

Alternating Current (AC)

1. Provide a definition.
2. Why is alternating current produced by most power plants rather than direct current?

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Alternating Current (AC): a current that is produced by a generator and flows back and forth (alternates) regularly. Alternating Current is abbreviated as AC.

It is relatively easy to increase or decrease the voltage of alternating current. In order to travel long distances efficiently through transmission lines, the voltage is increased. The voltage must later be decreased for commercial use.

Alternator

1. Provide a definition.

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Alternator: a generator that produces alternating current.

Binary Code

1. Provide a definition.

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Binary Code: two states (on or off) that represent numbers and letters.

Branch Circuit

1. Provide a definition.

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Branch Circuit: each current path in a parallel current. A parallel circuit has a series of branches connected side by side.

Each branch circuit supplies power to one or more wall plugs or lights connected in parallel by cables in the house walls.

Circuit Breaker

1. Provide a definition.

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Circuit Breaker: a switch that can turn itself off when current flow exceeds a safe limit (a safety device that can cut all power coming into the home).

Cogeneration

1. Provide a definition.

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Cogeneration systems: produce electricity and also supply thermal energy (such as hot water or steam) for industrial or commercial heating.

Digital Electronic Technology

1. Provide a definition.

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Digital Electronic Technology: machines that process numerically coded information.

Direct Current (DC)

1. Provide a definition.

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Direct Current (DC): current that flows in one direction only.

Domain

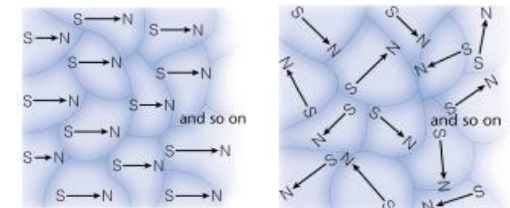
1. Provide a definition.
2. Describe the domains of a magnetized and unmagnetized material.

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Domain: any continuous region in a ferromagnetic material in which the direction of magnetization is uniform and different from any neighboring regions.

Domain of magnetized material is shown on the LEFT and unmagnetized material is shown on the RIGHT.

These diagrams are displaying the north and south pole of each atom.



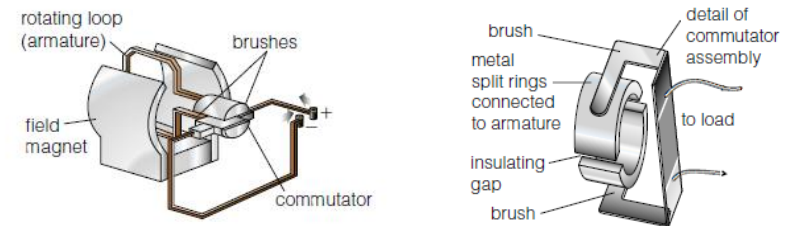
Dynamo

1. Provide a definition.
2. Describe the purpose of a split ring commutator in a dynamo.

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Dynamo: a generator that produces direct current.

Split ring commutators send current through a circuit in only one direction. The diagram below shows a dynamo (on the left) and the detail of a split ring commutator.



Electric Generator

1. Provide a definition.
2. List 2 types of electric generators

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Electric Generator: a device that converts mechanical energy into electric energy.

Dynamo: a generator that produces direct current
Alternator: a generator that produces alternating current.

Electric Motor

1. Provide a definition.

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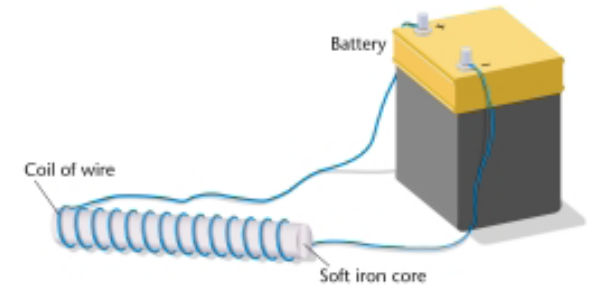
Electric Motor: a motor uses electrical energy to make a coil of wire spin between the poles of a magnet (electric energy to mechanical energy).

Electromagnet

1. Provide a definition.

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Electromagnet: a strong temporary magnet, created by inserting a soft iron core into a coil of wire and then passing a current through the wire.



Fission

1. Provide a definition.

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Fission: a process by which uranium atoms are bombarded with neutrons, causing the uranium to split into two smaller atoms. A tremendous amount of energy is released during this process.

Flare Gas

1. Provide a definition.

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Flare Gas: waste gas from natural gas production facilities that is burned to generate electricity.

Fuse

1. Provide a definition.

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Fuse: a device containing a metallic conductor that melts when heated by excessive current.

Geothermal Energy

1. Provide a definition.

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Geothermal Energy: thermal energy contained in the inner portions of Earth.

Greenhouse Gases

1. Provide a definition.

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Greenhouse Gases: gases that help regulate the temperature on Earth by holding in the heat from the Sun in our atmosphere.

Ground Wire

1. Provide a definition.

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Ground Wire: a device to safely channel any energy that has "leaked" out. The ground wire is either bare copper or covered with green insulation.

Hot Wire

1. Provide a definition.

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Hot wire: one of the "live" wires in electric cables, which carries high energy electricity. The hot wire is black and insulated.

Hydro-electric Plants

1. Provide a definition.

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Hydro-electric Plants: plants that use water pressure to generate electric energy.

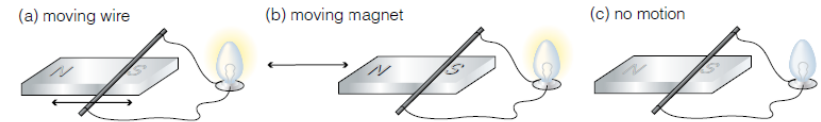
Magnetism

1. Provide a definition.
2. What is the connection between magnetism and electricity?

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Magnetism: the properties of attraction possessed by magnets.

Magnetic effects can be produced by electric currents and electric effects can be produced using a magnet (see diagram below).



Relative motion between a wire and magnet causes a current to flow in a circuit connected to the wire.

Neutral Wire

1. Provide a definition.

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Neutral Wire: one of the "live" wires in electric cables, which returns low energy electricity back to the breaker panel. The neutral wire is white and insulated.

Non-renewable Resources

1. Provide a definition.

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Non-renewable Resources: fuels that are consumed faster than they can be replaced by nature (fossil fuels).

Nuclear Fission

1. Provide a definition.

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Nuclear Fission: the energy-releasing process whereby uranium nuclei are split into smaller nuclei.

Open Pit Mining

1. Provide a definition.

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Open Pit Mining: mining in which the fuel, such as coal, is uncovered and dug directly from the ground (mining for fuels by digging a large hole).

Power

1. Provide a definition.
2. What are the units of power?
3. How is power usually calculated?

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Power: Energy per unit time (the number of joules per second is equal).

$$\text{Power (in watts)} = \frac{\text{Energy (in joules)}}{\text{Time (in seconds)}} = \frac{E}{T}$$

The units of power are joules per second. One joule per second is also called one watt (W).

It is more common to measure power using the following relationship:

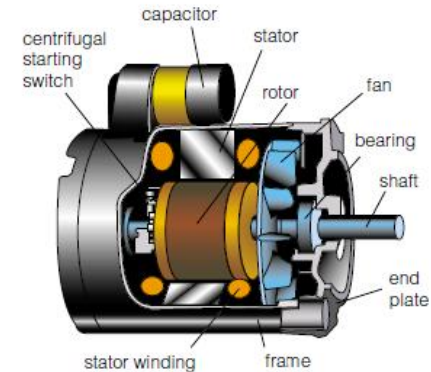
$$\text{Power (watts)} = \text{Current (amps)} \times \text{Voltage (volts)} = IV$$

Rotor

1. Provide a definition.

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Rotor: the rotating core of an alternating current (AC) motor, as shown in the diagram below.



Scrubber

1. Provide a definition.

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Scrubber: antipollution systems that remove sulfur dioxide and contaminating gases which result from the burning of fossil fuels.

Short Circuit

1. Provide a definition.

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Short Circuit: occurs when the wires in an electric cord accidentally connect, usually because of frayed insulation.

If bare wire touch directly, causing a short circuit, a high current flows between them, causing sparks and often starting a fire.

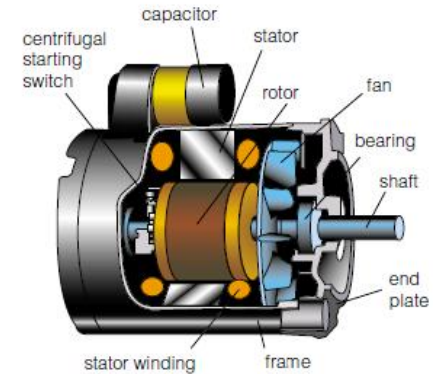
Stator

1. Provide a definition..

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Stator: a stationary part of a motor surrounding the rotor of an AC motor. The simplest form of stator is a two-pole electromagnet.

When an AC motor is turned on, the attraction and repulsion between the magnetic poles of the stator and the rotor causes the rotor to spin.



Thermal Pollution

1. Provide a definition.

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Thermal Pollution: the release of thermal energy due to warm water returning directly to the body of water from where it was taken. This increases the temperature of the body of water.

Thermonuclear (electric generation)

1. Provide a definition.

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Thermonuclear electric generation: using the energy released in nuclear fission to generate electricity.

Transistor

1. Provide a definition.

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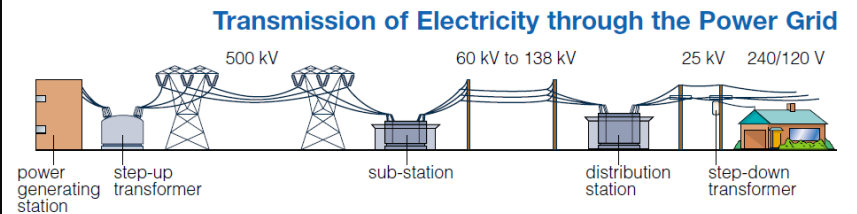
Transistor: electronic switches in modern digital devices.

Transformer

1. Provide a definition.

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Transformers: used to "step-up" or "step-down" the voltage for efficient transmission of current over long distances. Take note of the transformers and how they are used in the power grid depicted below.



Watt (W)

1. Provide a definition.

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Watt (W): a unit of power equivalent to one joule per second.