sources such as taps, hand pumps, well and ponds is not pure. It has dissolved salts in it. These dissolved salts help in conduction of electricity making it a good conductor of electricity.

Q. 3. LED is used in a circuit. Explain why.

Answer: If the current through a circuit is very weak, then a bulb cannot detect the current passing through it. It is because the current is not enough to heat up the filament of the bulb. Thus, LED is used to detect weak current in a circuit.

Check point 2

Q. 1. Name the factors on which chemical effects produce by an electric current depends.

Answer: The chemical effects produced by an electric current depends on:

- Nature of electrode
- Nature of the conducting solution

Q. 2. How many types of electrodes are there is in a battery.

Answer:

There are two types of electrode in a battery: cathode (negative) and anode (positive).

Q. 3. British chemist, William Nicholson had shown that if electrodes were immersed in water and a current was passed, bubbles of oxygen and hydrogen were produced. What do your understand by bubbles of hydrogen and oxygen?

Answer: When current is passed through water, the bubbles of Hydrogen and Oxygen are produced. This confirms the chemical effect of electric current. It shows that chemical reactions take place when current is passed through an electrolyte.

Check point 3

Q. 1. Explain the reason of coating of one metal to another metal.

Answer: A metal can be corroded when exposed to such weather conditions. Thus, it is coated with another corrosion resistant metal to prevent it from corrosion and scratch.

Q. 2. Electroplating is a very useful process. Explain how.

Answer: Electroplating is a very useful process. It is used to coat the metals with another metal. This prevents the exposure of metal to the atmosphere and protects them from corrosion.

Q. 3. Write any one harm of electroplating.

Answer: Electroplating is a costly process and the corrosion-resistant metal like Chromium is also very costly.

Chapter Test

Q. 1. Acidified water is electrolysed by using carbon electrodes. What is produced at cathode and at anode?

Answer: Hydrogen is produced at cathode and Oxygen is produced at anode.

Q. 2. Vinegar is a sour liquid. State whether vinegar conducts electricity or not.

Answer: Vinegar is mostly acetic acid dissolved in water. It contains ions and conducts electricity.

Q. 3. Name two industrial compounds or elements which are obtained by electrolytic method.

Answer: Extraction of Aluminium from its ore, Refining of Copper

Q. 4. Name the metal which is usually electroplated on car parts such as bumpers and bicycle handlebars made of steel.

Answer: Chromium is used to electroplate car parts such as bumpers and bicycle handlebars made of steel. It is corrosion and scratch resistant.

Q. 5. Fine machine parts can be repaired by which process?

Answer: Fine machine parts can be repaired by electroplating them.

Q. 6. Is sugar an electrolyte or non-electrolyte?

Answer: Sugar does not contain ions. So, it is non-electrolyte.

Q. 7. Give two examples of conductor.

Answer: Copper wire, acidified copper sulphate solution

Q. 8. Zinc is not plated on iron. Is it correct?

Answer: No. Zinc is plated on iron to prevent it from corrosion and formation of rust.

Q. 9. Explain the process to decompose water into hydrogen and oxygen.

Answer: When current flows through a conducting solution, chemical reactions are caused. As a result, gas bubbles are formed on the electrodes.

Aim: To decompose water into hydrogen and oxygen

Procedure:

● Take out two carbon rods from discarded cells and clean them with sandpaper.

● Make carbon rods as electrodes by connecting them to a battery after wrapping copper wire around them.

● Take a full cup of water in glass bowl or plastic bowl.

● Add few drops of lemon juice or a teaspoon of salt to the water. This will make it more conducting.

● Immerse the carbon rods into the water such that the metal caps of rod are outside the water.

● Wait for few minutes.

You will observe gas bubbles near the electrodes. The hydrogen is formed on the negative electrode and Oxygen is formed on the positive electrode.

Q. 10. Explain, why does a brand new bicycle, have shining handlebar and wheel rims. What will happen if these are accidentally scratched?

Answer: A brand new bicycle has electroplated handlebar and wheel rims. In electroplating, the layer of one metal is deposited on other metal to prevent it from corrosion. When the handlebar and wheel rims are accidentally scratched, the electroplated layer of Chromium metal comes off. This exposes the inner metal to corrosion. Thus, electroplated metal should not be scratched to prevent inner metal from corrosion.

Q. 11. For electroplating copper on an iron object, which terminal of the battery is connected to the iron object? Which electrolyte is used for this purpose?

Answer: The object to be electroplated is connected to the negative terminal of battery. The electrolyte is acidified copper sulphate. The free copper in the solution gets deposited to the iron object. An equal amount of copper gets dissolved in the solution from the other electrode.

Q. 12. Differentiate between electrolytes and non-electrolyte.

Answer:

Electrolytes	Non-electrolytes
ions are present	ions are not present
allow electricity to pass through them	do not allow electricity to pass through them
example: acidified copper sulphate solution	example: pure water, honey

Q. 13. Define cathode and anode.

Answer: Cathode: The electrode connected to the negative terminal of battery is known as cathode. Anode: The electrode connected to the positive terminal of the battery is known as anode.

Q. 14. Why chromium is used for electroplating?

Answer: Chromium is used for electroplating due to its characteristics. It is shiny which makes the object attractive after electroplating. It is corrosion and scratch resistant. Thus, it protects the object from corrosion and scratch.

Q. 15. All liquids conduct electricity. Comment.

Answer: No, all liquids do not conduct electricity. The liquids require free ions in them to conduct electricity.

Q. 16. Are lemon juice, vinegar and tap water, conductors or insulator?

Answer: Vinegar, lemon juice and tap water are conductors due to presence of dilute acids and dissolved salts in them.

Q. 17. Give an activity to examine the behaviour of the following solid materials towards electricity: plastic, copper, rubber, wood, graphite.

Answer: ● Take a torch bulb and connect its positive terminal to the positive terminal of the battery and negative terminal to the object to be tested.

● Connect the negative terminal of the battery to the object with a wire.

● Do not touch the object when the current is passing through it.

● If the bulb glows, then the material is conducting else not.

We see that graphite and copper conduct electricity whereas rubber, plastic and wood do not.

Q. 18. A strip of impure copper metal is given to you. Describe briefly, how you will purify it by using the chemical of electric current.

Answer: ● The impure copper metal is made anode (positive).

● A thin strip of pure copper is made cathode (negative).

● The cathode and anode are immersed in the acidified copper sulphate solution and a battery is connected across them.

● The acidified Copper Sulphate solution is used as the electrolyte.

When current is passed through the acidified Copper Sulphate solution, the copper ion present in the solution starts depositing on the cathode. Same amount of Copper is dissolved into the solution from the anode. In this way, the pure copper is deposited at

the cathode. The cathode gets thicker and the anode gets thinner as time passes during electrolysis. The impurities are left in the solution as anode mud.

Q. 19. Show the passing of current through the water with an activity.

Answer: ● Take out two carbon rods from discarded cells and clean them with sandpaper.

● Make carbon rods as electrodes by connecting them to a battery after wrapping copper wire around them.

● Take a full cup of water in glass bowl or plastic bowl.

● Add few drops of lemon juice or a teaspoon of salt to the water. This will make it more conducting.

● Immerse the carbon rods into the water such that the metal caps of rod are outside the water.

● Wait for a few minutes.

You will observe gas bubbles near the electrodes. The hydrogen is formed on the negative electrode and Oxygen is formed on the positive electrode. These bubbles confirm the chemical effect of current on water and also that current passes through water.

Q. 20. Write the applications of electrolysis.

Answer: Electrolysis is the chemical decomposition produced by passing an electric current through a liquid or a conducting solution. Its applications are as follows:

● Electroplating: In electroplating, the layer of one metal is deposited on other metal to prevent it from corrosion.

● Electro refining: It is used for extracting impurities from crude metals.

● Electrometallurgy: It is the process of extraction of metals from their respective ores by electrolysis.