Chapter 10. Chemical Effects of Electric Current

Very Short Q&A:

Q1: Name some materials which are good conductors of electricity.

Ans: Copper, aluminium, etc.

Q2: Name some materials which are bad conductors of electricity.

Ans: Wood, rubber, plastics etc.

Q3: What is the purpose of a tester?

Ans: To test whether a particular material allows the electric current to pass through it or not.

Q4: Does lemon juice or vinegar conduct electricity?

Ans: Yes

Q5: Which is good conductor a copper wire or a wooden board?

Ans: Copper wire

Q6: Dissolve some salt in distilled water, the resulting solution will be good conductor of electricity or bad conductor?

Ans: Good conductor

Q7: Why distilled water is poor conductor of electricity?

Ans: Because distilled water is free of salts.

Q8: What effect does the current produce when it flows through a conducting solution?

Ans: Current causes chemical reactions when it flows through a conducting solution?

Q9: Define electroplating.

Ans: The process of depositing a layer of any desired metal on another material by means of electricity is called electroplating.

Q10: Why electroplating are used?

Ans: Electroplating is mostly used in industry for coating of metal objects with a thin layer of different metal.

Q11: How tin cans are made?

Ans: By electroplating tin into iron.

Q12: How iron can be protected from corrosion?

Ans: A coating of zinc is deposited on iron to protect iron from corrosion.

Q13: Which is more reactive tin or iron?

Ans: Iron

Q14: Most liquid that conducts electricity are solutions of acids, _____ and _____.

Ans: Bases and salts.

Q15: The passage of an electric current through a solution causes _____ effect.

Ans: Chemical

Q16: Which of the following is good conductor of electricity

a. **copper**
b. **wood**
c. **distilled water**
d. **None of these**

Ans: Copper

Q17: Liquid conducts electricity .True/ False.

Ans: True

Q18: Why rubber and plastics do not conduct electricity?

Ans: Because they do not allow electric current to pass through it.

Q19: Why it is dangerous to touch an electrical appliance with wet hand?

Ans: Because water can conduct electricity.

Q20: In a set up to test conduction of electricity why the bulb glows when the electric current passes through it?

Ans: Because of the heating effects of current, the filament of the bulb gets heated to a high temperature and it starts glowing.

Q21: What is the full form of LED?

Ans: Light emitting diode.

Q22: What is LED?

Ans: It is a semiconductor light source, use to detect weak current in the circuit.

Q23: LED glows even when weak electric current flows through it. True/False.

Ans: True

Q24: Electric current produces _____field.

Ans: Magnetic

Q25: Is air a poor conductor of electricity under all conditions?

Ans: No

Q26: What do you mean by salt solution?

Ans: Salt dissolved in distilled water forms salt solution.

Q27: The passage of an electric current through a conducting solution causes _____.

Ans: Chemical

Q28: What is the name of process in which one metal has coating of another metal?

Ans: Electroplating

Q29: Why chromium plating is done on car parts?

Ans: Because chromium does not corrode.

Q30: Name some objects around you that are electroplated.

Ans: Kitchen gas burner, bath taps, bicycle handle bars etc.

Q31: We add small amount of dilute hydrochloric acid to distilled water, the resulting solution will be a good conductor or poor conductor?

Ans: Good conductor

Q32: We add small amount of sugar to distilled water, the resulting solution will be a good conductor or poor conductor?

Ans: Poor conductor

Q33: We add small amount of caustic soda to distilled water, the resulting solution will be a good conductor or poor conductor?

Ans: Good conductor

Q34: The path through which an electric current flows is called

a. **Electric path**
b. **Electric relay**
c. **Short circuit**
d. **Electric circuit**

Ans: Electric circuit.

Short Q&A:

Q1: Differentiate between good conductors and bad conductors of electricity.

Ans:

Good conductors of electricity	Bad conductors of electricity
1. They allow electricity to pass through it 2. Metals are generally good conductors 3. Eg: copper, aluminium	1. They do not allow electricity to pass through it 2. Non- Metals are generally bad conductors 3. Eg: rubber, wood

Q2: Describe an electrical tester.

Ans: An electrical tester is a simple piece of electronic test equipment used to determine the presence or absence of an electric voltage in a piece of equipment under test. It is also used to test whether a liquid allows electric current to pass through it or not.

Q3: How can we check whether a tester is working or not?

Ans: Join the free ends of the tester together, for a moment, and check whether the bulb glows or not, if the bulb glows it means tester is working and if not it means tester is not working. In case it does not glow check that all connections are tight, or not.

Q4: How can you test whether lemon juice is good conductor or poor conductor of electricity?

Ans: Pour one table spoon of lemon juice in a plastic cap of discarded bottle, dip the end of tester into lemon juice, make sure that the tester should not more than 1 cm apart at also should not touch each other, we will observe the current flows in the circuit and bulb glows, this proves that lemon juice is good conductor.

Q5: In some situation even liquid is allowing the electric current to pass but, bulb does not glow. Why so?

Ans: This happens when current through the circuit is too weak to make the bulb glow

Q6: Why the filament of bulb does not get heated sometimes in a circuit?

Ans: This is because current through the circuit is too weak so the filament of the bulb does not get heated sufficiently and it does not glow.

Q7: Is it possible for an electric tester to detect weak current also, if no how can we detect weak current flowing in a circuit?

Ans: If weak current flows through the circuit then bulb in it will not glow. In order to detect weak current we use LED or may use another effect of electric current that is it produces magnetic effect also so we can use this property of electric current to detect weak current.

Q8: Why materials classified as poor conductors, also allow electricity to pass under certain conditions?

Ans: Under certain condition most of the materials can conduct electricity thus it is right to say poor conductors instead of bad conductors or insulators.

Q9: Distilled water is good conductor or bad, how can we make distilled water a good conductor?

Ans: Distilled water is a poor conductor but if we add some salt in it the resulting salt solution is good conductor.

Q10: Explain the functioning of a LED.

Ans: LED stands for Light emitting diode. It is a semiconductor light source, use to detect weak current in the circuit. There are two wires attached to a LED, one lead is slightly longer than the another one, the longer lead is always connected to the positive terminal of battery and shorter lead is connected to negative terminal of battery

Q11: What are the purpose of one longer and another shorter lead of a LED?

Ans: the longer lead is always connected to the positive terminal of battery and shorter lead is connected to negative terminal of battery.

Q12: Why tap water is always good conductors?

Ans: Tap water is not pure, it contains several amounts of mineral salts naturally dissolved in it , thus it is good conductor.

Q13: Why water that we get from ponds and hand pumps are always good conductors?

Ans: Water that we get from ponds and hand pumps is not pure, it contains several amounts of mineral salts naturally dissolved in it , thus it is good conductor.

Q14: We add small amount of dilute hydrochloric acid to distilled water, the resulting solution will be a good conductor or poor conductor? Explain why.

Ans: Good conductor, becauseWhen we add kitchen salt (NaCl) to the distilled water the salt dissolves in water by splitting its molecules in ions:

H2O + NaCl --> H2O + (Na+) + (Cl-)

The NaCl molecules react to give ions. This happens because the NaClis a strong electrolyte. Solutions of strong electrolytes are good conductors of electricity because they contain a relatively high concentration of ions.

Q15: We add small amount of sugar to distilled water, the resulting solution will be a good conductor or poor conductor?Explain why.

Ans: Poor conductor, because Sugar, as a non-electrolyte substance, does not produce ions when dissolved in water. A solution of sugar contains molecules of sucrose,but no ions. The absence of ions in a sugar aqueous solution makes it a non-electricity conductor fluid.

Q16: What happens when electrodes are immersed in water and a current is passed?

Ans: When electrodes are immersed in water and a current is passed bubbles of oxygen and hydrogen is produced.

Q17: Explain the process of electroplating.

Ans: One of the most common applications of the chemical effect of electric current is electroplating. In this process, there exists a liquid, usually called the electrolyte, through which current passes. Two electrodes, connected to the terminals of a battery with a switch in between, are inserted in the liquid. The electrode that is connected to the positive terminal of the battery is called the “anode,” and the other connected to the negative terminal is called the “cathode”. Electroplating is done in industries to have an anti-reactive coating on the parts of machines so that they do not react with the raw material, to have an anti-corrosive coating for the machines so that they do not get corroded, and a heat-resistivecoating for parts like boilers to resist the heat produced by the machinery.The process of electroplating is used for plating parts of vehicles with nickel and chromium, which protects them from corrosion.

Q18: Discuss the importance of electroplating.

Ans: One of the most common applications of the chemical effect of electric current is electroplating. In this process, there exists a liquid, usually called the electrolyte, through which current passes. Two electrodes, connected to the terminals of a battery with a switch in between, are inserted in the liquid. The electrode that is connected to the positive terminal of the battery is called the "anode," and the other connected to the negative terminal is called the "cathode". Electroplating is done in industries to have an anti-reactive coating on the parts of machines so that they do not react with the raw material, to have an anti-corrosive coating for the machines so that they do not get corroded, and a heat-resistivecoating for parts like boilers to resist the heat produced by the machinery.The process of electroplating is used for plating parts of vehicles with nickel and chromium, which protects them from corrosion.

Q19: What do you mean by gold plating?

Ans: Gold plating is one of the most common applications of electroplating in ornament-making.

Q20: Define electro- magnetic induction.

Ans: In a circuit the induced current flowing through the coil is always such that it opposes the motion of the magnet. This process of producing induced current due to a varying magnetic field is called electro-magnetic induction.

Q21: What do you mean by electrolysis and electrolytes?

Ans: Electrolysis: The passage of an electric current through a liquid causes chemical changes. This process is known as electrolysis.

Electrolytes: Conduction is possible only in those liquids which are at least partly dissociated into oppositely charged ions; such liquids are called electrolytes.Solutions of many inorganic chemical compounds (e.g. common salt, sulphuric acid, etc.) are examples of this type of liquid.

Q22: What do you mean by voltameter?

Ans: Voltameter: In electrolysis, the whole arrangement of electrodes, electrolyte and the vessel containing them is called a voltameter. In the case of the copper voltameter, which involves copper electrodes in copper sulphate solution, the net effect is that copper is dissolved off the anode and deposited on the cathode, with the electrolyte remaining unchanged.

Q23: When the free ends of a tester are dipped into a solution, the magnetic needle shows deflection. Can you explain why?

Ans: The deflection through 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 the solution and the solution is certainly conducting solution.

Q24: In case of fire before the fireman used the water hoses, they shut off the main electrical supply of the area, why so?

Ans: Water may conduct electricity, if the electrical supply of the area is not shut off and water is poured over electrical appliances then electricity may pass through fire and may harm the fireman, thus In case of fire before the fireman used the water hoses, they shut off the main electrical supply of the area

Q25: In which case the compass needle will deflect more: by testing sea water or by testing drinking water?

Ans: The compass needle will defect more in case of sea water than drinking water because sea water contains more dissolved salt than the drinking water.

Q26: It is said that rain water is as pure as distilled water, but once while testing rain water compass needle shows deflection, explain why?

Ans: This is because rain water contains dissolved salts that makes it a conducting solution

Q27: Differentiate between conductors and insulators.

Ans: The substances which allow the electric current to pass through them are called conductors. Example metals like copper, aluminium. The substances which do not allow electric current to pass through them are called insulators, example : rubber, wood

Q28: Write some of the chemical effects of electric current. What causes the chemical reactions in a conducting solution?

Ans: The passage of an electric current through a conducting solution causes chemical reactions. Following are listed some of the chemical effects of electric current:

a. Bubbles of a gas may be formed on the electrodes.
b. Deposits of metal may be seen on electrodes.
c. Changes of colour of solutions may occur.

Infact, the reaction would depend on what solution and electrodes are used.

Q29: Is it safe for an electrician to carry out electrical repairs outdoors during heavy downpour? Explain.

Ans: No, it is not at all safe for an electrician to carry out electrical repairs during heavy downpour. Rather, it is highly dangerous, because during heavy downpour there is a high risk of electrocution.

Q30: Can you prepare an electric pen? Describe how?

Ans:

a. Take a filter paper and soak it with potassium iodide and starch solution.
b. Spread this filter paper on a metal sheet.
c. Now take two connecting wires and join them to the terminals of battery.
d. Attach the wire connected at positive end to plate.
e. Now write on the sheet wire attached to negative terminal.

We will see that wherever we write, blue coloured ink will appear. The reason for this is electrolysis of potassium iodide solution which produces iodine. Iodine on reaction with starch produces ink of blue colour.

Long Q&A:

Q1: Explain the process of electroplating, along with its advantages and uses.

Ans: One of the most common applications of the chemical effect of electric current is electroplating. In this process, there exists a liquid, usually called the electrolyte, through which current passes. Two electrodes, connected to the terminals of a battery with a switch in between, are inserted in the liquid. The electrode that is connected to the positive terminal of the battery is called the “anode,” and the other connected to the negative terminal is called the “cathode”. Electroplating is done in industries to have an anti-reactive coating on the parts of machines so that they do not react with the raw material, to have an

anti-corrosive coating for the machines so that they do not get corroded, and a heat-resistivecoating for parts like boilers to resist the heat produced by the machinery.The process of electroplating is used for plating parts of vehicles with nickel and chromium, which protects them from corrosion.

Q2: 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

a. **liquid A is a better conductor than liquid B.**
b. **liquid B is a better conductor than liquid A.**
c. **both liquids are equal conducting.**
d. **Conducting properties of liquid cannot be compared in this manner.**

Ans: Liquid A is a better conductor than liquid B.

Q3: Most liquids that conduct electricity are solutions of acid, bases and salt . Justify the statement.

Ans: Good conductor, becauseWhen we add kitchen salt (NaCl) to the distilled water the salt dissolves in water by splitting its molecules in ions:

$H_2O + NaCl \rightarrow H_2O + (Na^+) + (Cl^-)$

The NaCl molecules react to give ions. This happens because the NaClis a strong electrolyte. Solutions of strong electrolytes are good conductors of electricity because they contain a relatively high concentration of ions.

Poor conductor, because Sugar, as a non-electrolyte substance, does not produce ions when dissolved in water. A solution of sugar contains molecules of sucrose,but no ions. The absence of ions in a sugar aqueous solution makes it a non-electricity conductor fluid.