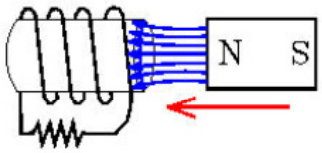
Faraday's Law



$$\text{Voltage generated} = -N \frac{\Delta (BA)}{\Delta t}$$

"B" is the average magnetic field
"A" is area

"BA" is usually in units of "Teslas", T

"Δt" is "change in time", in seconds.

Example 1: If the magnet has a field strength of .4 Teslas, and if it approaches the coil in 1 second, an N is 5 turns of wire, then Vgen = .004 volts.

Example 2: If the magnet has a field strength of .4 Teslas, and if it approaches the coil in .001 second, an N is 5 turns of wire, then Vgen = 4 volts.

Example 3: If the magnet has a field strength of .4 Teslas, and if it approaches the coil in .000001 second, an N is 5 turns of wire, then Vgen = 4000 volts.

Key Concepts:

1) The faster the change in the field, the higher the induced voltage. As Δt approaches ZERO, the induced voltage will approach INFINITY.

2) The direction of the field strength change does not matter.....the field can be INCREASING or DECREASING; only the polarity of the induced voltage will change.

3) This also works in reverse: APPLYING a voltage to a coil of wire will produce a magnetic field. (The speed of the field strength increase depends on N, the number of turns, and the inductance of the core.)

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