

-: Unit - 3 :-

1.) Write a note on battery that is used in automobile:-

Ans: The four common types of batteries used in cars are lithium-ion batteries, lead acid batteries, SLI batteries and deep cycle batteries.

1.Function:-

- i. To provide electrical power to start the engine. A battery's primary function is engine starting. ...
- ii. To supply additional current when the charging system can't keep up with electrical demand. ...
- iii. To act as a voltage stabilizer for the charging system.

2.requirement:-

- a) It serves as a power storage and releases the same quickly to operate a vehicle starter motor.
- (b) It provides power to the parking lights for a reasonable time.
- (c) It allows operation of accessories when the engine is not running.
- (d) It acts as a swamp to damp out fluctuation of system voltage.

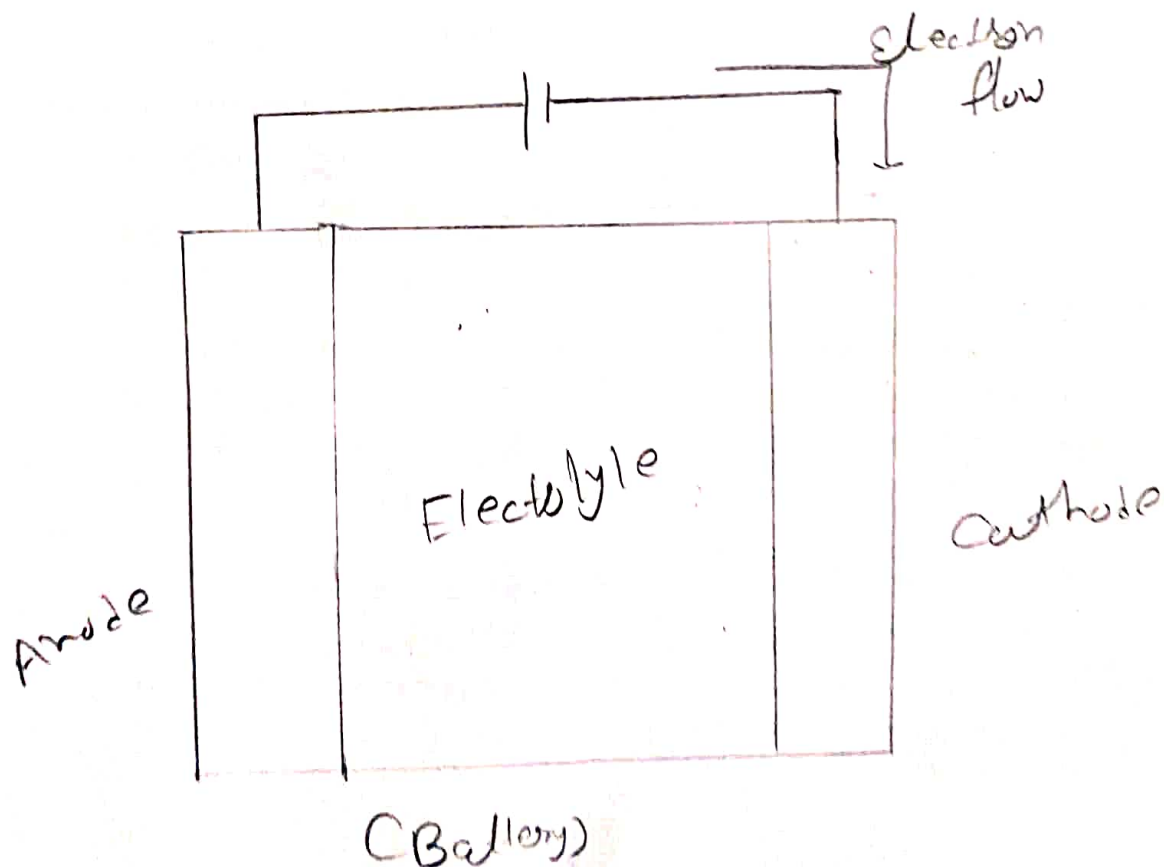
3.components:-

- Batteries are made up of three basic components: an anode, a cathode, and an electrolyte.

4.working:-

- A car battery uses lead-acid technology to turn chemical energy into electricity. It accomplishes this through the usage of cells, which contain and store the energy until needed.

- Most standard car batteries contain six cells that are situated in a row inside the plastic casing. Each cell contains a lead dioxide plate and a lead plate. Together, they create two volts for each cell—which is why it's often referred to as a 12-volt battery.
- The rows of cells are submerged in sulfuric acid, which triggers a chemical reaction between the lead dioxide and lead plates, and this creates lead sulfate and ions. As the ions move freely around the lead plates, another chemical reaction occurs, which produces hydrogen and lead sulfate.
- The movement of ions generates electricity that moves to either the positive or negative terminal of the battery. The two wires that connect to your car battery then disperse the electricity to the starter motor and other vital electrical systems.



2.) In detail describe the charging system in automobile :-

Ans :

1.Function:-

- The primary purpose of the charging system is to provide power to all electrical components in a vehicle.
- It comprises alternator that maintains and keep the vehicle's battery charged.
- Charging system supplies electrical current to fire the spark plugs, which ignite the air/fuel mixture in the combustion chamber,
- Alternators help to charge dead batteries, while the engine is running.
- Charging system help to send the engine mechanical issue to the engines ECU using a sensing device.
- Vehicles electrical components are powered when the engine is not running.

2.component:-

i. Alternator:

-An alternator is one of the major and inevitable parts in automobile charging system as it plays the best role. The electrical power that charges the battery is from the alternator, but the current produced is alternating current (AC).

-This AC power is immediately converted to direct current (DC) because automobiles use a 12-volt DC electrical system. The dead battery does not mean there is something wrong with it. it just that being deprive of charge, this is why alternator is also checked if a car is not starting.

ii. Voltage Regulator:

-The voltage regulator controls the alternator's power output. Though this device is often located in the alternator, as it regulates the charging voltage that the alternator produces.

-It keeps the voltage between 13.5 and 14.5 volts to protect the electrical parts in the vehicle. In modern vehicles that use ECU to sense when the battery needs to be charged as controls the volt supplied.

- The warning lamp in the dashboard indicates something is wrong with the charging system. Often time the warning lamp is indicating faulty alternator, resulting in an uncharged battery.

iii. Battery:-

-The battery is another essential of the automobile charging system, as it serves as a reservoir of electrical power. The engine's starter motor is directly connected to the positive terminal.

- It helps to crank the component making the engine to start. As the engine is running, alternator directly charges the battery. The battery can also supply power to the electrical components when the engine isn't running

3.requirement:-

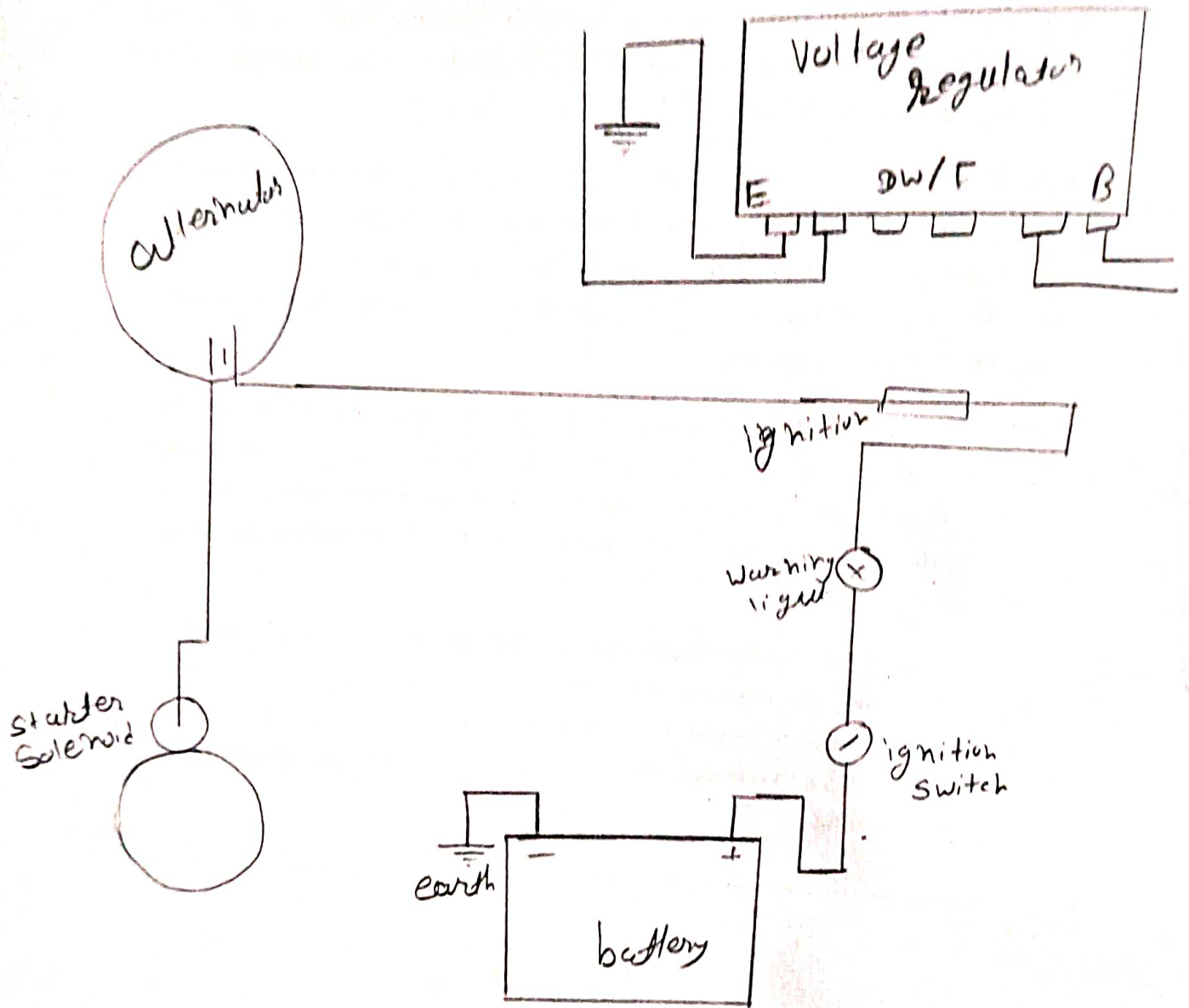
- The charging system has three main components: the alternator, the voltage regulator, and the batteries. The alternator generates electrical power to run accessories and to recharge the batteries. It is normally driven by a belt located off the crankshaft.

4.working:-

- The working of a car charging system can be complex or easy, depending on the design. Well, the diagram layout of a vehicle charging system has been indicated below this post. It shows the alternator, battery and vehicle

loads, which are the electric components. In its design, an alternator's voltage is less than battery voltage when the engine is not running. This is because the current from the battery is used to power the vehicle loads and not the alternator. The alternator contains diodes that prevent current from flowing into the alternator.

- In a situation where the engine is running, the alternator current output is greater than the battery voltage. The current flows from the alternator to the electrical load in the vehicle and the battery to charge it up. Conventionally, the alternator's output voltage is above the battery voltage when the engine is working.
 - Now you can see that vehicles' electrical loads are still powered even when the engine is not running, as long as the battery is charged enough. Though a large amount of energy is needed to power the various electrical systems contained in a vehicle, batteries can still meet reasonable electrical demands depending on their strength.
 - A car charging system begins its work when the starter key is on the ignition, at the point the vehicle's electrical components rely on the battery. As soon as the engine begins working, the alternator starts supplying power to the components and the battery. This is why the battery is charged when the engine is running.
-



[charging system]

3.) Discuss in detail the starting system that is used in automobile:-

Ans:-

1. Function:-

>The starter system is an electrical circuit that is useful for starting or starting the vehicle engine. This system can convert electrical energy from the battery into mechanical energy. Furthermore, this mechanical energy will be used to rotate the engine so that the vehicle engine can run.

2. Requirement:-

>The key components of the starter system are: – Battery – Starter (ignition) switch (part of the ignition lock) – Starter relay – Starter motor – Starter gear ring mounted on the flywheel. The battery provides the required electrical energy during start-up.

3. Components:-

>The starting system includes the battery, starter motor, solenoid, ignition switch and in some cases, a starter relay. An inhibitor or a neutral safety switch is included in the starting system circuit to prevent the vehicle from being started while in gear.

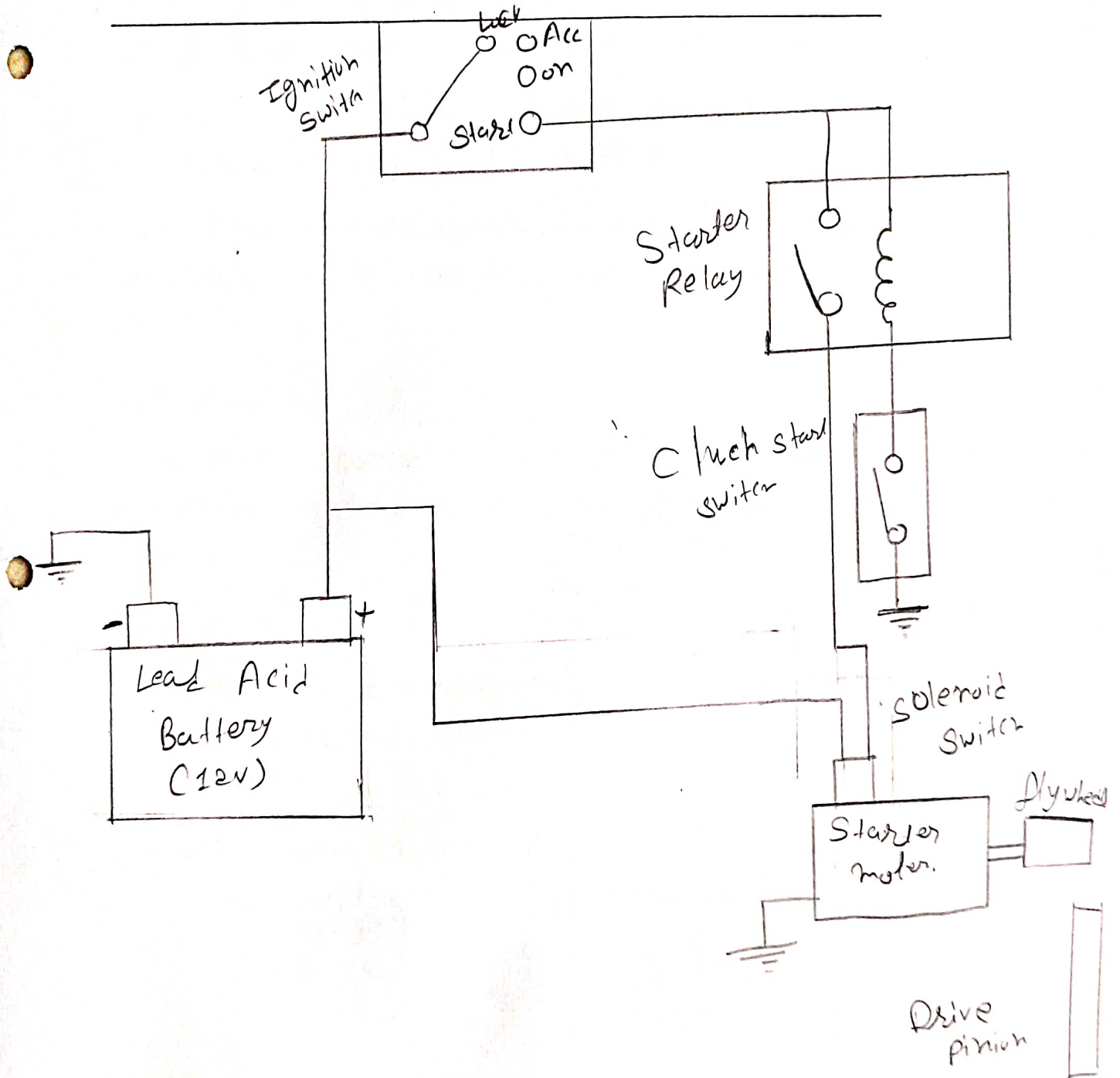
>The starter motor is a component in the vehicle's starter system that changes the electric power streamed into a turning moment on the engine. This starter motor component works by turning the gears on the flywheel, which makes the engine compress, and turn on then the car can move.

4. Working:-

>The starter motor is an electric motor that rotates your engine in order to allow the spark and fuel injection systems to begin the engine's operation under its own power.

>Typically, the starter is a large electric motor and stator coil mounted to the bottom (generally to one side) of the vehicle's transmission bell housing where it connects to the engine itself.

>The starter has gears which mesh with a large flywheel gear on the back side of the engine, which turns the central crank shaft. Because this is a lot of physical weight and friction to overcome, starter motors are generally powerful, high-speed motors and use an ignition coil to ramp up their power before engaging.



4.)Write a note on ignition system:-

Ans:

> It is a system that furnishes high voltage sparks to the engine cylinder to fire the compressed air fuel mixture in the combustion chamber.

1.Function:-

> It must maintain any electric spark with sufficient heat in order to ignite the air fuel mixture in the combustion chamber of the engine.

> It must maintain the spark long enough to permit the combustion of all fuel charges in the cylinder of the engine.

> It must draw the spark to each cylinder combustion can begin at specific time during the stroke of compression for every cylinder engine.

2.requirements:-

> It should provide good spark at correct timing. It should function efficiently for all engine speeds. It should be light, effective and reliable in service.

3.Components:-

- Battery:- a device for storing energy in chemical form that can be released as electricity. It serves as a source of electric current in an automobile.
- Ignition switch:- it opens and closes the ignition coil primary circuit. It may also be used to open and close other electric circuits.

- Ignition Resistor:- a resistor connected into the ignition primary circuit to reduce battery voltage to the coil during engine operation.
- Ignition coil :- the ignition system component that set a transformer to step up (increase) the battery voltage into many thousands of volts.
- Distributor:- a device that distributes an electric current to the spark plug. The rotary switch that directs high voltage surges to the engine cylinder in the proper sequences.
- Contact point:- it refers to the point in the distributor that opens and closes the primary circuit to build up and collapse the magnet line of force.
- condenser:- it is connected across the contact point to prevent arcing and burning . Also provides the storage of electricity when breaker point is open.
- Rotor:- it is the rotating parts of the distribution assembly that distributes high voltage from coil center cable to different spark plug.
- Distributor cap:- top cover of distributor assembly that prevents dirt or any particles from entering delicate parts.
- High Tension:- it is a secondary wire that include the coil wire and the spark plug wires.
- Spark plug :- is the device that burn air fuel mixture , which includes a pair of electrodes and an insulator , that provides a spark gap in the cylinders.

4. working:-

>When the ignition key is turned on, a low voltage current from the battery flows through the primary windings of the ignition coil, through the breaker points and back to the battery. This current flow causes a magnetic field to form around the coil.

