Electric Power

Electric Power

- "Power" means "strength" or "might."
- Electric Power is the RATE at which electric energy is transferred by an electric circuit.
- The SI unit of power is the watt.
- 1 watt = 1 Joule per second.

Electric Energy is useful !!!

- Electric energy is useful to us because it can easily be transformed into other forms of energy.

  - Motors do mechanical work.

  - Heaters give thermal energy.

  - Lightbulbs provide light.

Household Examples of Electric Power

- 100 watt lightbulb uses 100 Joules per second

- Electric stove uses 5,000 watts.

- Electric heater uses 1,500 watts.

- Hair dryer uses 1,200 watts.

- Iron uses 800 watts.

- Lightbulb 40 watts – 100 watts.

Electric Power

- P = work done (= energy) per unit time (watt)
- = Joule   x   1/second
- = Joule/Coulomb   x   Coulomb/second

    =   Volts x Amps

    =   V x I

    =   I^2 x R

    =   V^2/R
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Example

- Headlights. Calculate the current and the resistance for a 40 watt automobile headlight designed for 12 volts.

- P = V x I   40 = 12 x I   I = 40/12 = 3.3 amp
- P = V^2/R   R = V^2/P = 12^2/40 = 3.6 ohm

Example

- Electric heater. An electric heater draws 15.0 amps on a 120 volt household circuit. How much power does it use?

- P = V x I = 15 x 120 = 1,800 watts