Kinematics

Uniform Motion

$$v = \frac{\Delta d}{\Delta t}$$

Uniform Acceleration

$$\Delta \vec{d} = \frac{(\vec{v}_i + \vec{v}_f)\Delta t}{2}$$

$$\vec{a}_{av} = \frac{\vec{v}_f - \vec{v}_i}{\Delta t}$$

$$\Delta \vec{d} = \vec{v}_i \Delta t + \frac{\vec{a}(\Delta t)^2}{2}$$

$$\Delta \vec{d} = \vec{v}_f \Delta t - \frac{\vec{a}(\Delta t)^2}{2}$$

$$v_f^2 = v_i^2 + 2a\Delta d$$

Dynamics

$$\vec{F}_{net} = \sum \vec{F}$$

$$\vec{F}_{net} = m\vec{a}$$

$$\vec{F}_g = m\vec{g}$$

$$F_f = \mu F_N$$

Waves and Sound

$$f = \frac{1}{T} \qquad T = \frac{\Delta t}{n} \qquad f = \frac{n}{\Delta t}$$

$$v = f\lambda \qquad v = 332 m/s + \left(0.606 \frac{m/s}{^\circ C}\right) T$$

$$f_{beat} = |f_1 - f_2| \qquad f_2 = f_1\left(\frac{v + v_d}{v + v_0}\right)$$

$$L_n = \frac{n\lambda}{2} \qquad v = \sqrt{\frac{F_T}{\mu}}$$

$$L_n = \frac{(2n-1)\lambda}{4} \qquad \mu = \frac{m}{L}$$

Energy in Society

$$W = \Delta E \qquad E_T = E_g + E_k \qquad \%efficiency = \frac{E_{out}}{E_{in}} \times 100\%$$

$$W = F \cdot \Delta d \qquad P = \frac{W}{\Delta t} = \frac{\Delta E}{\Delta t} \qquad Q_f = mL_f \qquad Q_v = mL_v \qquad E_k = \frac{mv^2}{2} \qquad Q = mc\Delta T$$

$$A = A_o\left(\frac{1}{2}\right)^{t/h} \qquad E_g = mgh \qquad Q_{gained} + Q_{lost} = 0 \qquad E = \Delta mc^2$$

Electricity and Magnetism

$$I = \frac{Q}{\Delta t} \qquad R = \frac{V}{I} \qquad P = VI \qquad V = \frac{\Delta E}{Q} \qquad R_s = R_1 + R_2 + R_3 + \ldots + R_n$$

$$P = \frac{V^2}{R} \qquad P = I^2 R \qquad \Delta E = VIt \qquad \frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots + \frac{1}{R_n} \qquad \frac{V_P}{V_S} = \frac{N_P}{N_S}$$

Useful Constants $G = 6.67 \times 10^{-11} \frac{Nm^2}{kg^2}$ $e = 1.60 \times 10^{-19} C$

$g = 9.80 \frac{m}{s^2}$ $g = 9.80 \frac{N}{kg}$ $c = 3.00 \times 10^8 \frac{m}{s}$