ELECTROLYSIS #3

Question -
What are the major differences between Electrodes and Electrolytes ? [4 marks]

Answer -

NOTE:

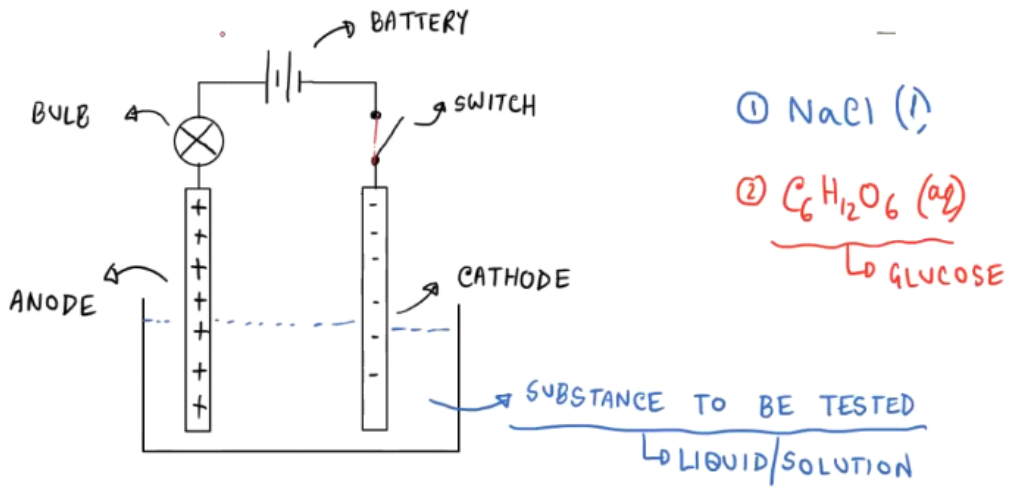
- *Metals, Graphite, molten ionic compound and aqueous solution of ionic compounds are all good conductors*
- *Metals and Graphite are known as **Electrodes**, which are electrical conductor*
- *Molten ionic compounds and aqueous solutions are known as **Electrolytes**, which are also electrical conductor.*

	ELECTRICAL CONDUCTION BY ELECTRODES	**ELECTRICAL CONDUCTION BY ELECTROLYTE**
METHOD OF CONDUCTION	Electricity is conducted by the **flow of electrons**	Electricity is conducted by the **movement of oppositely charged ions**
EFFECT OF CONDUCTION	Electrodes remain **chemically unchanged** when electricity flow through them	The **oppositely charged ions** discharge in the electrolyte and thus, it **breaks down / decomposes into its constituent elements**

Apparatus :

- Battery / Cell
- Connecting wire
- Electrodes (Cathode and Anode) ----> made up of Graphite / Platinum
- Bulb
- Switch
- Beaker

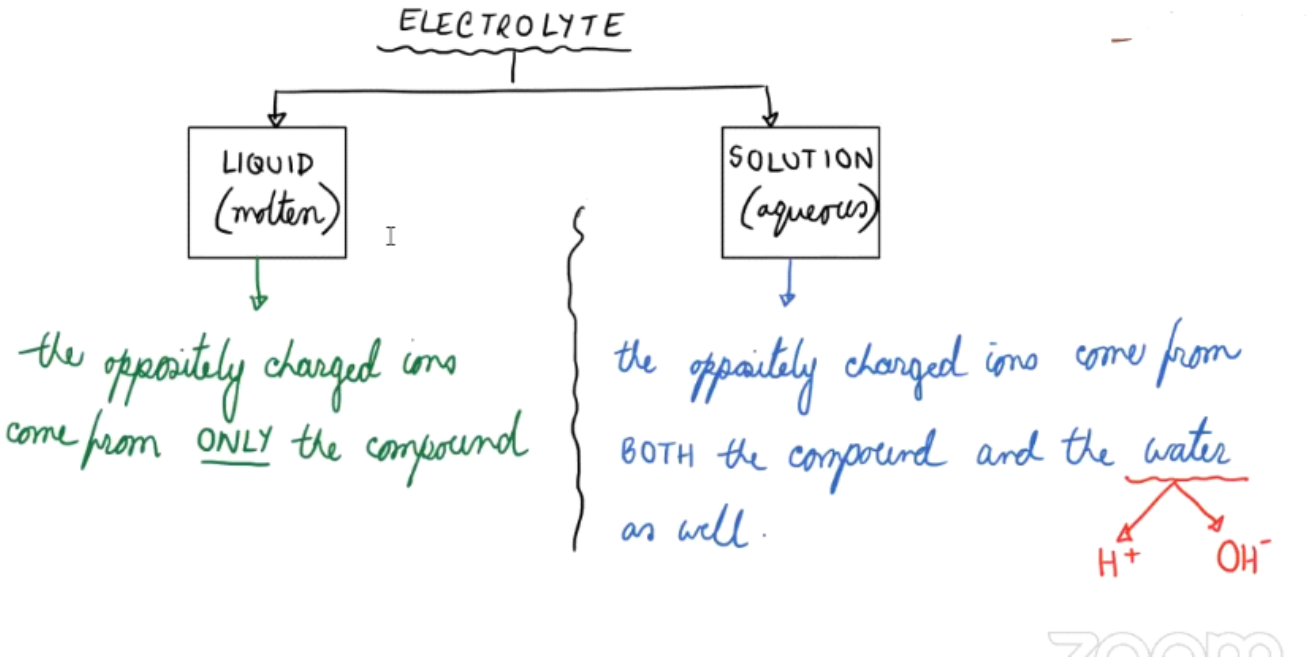
Diagram :

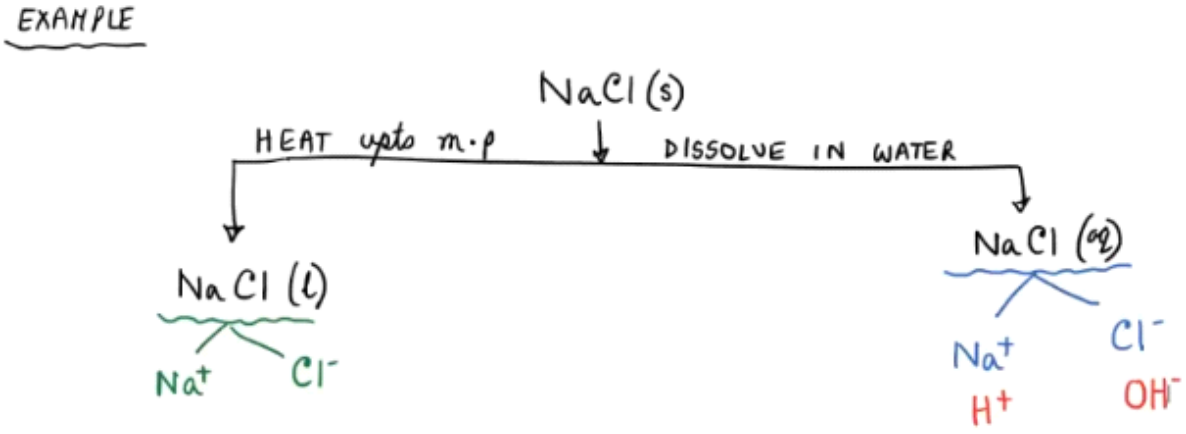


Procedure:

A solution of NaCl is taken in a beaker. The switch is turned on and the electricity passes through the copper wire. It will be observed that the bulb glows. Therefore, it can be concluded that since the solution is conducting electricity, it is an electrolyte.

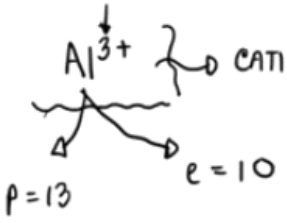
If a solution of sugar is taken in the beaker, and then the switch is turned on, it will be observed that the bulb does not glow. This proves that the solution does not conduct electricity and therefore is a non – electrolyte.





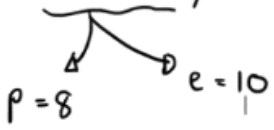
- CATIONS ⟶ POSITIVELY charged ions
  - ↳ they have a DEFICIENCY/SHORTAGE OF ELECTRON(S).
    - ↳ in them, the number of protons is GREATER THAN the number of electrons.

EXAMPLE : Al^{3+} } ↳ CATION ⟶ it has a SHORTAGE/DEFICIENCY of 3 electrons.



- ANIONS ⟶ NEGATIVELY charged ions
  - ↳ they have an EXCESS/SURPLUS of electron(S).
    - ↳ in them, the number of protons is LESS THAN the number of electrons.

EXAMPLE : O^{2-} } ↳ ANION ⟶ it has an excess/surplus of 2 electron



- CATHODE → NEGATIVELY charged electrode
  - has an EXCESS / SURPLUS of electrons.

- ANODE → POSITIVELY charged electrode
  - has a DEFICIENCY / SHORTAGE of electrons.

DURING ELECTROLYSIS,

- CATIONS (+) are attracted towards and gets DISCHARGED by GAINING electrons from (REDUCTION) → CATHODE (-) } form PRODUCT

So, cations get reduced at CATHODE.

- ANIONS (-) are attracted towards and gets DISCHARGED by LOSING electrons to (OXIDATION) → ANODE (+) } form PRODUCT.

So, anions get oxidized at ANODE.

This is what happens during electrolysis:

- *Positively charged ions* move to the *negative electrode* during electrolysis. They receive electrons and are reduced.
- *Negatively charged ions* move to the *positive electrode* during electrolysis. They lose electrons and are oxidized.