

SPH3U Physics Resource Sheet

Optics

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

$$\begin{aligned} n_{1,2} &= \frac{n_2}{n_1} = \frac{\sin\theta_1}{\sin\theta_2} \\ &= \frac{v_1}{v_2} \\ &= \frac{\lambda_1}{\lambda_2} \end{aligned}$$

$$\sin\theta_c = \frac{n_2}{n_1}$$

$$n = c/v$$

$$v = f\lambda$$

Waves and Sound

$$f = \frac{N}{\Delta t}$$

$$T = \frac{\Delta t}{N}$$

$$f = \frac{1}{T}$$

$$v = (331 + 0.59T) \frac{\text{m}}{\text{s}}$$

Kinematics:

$$d = \frac{1}{2}at^2 + v_1t$$

$$2ad = v_2^2 - v_1^2$$

$$d = \frac{1}{2}(v_1 + v_2)t$$

$$v_{\text{avg}} = \frac{\Delta d}{\Delta t}$$

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

Dynamics:

$$F_{\text{net}} = ma$$

$$F_g = \frac{GMm}{d^2}$$

$$F_g = mg$$

$$W = Fd$$

$$E_k = \frac{1}{2}mv^2$$

$$E_g = mgh$$

$$P = \frac{W}{\Delta t} = \frac{E}{\Delta t} = F_{\text{av}}v$$

Electricity:

$$Q = ne$$

$$W = E = qV$$

$$E = VIt$$

$$I = \frac{Q}{t}$$

$$R = \frac{\rho L}{A}$$

$$P = IV = I^2R = \frac{V^2}{R}$$

Electromagnetism:

$$\frac{V_s}{V_p} = \frac{N_s}{N_p} = \frac{I_p}{I_s}$$

Physical Constants

$$g = 9.8 \text{ m/s}^2$$

$$G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$$

$$e = 1.6 \times 10^{-19} \text{ C}$$

$$c = 3.00 \times 10^8 \text{ m/s}$$