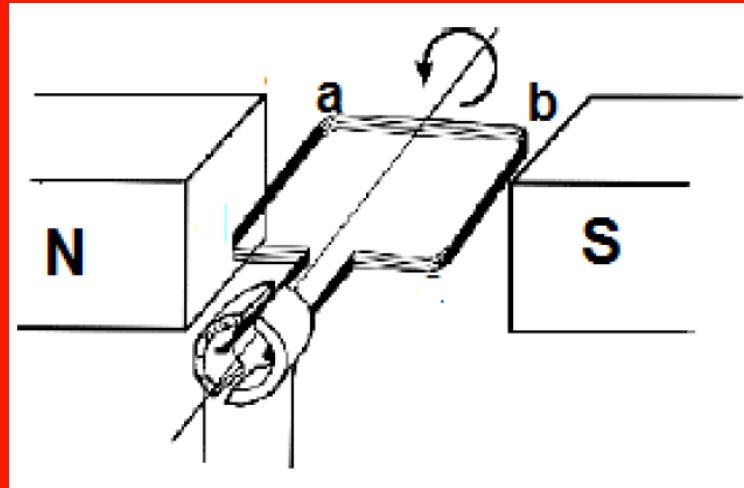


MOTORS AND GENERATORS



	DC MOTOR	AC MOTOR
Work Principle	Motor effect	
Energy conversion	Electrical to mechanical	
Source of electric energy	Battery	Alternating current
Coil makes contact with	Commutator (split ring) Brushes	Slip rings Brushes
Uses	Small appliances	Heavy machinery

■ NOTES:

- Conductor moves in a magnetic field or magnet moves near a conductor – current flows – depends on:
 - Speed of changing magnetic field
 - Number of coils making up conductor – N
 - Strength of magnet
- Reason why AC voltage is preferred to DC voltage
- Can be stepped up or down with a transformer / can be transmitted with less power loss.
- Fleming's **left** hand rule – for **MOTORS**
- Fleming's **right** hand rule – for **GENERATORS**
- Faraday's Law – size of induced emf depends on rate of change of magnetic flux.

FORMULAE

ALTERNATING CURRENT/WISSELSTROOM

$$I_{\text{rms}} = \frac{I_{\text{max}}}{\sqrt{2}} \quad / \quad I_{\text{wgk}} = \frac{I_{\text{maks}}}{\sqrt{2}}$$

$$V_{\text{rms}} = \frac{V_{\text{max}}}{\sqrt{2}} \quad / \quad V_{\text{wgk}} = \frac{V_{\text{maks}}}{\sqrt{2}}$$

$$P_{\text{ave}} = V_{\text{rms}} I_{\text{rms}} \quad / \quad P_{\text{gemiddeld}} = V_{\text{wgk}} I_{\text{wgk}}$$

$$P_{\text{ave}} = I_{\text{rms}}^2 R \quad / \quad P_{\text{gemiddeld}} = I_{\text{wgk}}^2 R$$

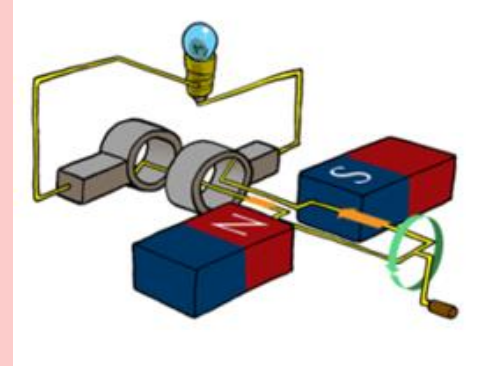
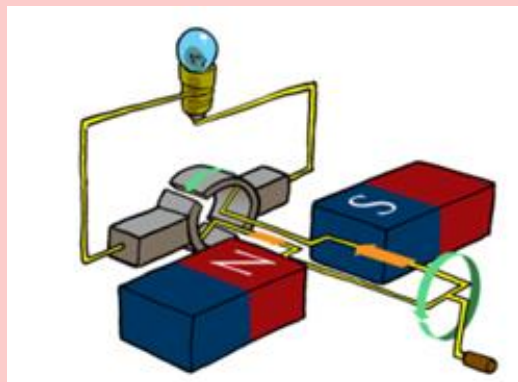
$$P_{\text{ave}} = \frac{V_{\text{rms}}^2}{R} \quad / \quad P_{\text{gemiddeld}} = \frac{V_{\text{wgk}}^2}{R}$$

	DC GENERATOR	AC GENERATOR
Work principle	Electromagnetic induction	
Energy conversion	Mechanical to electrical energy	
Makes electric energy	Direct current	Alternating current
Coil makes contact with	Commutator(split ring) Brushes	Slip ring Brushes
Uses	Electroplating	Electricity generation at

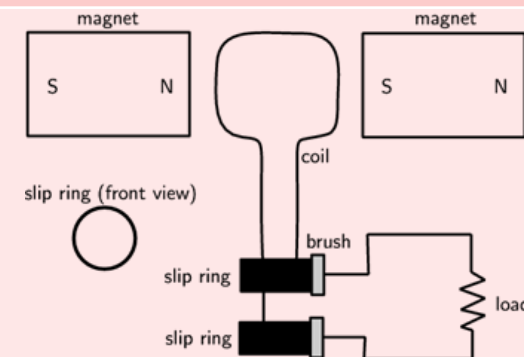
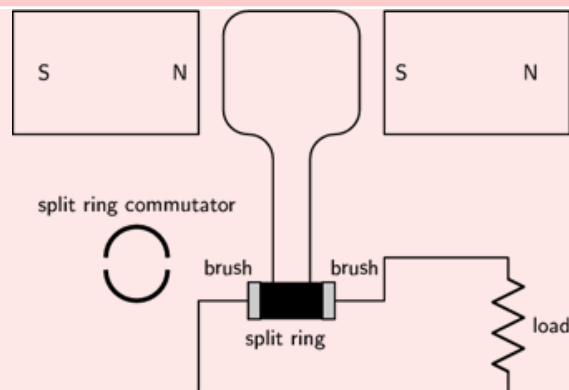
DC GENERATOR

AC GENERATOR

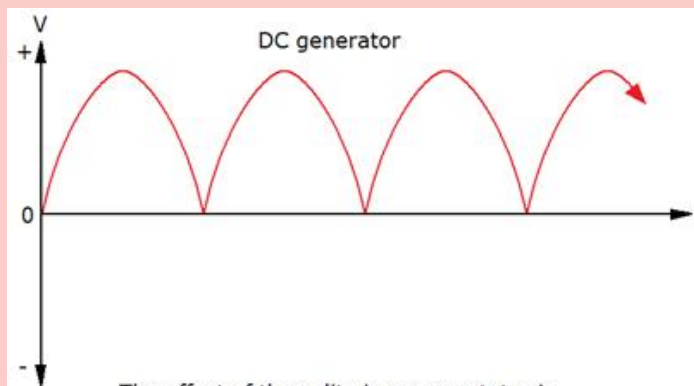
Picture



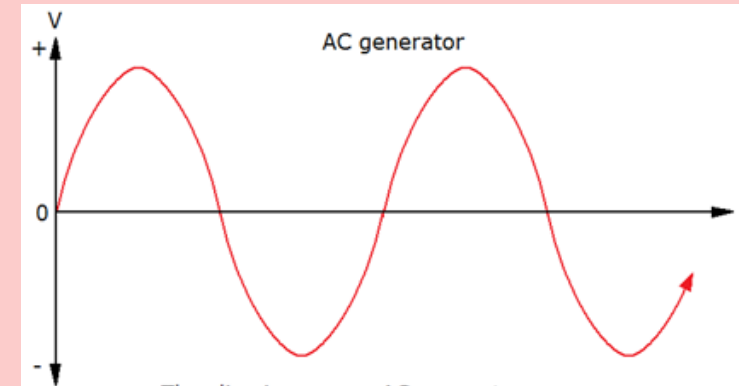
Diagram



Graphic representation



The effect of the split-ring commutator in DC generators is to ensure the induced EMF is always in one direction.



The slip-rings on an AC generator preserves the sinusoidal EMF produced at the rotating coils

Minimum
Coil experiences least field lines

Maximum
Coil experiences most field lines

