## Chapter 18 Circuits and Circuit Elements

**RESISTORS IN SERIES: EQUIVALENT RESISTANCE AND CURRENT**

$$R_{eq} = R_1 + R_2 + R_3 \ldots$$

The current in each resistor is the same and is equal to the total current.

**RESISTORS IN PARALLEL: EQUIVALENT RESISTANCE AND CURRENT**

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \ldots$$

The sum of the current in each resistor equals the total current.

## Chapter 19 Magnetism

**MAGNETIC FLUX**

$$\Phi_M = AB\cos\theta$$

**MAGNITUDE OF A MAGNETIC FIELD**

*The direction of $F_{magnetic}$ is always perpendicular to both B and v, and can be found with the right-hand rule.*

$$B = \frac{F_{magnetic}}{qv}$$

**FORCE ON A CURRENT-CARRYING CONDUCTOR PERPENDICULAR TO A MAGNETIC FIELD**

*This equation can be used only when the current and the magnetic field are at right angles to each other.*

$$F_{magnetic} = BI\ell$$

## Chapter 20 Electromagnetic Induction

**FARADAY'S LAW OF MAGNETIC INDUCTION**

*N is assumed to be a whole number.*

$$\text{emf} = -N\frac{\Delta\Phi_M}{\Delta t}$$

**EMF PRODUCED BY A GENERATOR**

*N is assumed to be a whole number.*

$$\text{emf} = NAB\omega \sin \omega t$$

$$\text{maximum emf} = NAB\omega$$

**FARADAY'S LAW FOR MUTUAL INDUCTANCE**

$$\text{emf} = -M\frac{\Delta I}{\Delta t}$$