# SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 19OE120 AUTOMOTIVE ELECTRONICS I YEAR /I SEMESTER

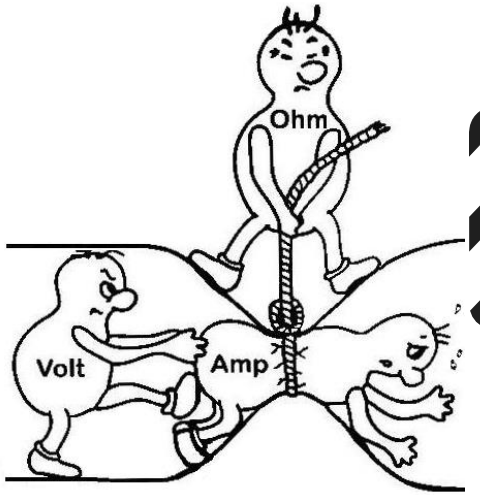
MECHATRONICS ENGINEERING

Unit 3 – STARTING / CRANKING AND ELECTRIC SYSTEMS

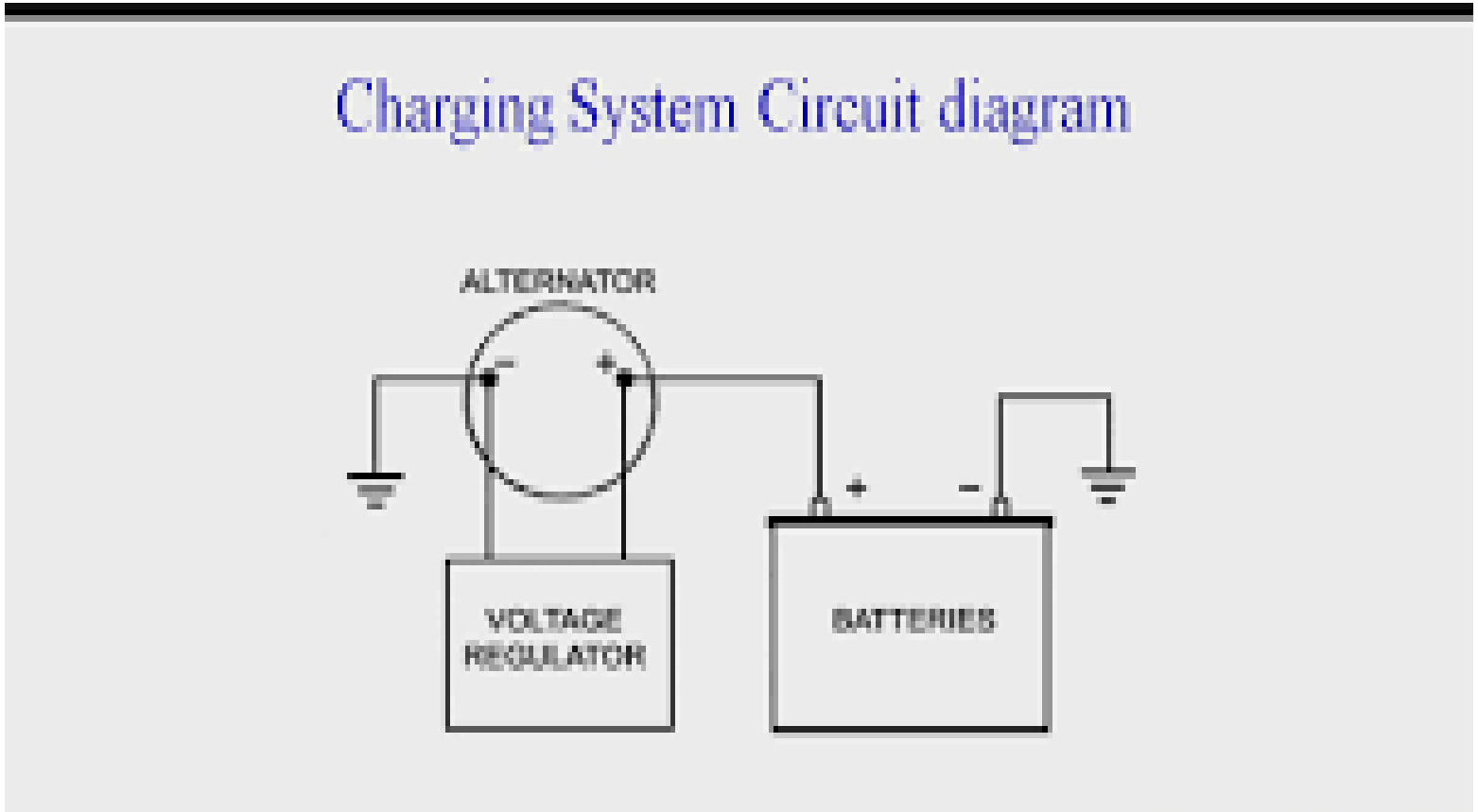
Topic – Charging System

## ❖ Requirements of the charging system

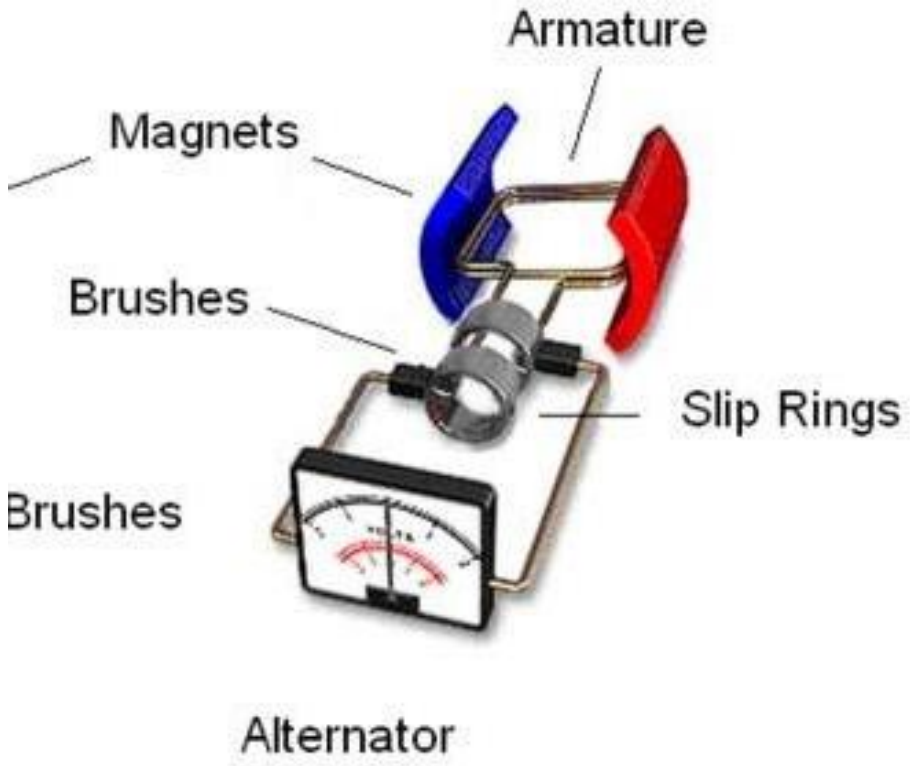
- Supply the current demands made by all loads.
- Supply whatever charge current the battery demands.
- Operate at idle speed.
- Supply constant voltage under all conditions.
- Have an efficient power-to-weight ratio.
- Be reliable, quiet, and have resistance to contamination.
- Require low maintenance.
- Provide an indication of correct operation.



# Charging System



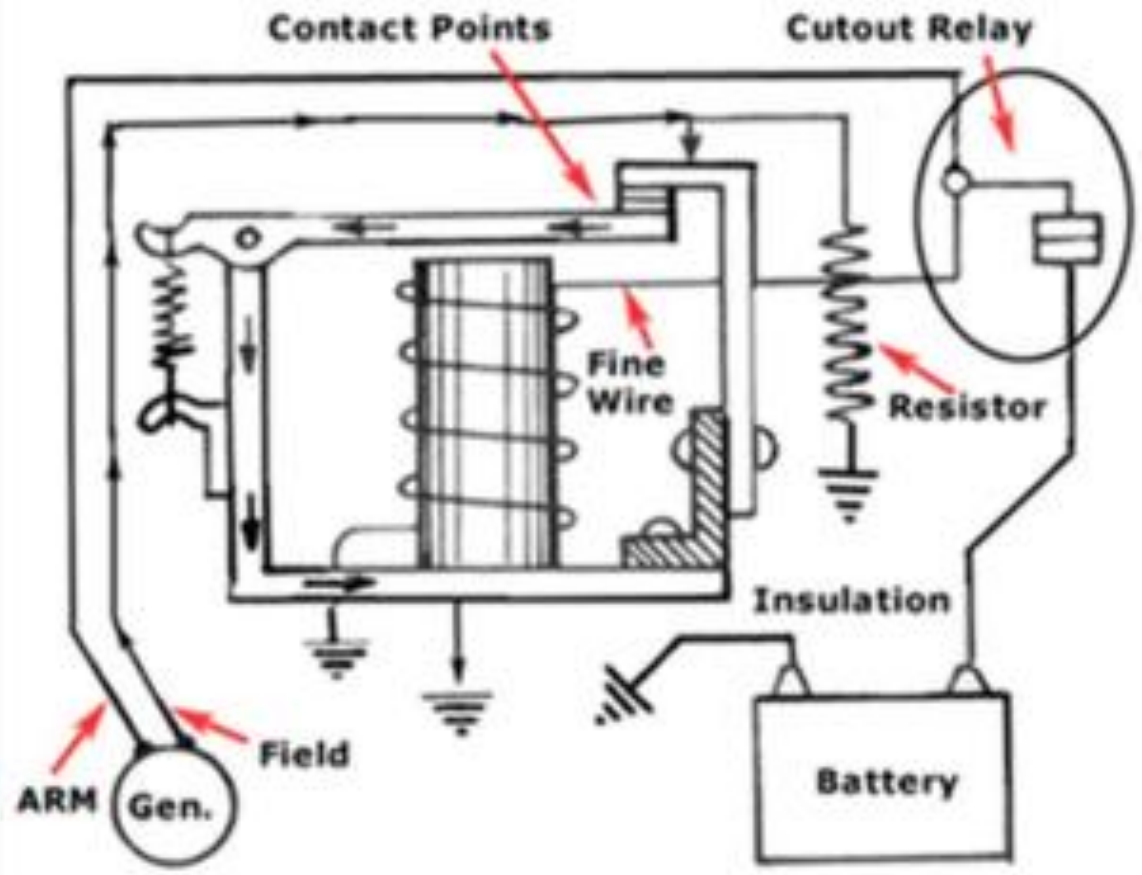
# AC Generator (Alternator)



# AC Generator (Alternator)

An alternator, as an integral part of every combustion engine vehicle, its main responsibility is to convert chemical energy to electrical energy so that you can charge and replenish the battery in your engine and other electrical components in a car.”

# Voltage Regulator




Typical Voltage Regulator

# Voltage Regulator

- A voltage regulator is an electromagnetic device. It operates in the same way as cutout relay.
- The voltage regulator prevents generation of excessive voltage, thus avoiding the damage to the electronic devices and overcharging of the battery.
- The current regulator limits the current and thus output of the generator is prevented from increasing beyond the rated output.
- The voltage produced depends on
  - The physical thing,
  - The speed of rotation
  - **The strength of magnetic field**

# Charging System

- The charging system consists of an alternator (generator), drive belt, battery, voltage regulator and the associated wiring.
- The charging system, like the starting system is a series circuit with the battery wired in parallel.
- After the engine is started and running, the alternator takes over as the source of power and the battery then becomes part of the load on the charging system.
- The alternator, which is driven by the belt, consists of a rotating coil of laminated wire called the rotor. Surrounding the rotor are more coils of laminated wire that remain stationary (called stator) just inside the alternator case.
- When current is passed through the rotor via the slip rings and brushes, the rotor becomes a rotating magnet having a magnetic field.
- When a magnetic field passes through a conductor (the stator), alternating current (A/C) is generated. This A/C current is rectified, turned into direct current (D/C), by the diodes located within the alternator