Name: Date: Period:

Honors Physics Equation Sheet (Spring Final Exam)

Momentum

$$p \equiv mv \qquad J \equiv F\Delta t \qquad \Sigma F = \frac{\Delta p}{t} \qquad \Sigma p = \Sigma p' \qquad v_A + v'_A = v_B + v'_B \qquad x_{CM} = \frac{\Sigma m_i x_i}{m_i}$$

Rotational Motion

$$\omega \equiv \tfrac{\Delta\theta}{\Delta t} \qquad v = r\omega \qquad 1 \text{ rev} = 360^\circ = 2\pi \text{ rad}$$

$$\alpha \equiv \tfrac{\Delta\omega}{\Delta t} \qquad a_T = r\alpha \qquad 1 \text{ rpm} = 0.1047 \text{ rad/s}$$

$$\tau = I\alpha \qquad \tau \equiv rF_\perp$$

$$L = I\omega \qquad a_C = \omega^2 r \qquad I = mr^2$$

$$I_{\text{hoop}} = MR^2 \qquad I_{\text{disc}} = \tfrac{1}{2}MR^2 \qquad I_{\text{sphere}} = \tfrac{2}{5}MR^2$$

$$\omega = \omega_0 + \alpha t \qquad \theta = \theta_0 + \omega_0 t + \tfrac{1}{2}\alpha t^2 \qquad \omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$$

"Old Faithful" *"The Big Chalupa"* *"Ain't Got No Time"*

Simple Harmonic Motion & Waves

$$F_S = -kx \qquad KE = \frac{1}{2}mv^2 \qquad PE_e = \frac{1}{2}kx^2 \qquad PE_g = mgy$$

$$f_s = \frac{1}{2\pi}\sqrt{\frac{k}{m}} \qquad f_p = \frac{1}{2\pi}\sqrt{\frac{g}{L}} \qquad \omega = 2\pi f \qquad x(t) = A\sin(\omega t + \phi)$$

$$v = f\lambda \qquad f_n = \frac{nv}{2L} = nf_1 \qquad f_{BEAT} = |f_1 - f_2|$$

Electricity

$$F = \frac{kq_1q_2}{r^2} \qquad E \equiv \frac{F}{q} = \frac{kq}{r^2} \qquad I \equiv \frac{\Delta q}{t} \qquad V = IR$$

$$k = 9.0 \times 10^9 \text{ Nm/C}^2 \qquad e = 1.60 \times 10^{-19} \text{ C}$$

Optics

$$n = \frac{c}{v} \qquad n_1 \sin\theta_1 = n_2 \sin\theta_2 \qquad \sin\theta_c = \frac{n_2}{n_1}$$

$$\frac{1}{d_i} + \frac{1}{d_o} = \frac{1}{f} \qquad m \equiv \frac{h_i}{h_o} = -\frac{d_i}{d_o} \qquad P \equiv \frac{1}{f}$$

$$c = 3.0 \times 10^8 \text{ m/s}$$