Relevance/Objective:

- To measure battery condition.

Learning Outcome:

- Students will be able to measure SOC of battery in various load conditions.

Relevant CO:

- Interpret the purpose, construction and working of different automotive battery.

Introduction: -

Every electrical component in a vehicle is supplied current from the battery. The battery is one of the most important parts of a vehicle because it is the heart or foundation of the electrical system. The primary purpose of an automotive battery is to provide a source of electrical power for starting and for electrical demands that exceed alternator output.

State of Charge: -

Testing the battery voltage with a voltmeter is a simple method for determining the state of charge of any battery. The voltage of a battery does not necessarily indicate whether the battery can perform satisfactorily, but it does indicate to the technician more about the battery's condition than a simple visual inspection. A battery that "looks good" may not be good. This test is commonly called an open circuit battery voltage test because it is conducted with an open circuit, no current flowing, and no load applied to the battery.

1. If the battery has just been charged or the vehicle has recently been driven, it is necessary to remove the surface charge from the battery before testing. A surface charge is a charge of higher-than-normal voltage that is just on the surface of the battery plates. The surface charge is quickly removed when the battery is loaded and therefore does not accurately represent the true state of charge of the battery.

2. To remove the surface charge, turn the headlights on high beam (brights) for one minute, then turn the headlights off and wait two minutes.

3. With the engine and all electrical accessories off, and the doors shut (to turn off the interior lights), connect a voltmeter to the battery posts. connect the red positive lead to the positive post and the black negative lead to the negative post. This reading will be our NO-LOAD reading.

4. Turn on all the electrical load and take voltmeter reading. This will be our LOAD reading.

Compare both readings with table given below to determine state of charge of battery.

Battery voltage (v)	state of charge
12.6 or higher	100% Charged
12.4	75% Charged
12.2	50% Charged
12.0	25% charged
11.9 or below	Discharged

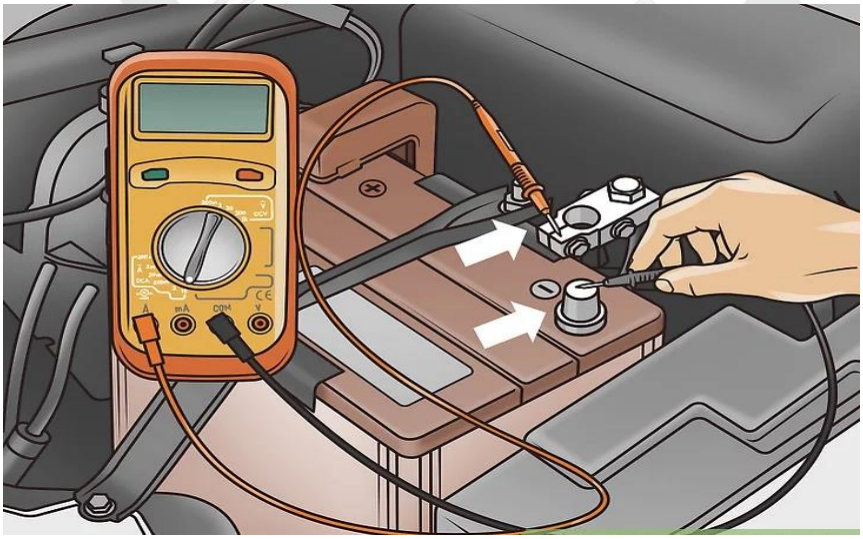

Figure : Voltage measurement of battery

Task: -

Measure voltage given battery with the help of multimeter/voltmeter and determine SOC in NO LOAD and LOAD conditions.

Introduction: -

A standard operating procedure is a set of written instructions that describes the step-by-step process that must be taken to properly perform a routine activity. SOPs should be followed the exact same way every time to guarantee that the equipment remains as per company standards.

Need for Visual Inspection: -

Visual inspection gives some idea of battery condition. So proper inspection and follow up helps to increase battery life. Following is some of parts that need to be inspected frequently.

1. **Battery Case:** Distortion or crake in battery case may lead to permanent battery failure.
2. **Battery mountings:** Loose battery mounting may cause short battery life. Battery may damage other parts also if it's mounting kept loose. On other hand tight mounting also caused crack on battery case.
3. **Battery terminals:** Battery should be check for corrosion or loose connection at terminals. This may cause battery discharging or arcing at terminal connection.
4. **Electrolyte level:** Less electrolyte may hamper battery's overall life.
5. **Vent Plugs:** Blocked vent plugs may cause permanent damage of battery case and tends to reduce battery life.
6. **Dirt or leakage on top:** Dirt of leakage on top causes short circuit which may damage other circuit of vehicle.

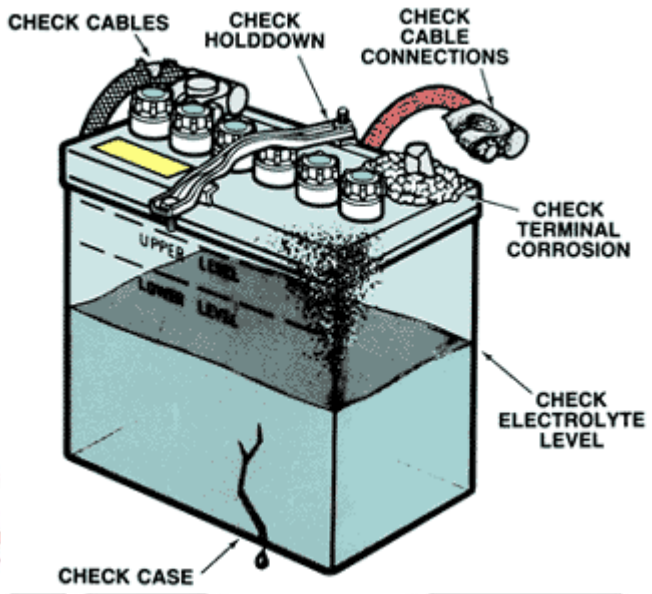

Figure Visual Inspection of battery

Task: -

Prepare SOP for visual inspection of battery. SOP must contain above mention points.