GENERATION OF ELECTRICITY

PRODUCTION OF ELECTRICITY

Electrical energy can be produced in a number of methods. The four most common are **pressure**, **chemical**, **thermal**, and **light**.

LIGHT:

1, solar cell or a photovoltaic cell is a device that converts light energy into electricity

2, the device contains certain chemical elements that when exposed to light energy, they release electrons

3, Photons in sunlight are taken in by the solar panel or cell, where they are then o absorbed by semi conducting materials, such as silicon.

4, Electrons in the cell are broken loose from their atoms, allowing them to flow o through the material to produce electricity.

5, The **EMF** generated by this method is a small continuous voltage that when connected to a circuit produces a direct current (DC).

HEAT: thermocouples

1, thermocouples are widely used as temperature sensors

2, thermocouples are pairs of dissimilar metal wires joined at least at one end, which generate a voltage between the two wires (have different conductivity) that is .proportional to the temperature at the junction

3, different metal combinations have a different voltage difference

4, Thermocouples are used in aviation as ways to measure:

a) cylinder head temperatures,

b) inter turbine temperature

c) exhaust gas temperature

5, The EMF generated by this method is a small continuous voltage that when connected to a circuit produces a direct current (DC).

6, In case of uniformly heated wires no potential difference between the wires can exist because under identical temperature conditions there is no thermal gradient to produce a current.

FRICTION

1, the production of electricity by friction refers to the build up of static electricity when non-conductive materials are rubbed together

2, A transfer of electrons occurs resulting in an imbalance of charges between the materials

PRESSURE

1, this form of electrical generation is commonly known as piezoelectric

2, result of the application of mechanical pressure on a dielectric or non-conducting crystal.

 If a crystal of quartz is <u>squeezed</u>, charges of opposite polarity will appear on two opposite surfaces of the crystal.

4, If the force is reversed and the crystal is <u>stretched</u>, charges will again appear, but will be of the **opposite polarity** from those produced by squeezing.

5, **EMF** generated by this method is a small alternating voltage, and when connected to a circuit produces a small **alternating current (AC)**.

CHEMICAL SOURCE

1, <u>Chemical energy</u> can be converted into electricity; the most common form of this is the battery

2, a chemical reaction between the metals and the chemicals frees more electrons in one metal than in the other.

3, The two metallic materials are called **electrodes** and the solution is called the **electrolyte**; these together form an <u>electrochemical cell</u>

4, The EMF generated by this method is a continuous voltage that when connected to a circuit produces a direct current (DC).

MAGNETISM AND MOTION SOURCE

1, <mark>a conductor is moved through the magnetic lines of flux created by a magnet or </mark> electromagnet

2, electromotive force is created, and current flow produced for use by various electrically operated devices and components.

EMF generated by this method is a small alternating voltage, and when connected to a circuit produces a small alternating current (AC).

PHOTO-CELLS

1, Photo-cells are a source of electricity with applications in electronics and electronic control of mechanical systems

2, Light contains electromagnetic energy that is carried by photons.

3, The amount of energy depends on the frequency of light of the photon.

4, When a photon strikes a semiconductor atom, it raises the energy level above what is needed to hold its electrons in orbit. The extra energy frees an electron enabling it to flow as current.

5, The current can be used in a circuit to initiate any number of actions such as energizing a coil to close a circuit enabling its operation.