



## **19CH201 - ENGINEERING CHEMISTRY FOR CIRCUIT BRANCHES**

### **UNIT-2 - ENERGY STORAGE DEVICES**

#### **2.1. Introduction**

A battery is an arrangement of several electrochemical cells connected in series, that can be used as a source of direct electric current at a constant voltage.

**Cell:** Contains an anode and cathode

**Battery:** Contains several anodes and cathodes

#### **Requirements of a Battery**

- i) It should be light and compact for easy transport.
- ii) It should have long shelf life, when it is being used and not used.
- iii) The voltage should be appreciably constant during its use.

#### **Types of Batteries**

##### **Primary Battery (Primary Cell)**

In these cells, the electrode reactions cannot be reversed by passing an external current. The reactions are possible only once and the battery will be dead after use. They cannot be recharged.

*Examples: Dry cell, mercury cell.*

##### **Secondary Battery (Secondary Cell)**

In these cells, the electrode reactions can be reversed by passing an external current. Therefore, they can be recharged and used repeatedly. They are also known as **Storage cells** or **accumulators**.

*Examples: Lead acid storage cell, Ni - Cd cell.*



## DIFFERENCES

### Primary Batteries

### Secondary Batteries

- |   |   |
|---|---|
| ➤ Cell reaction is irreversible           | Cell reaction is reversible.  |
| ➤ Must be discarded after use.            | May be recharged  |
| ➤ Have relatively short shelf life        | Have long shelf life.   |
| ➤ Function only as galvanic cells .       | Functions both galvanic Cell & as electrolytic cell.  |
| ➤ They cannot be used as storage devices  | They can be used as energy storage devices (e.g. solar/thermal energy converted to electrical energy) |
| ➤ They cannot be recharged e.g. Dry cell. | They can be recharged. Li-MnO <sub>2</sub> battery. Lead acid, Ni-Cd battery.                         |

- **Flow Battery (Fuel Cell)**

The reactants, products and electrolytes continuously passing through the cell, the chemical energy is converted to electrical energy.

*Examples: Hydrogen – oxygen fuel cell.*



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