



TRINITY COLLEGE FOR WOMEN
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BATTERY

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BATTERY

- It is a source which converts chemical energy into electrical energy and vice versa.
- Cell is the building block of battery.
- Battery is combination of cells in series.



TYPES OF CELLS :

1. PRIMARY CELL:

- CAN NOT BE RECHARGED
- CHEMICAL PROCESS NOT REVERSABLE
- CHEMICAL REACTION TOTALLY DESTROY ONE OF THE METAL AFTER A PERIOD OF TIME
- EXAMPLES- ZINC CARBON (1.5V), ALKALINE (1.5V)



2. SECONDARY CELL:

- CAN BE RECHARGED
- CHEMICAL REACTION REVERSIBLE
- THE ELECTRODE & ACID MIXTURE CHANGE AS THE BATTERY SUPPLIES .THIS IS CALLED DISCHARGING.BY APPLYING CURRENT TO CELL IN OPPOSITE DIRECTION,THE BATTERY MATERIAL RESTORED.THIS IS CALLED CHARGING.
- EXAMPLES – LEAD ACID(2.0V),NICKEL-CADMIUM(1.2V),NICKEL-METAL HYDRIDE(1.2V),LITHIUM ION(3.3V)
- ALSO KNOWN AS STORAGE CELL OR ACCUMULATOR



LEAD ACID BATTERY

Invented in 19th
Century.

Rechargeable

Applications



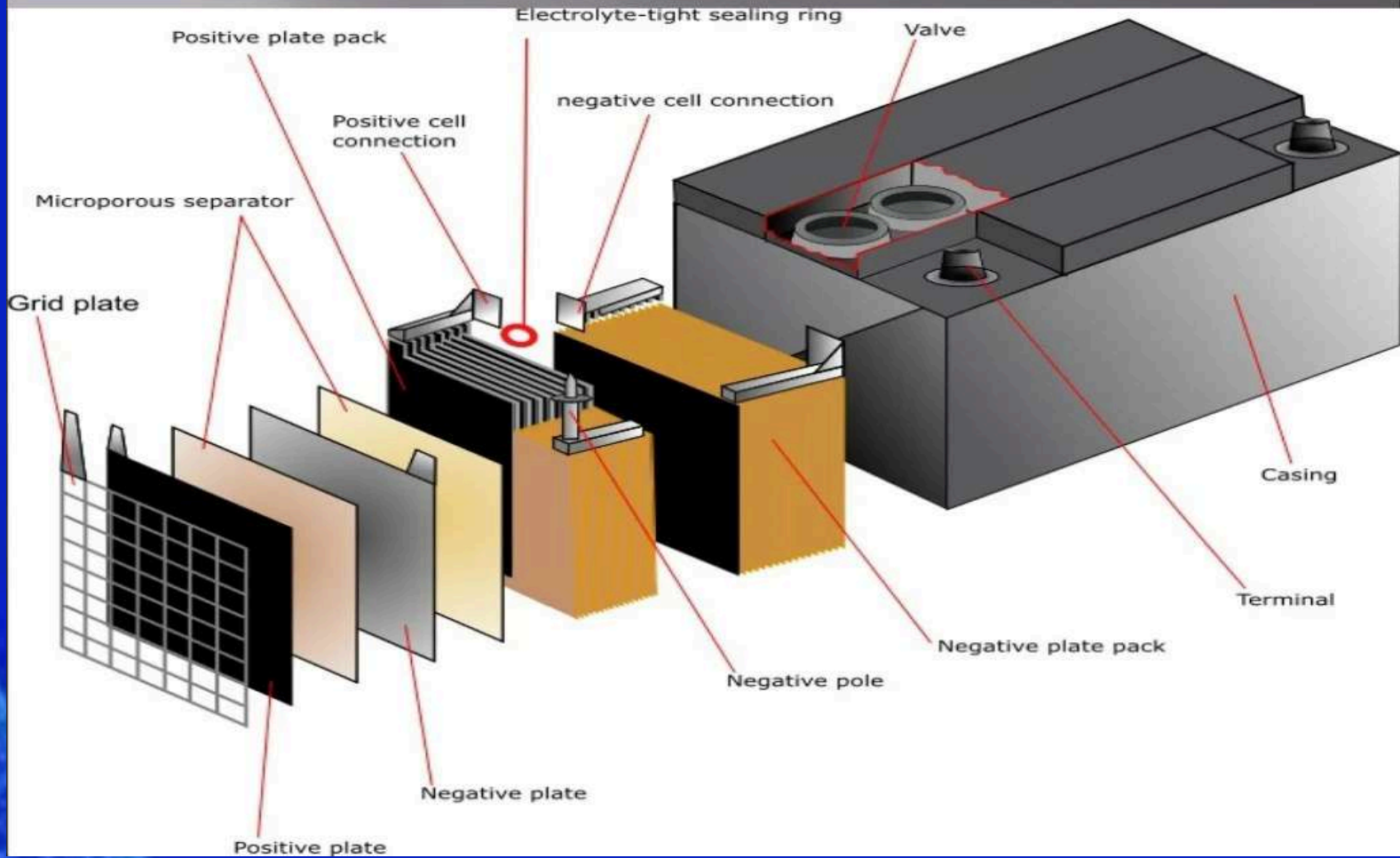
Widely used in various industries,
generation plants, hotels ,hospitals,
,power backup in home.

**Automobile
Industries**

Best selling battery
and most
frequently used in
automobiles.

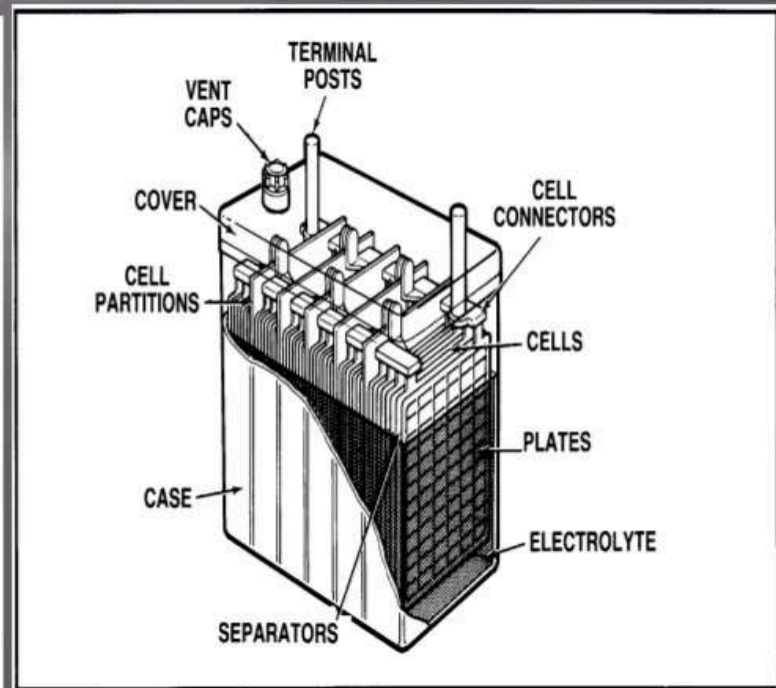
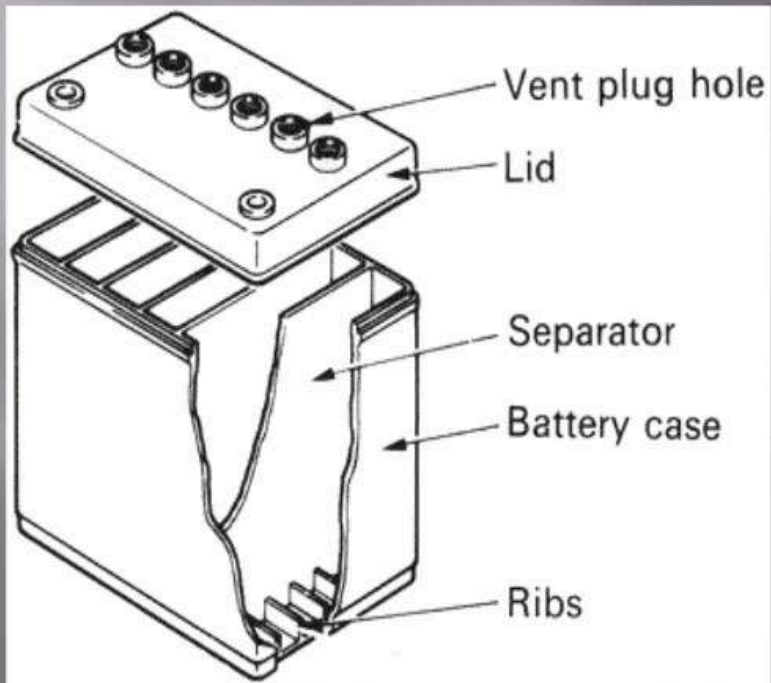
Powers the wipers
headlight,radio,air
conditioning & most
importantly the
engine starter.

BATTERY CONSTRUCTION



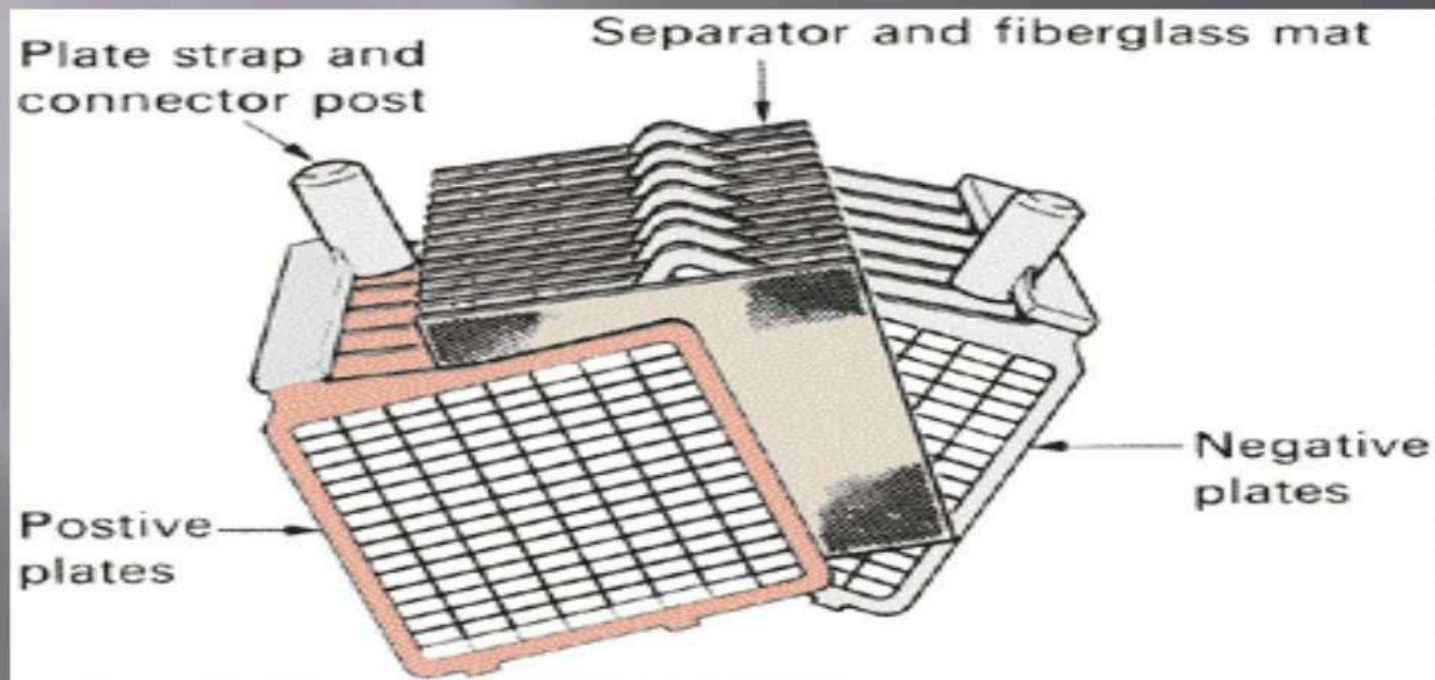
1. **BATTERY CASE & COVER:-** The battery case and cover ...

- form a sealed container
- Protects the internal parts
- Keep the internal parts in proper alignment
- Prevent the electrolyte leakage
- is made of polypropylene, hard rubber, and plastic base materials.

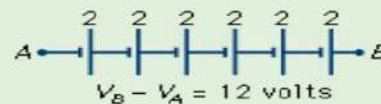
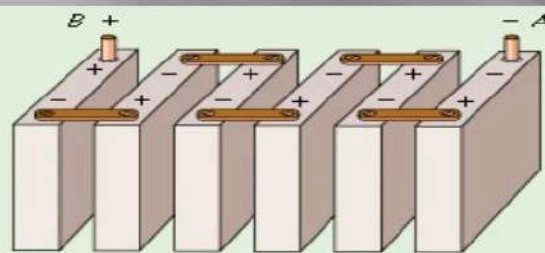


2. PLATES:-Two plates:

1. POSITIVE PLATE- It is made of **antimony** covered with an active layer of **lead dioxide**(brown coloured).
2. NEGATIVE PLATE- It is made of lead covered with an active layer of **spongy lead**.

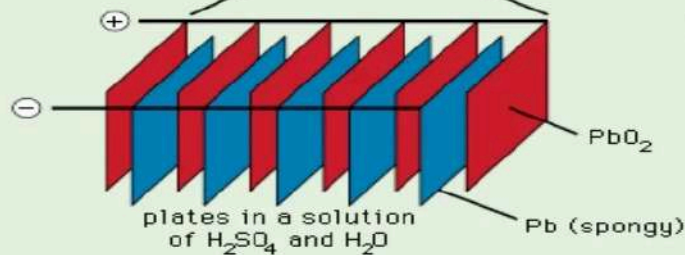


3. **SEPERATOR**:- Plates are separated by **thin porous separator (woven glass or plastic envelope)**. They allow electrolyte to pass freely between the plates but prevent the plates from touching each other.
4. **CELLS**:- A typical lead acid battery is organized into cells. Each cells...
 - consist of multiple positive and negative plates immersed in their own electrolyte reservoir.
 - produce about **2.1 volt** regardless of battery size.
 - are connected in series with heavy internal straps.



A The battery consists of six two-volt cells connected in series.

B Each component cell is composed of several negative and positive electrodes made of pure spongy lead and lead oxide, respectively; the electrodes, connected in parallel, are immersed in a dilute solution of sulfuric acid.



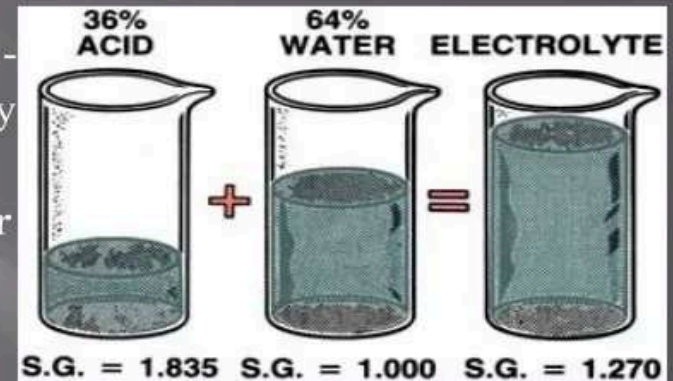
5. VENTING SYSTEM:- They allow controlled release of **hydrogen gas** which forms normally during battery recharging. If removed, they permit checking electrolyte and if necessary adding water.

6. ELECTROLYTE:

- ❖ It is mixture of **Sulphuric acid (36%) and Water (64%)**.
- ❖ It reacts chemically with the active material on the plate to produce voltage (electric pressure).

❖ SPECIFIC GRAVITY OF ELECTROLYTE:-

- When fully charged specific gravity of battery electrolyte is **1.270**
- Specific gravity is measured by **Hydrometer or Refractometer**.



❖ SULPHATION:

- Sulphation starts when specific gravity falls below **1.225** or voltage measure less than **12 volt**.
- Sulphation destroy the battery ability to generate volts and amps.

WORKING OF LEAD ACID BATTERY

There are four stages of working:

1. **CHARGED:** A fully charged battery contains....

- Negative plate of spongy lead
- Positive plate of lead oxide
- Electrolyte consisting of 36% acid & 64% water.

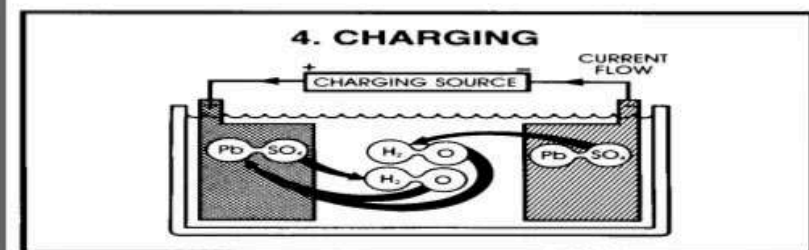
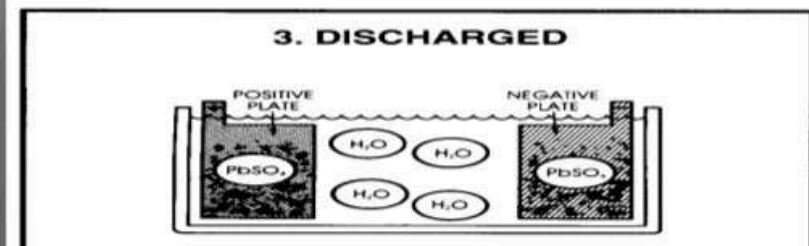
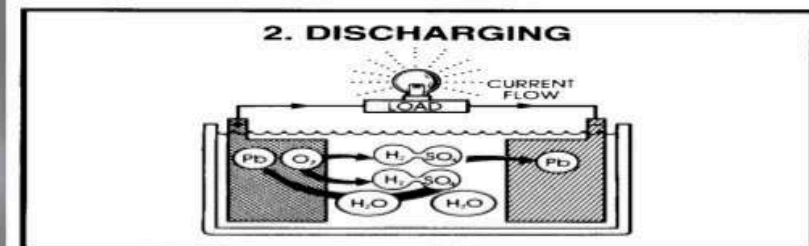
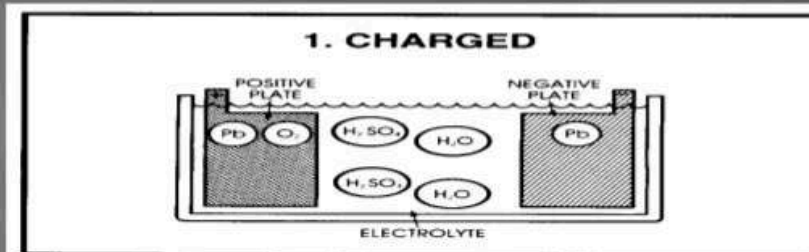
2. **DISCHARGING:** During discharging...

- Electrolyte becomes diluted and plates becomes sulphated.
- Electrolyte divides into hydrogen and sulphate.
- The hydrogen combines with oxygen from the positive plate to form more water.
- The sulphate combines with the lead in both plates to form lead sulphate.

3. **DISCHARGED:** In a fully discharged battery, both plates are covered with lead sulphate and the electrolyte is diluted to mostly water

4. **CHARGING:** During charging...

- Sulphate leaves the plates and combines with hydrogen to become sulphuric acid.
- Free oxygen combines with lead on the positive plate to form lead dioxide.



THANK YOU

<http://www.trinitycollegenkl.edu.in/>