

Physics 2204: Data Sheet

Formula and Constants



Kinematics

$$\vec{v}_{av} = \frac{\Delta \vec{d}}{\Delta t} \quad \vec{d} = \left(\frac{\vec{v}_1 + \vec{v}_2}{2} \right) t \quad \vec{d} = \vec{v}_1 t + \frac{1}{2} \vec{a} t^2 \quad \vec{d} = \vec{v}_2 t - \frac{1}{2} \vec{a} t^2 \quad \vec{v}_2^2 = \vec{v}_1^2 + 2\vec{a}\vec{d} \quad \vec{v}_2 = \vec{v}_1 + \vec{a}t$$

Dynamics

$$\vec{F}_{NET} = m\vec{a} \quad \vec{F}_g = m\vec{g} \quad F_f = \mu F_N \quad \vec{p} = m\vec{v} \quad \vec{F}\Delta t = m\Delta \vec{v}$$

Work, Power and Energy

$$W = \vec{F}\Delta \vec{d} \quad P = \frac{W}{\Delta t} \quad W = \Delta E_k \quad \text{percent efficiency} = \left(\frac{E_{out}}{E_{in}} \right) \times 100\% \quad \vec{F} = -k\vec{x}$$

$$E_k = \frac{1}{2}mv^2 \quad E_g = mgh \quad E_p = \frac{1}{2}kx^2 \quad \vec{a} = \frac{-k\vec{x}}{m} \quad E = mc^2$$

Waves

$$f = \frac{\# \text{ cycles}}{\text{time}} \quad T = \frac{\text{time}}{\# \text{ cycles}} \quad f = \frac{1}{T} \quad v = f\lambda \quad v_{sound} = 332 \text{ m/s} + 0.6 \left(\frac{\text{m/s}}{^\circ\text{C}} \right) T$$

$$\sin \theta = \frac{n\lambda}{d} \quad f = \frac{f_0 v_s}{v_s \pm v_0} \quad v_r = \left(\frac{\Delta f}{2f_1} \right) c \quad n = \frac{c}{v} \quad n_1 \sin \theta_1 = n_2 \sin \theta_2$$

Constants

$$g = -9.81 \text{ m/s}^2 \quad c = 3.00 \times 10^8 \text{ m/s}$$