SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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: 19EEB201- DC machines and Transformers

II YEAR / III SEMESTER

Unit 2 – DC Motor

Topic 1: Principle of operation of DC Motor

What We'll Discuss

TOPIC OUTLINE

A Case

Lorentz law

Fleming’s left hand rule

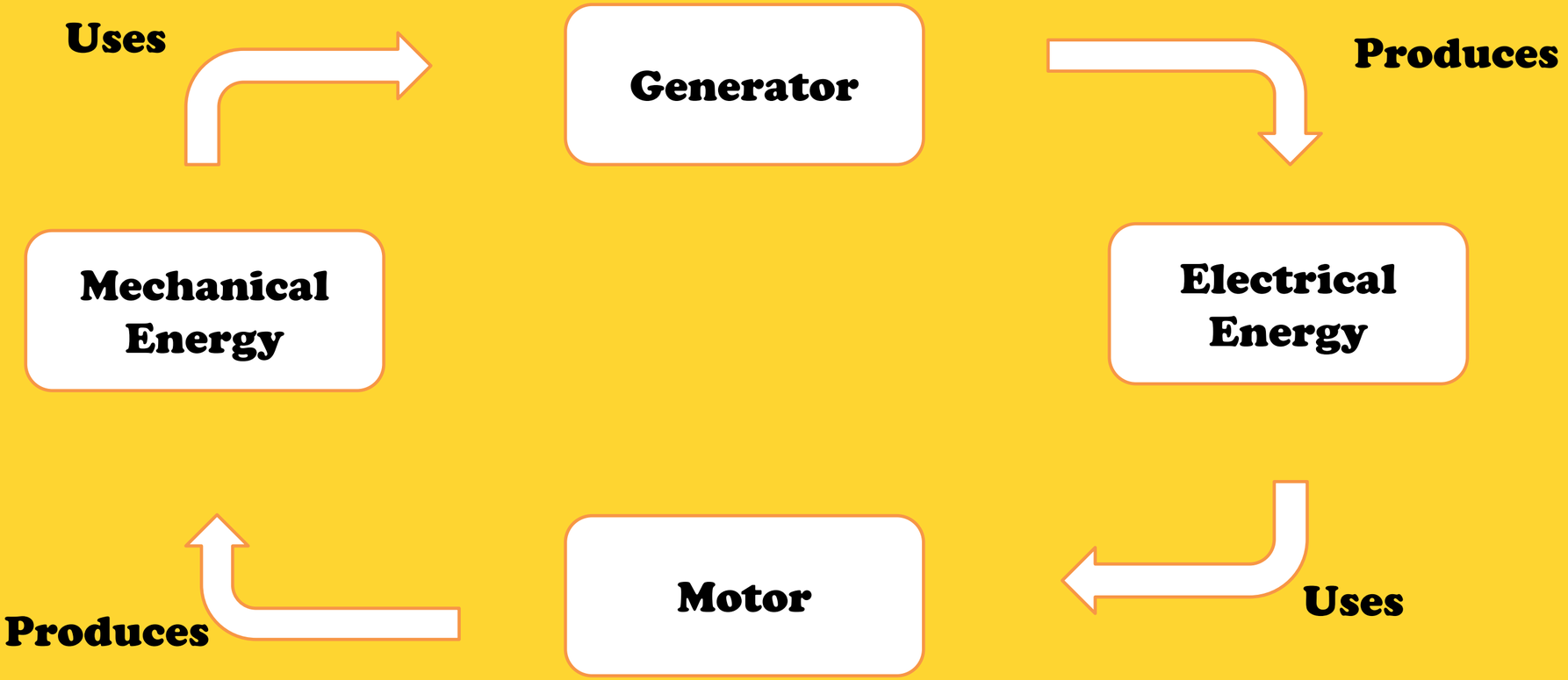
Principle of Operation

Assessment

A CASE

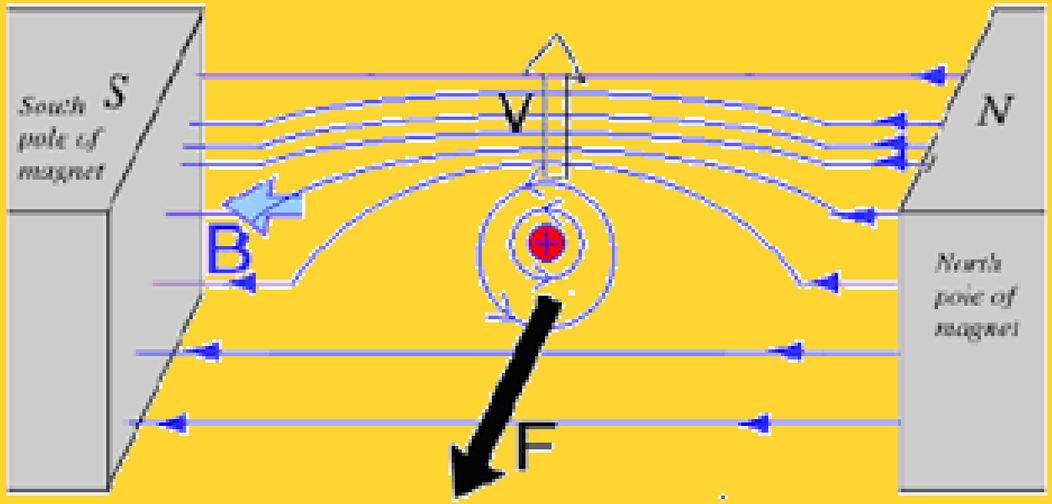
- Do u think what type of motors are used in these places…
- How does the motor operate…

Generator / Motor



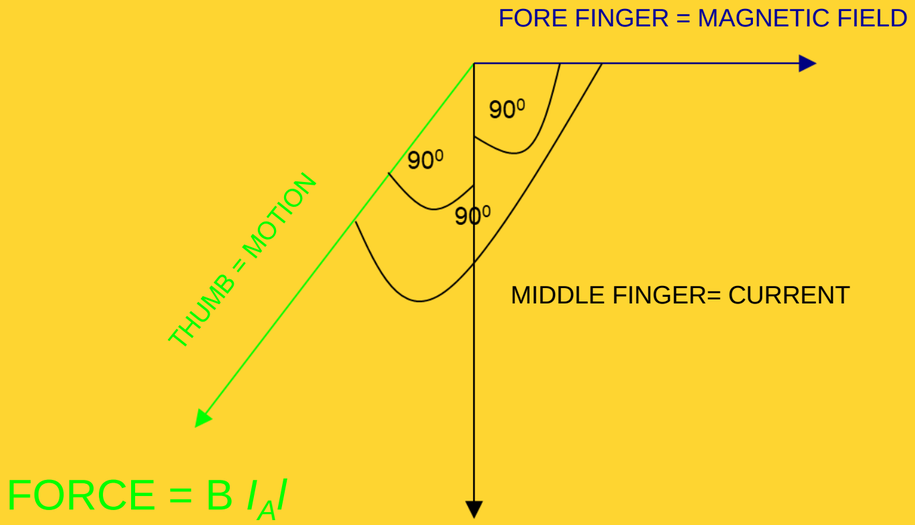
Lorentz Law

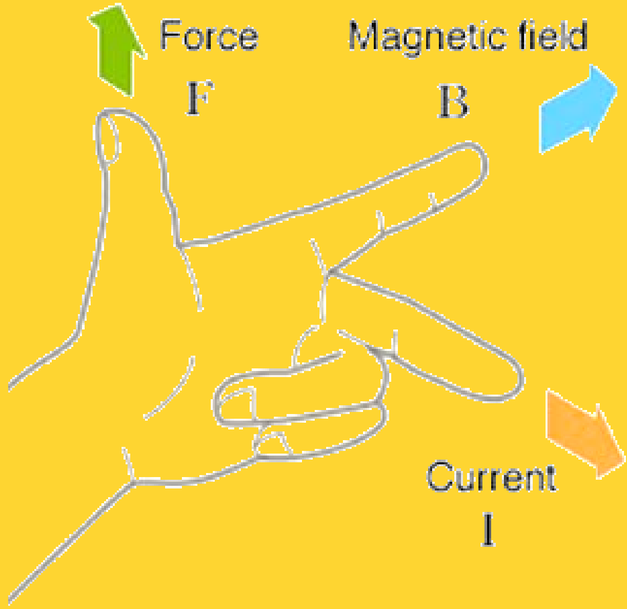
- Whenever the current carrying conductor placed in a magnetic field experience a force



Fleming's left Hand Rule

- The Thumb represents the direction of the Thrust on the conductor / Motion of the Conductor.
- The Fore / First finger represents the direction of the magnetic Field
- The Centre finger represents the direction of the Current





PRINCIPLE OF OPERATION

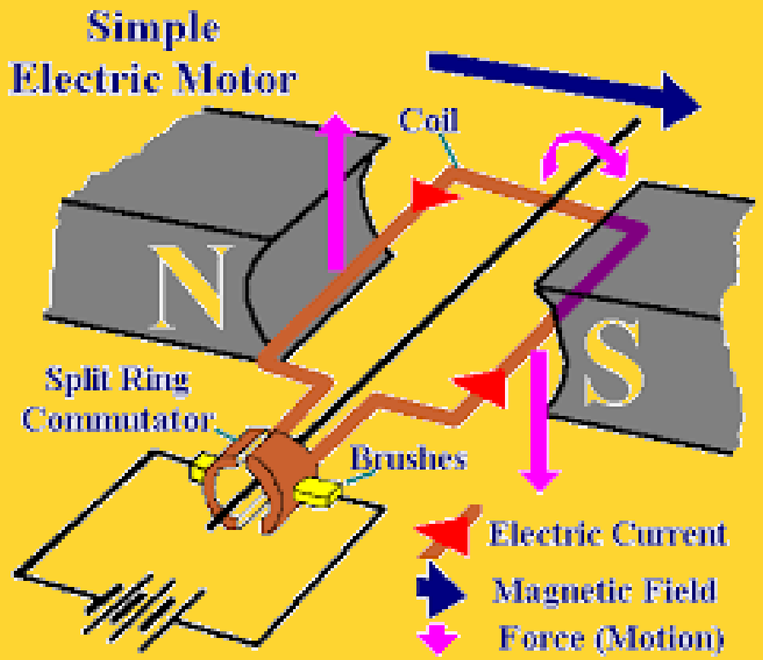
A DC motor works on the principle that “whenever a current carrying conductor is placed in a magnetic field, it experiences a force”.

The magnetic is given by:

$$F = B\ I\ L$$

Where: **F** = Force in Newton
B = Flux density in Weber/meter^2
I = Current in amperes flowing through the conductor
L = Length of the conductor in meters

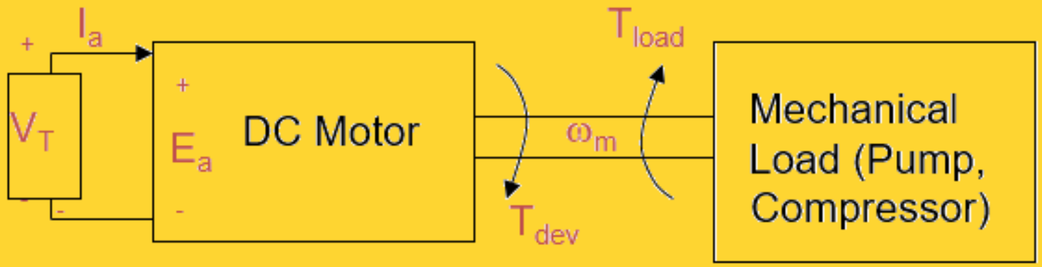
The direction of force is given by Fleming’s left hand rule.



Back E.M.F

When a d.c. motor rotates, an e.m.f is induced in the armature conductors. By Lenz's law this induced e.m.f (E) opposes the supply voltage (V), is given by:

$V = E + IaRa$ $E = V - IaRa$



E_a is Back EMF
V_T is Applied voltage
T_{dev} is the Torque developed by DC Motor
T_{load} is the opposing load torque

RECALL

1. Whenever the ---------- carrying conductor placed in a magnetic field experience a force
2. The above law is called ---------- law
3. State Flemings left hand rule

THANK YOU