

Name:

Date:

Period:

# Honors Physics Equation Sheet (Spring Final Exam)

## Momentum

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

## Rotational Motion

$$\begin{aligned} \omega &\equiv \frac{\Delta \theta}{\Delta t} & v &= r\omega & 1 \text{ rev} &= 360^\circ = 2\pi \text{ rad} \\ \alpha &\equiv \frac{\Delta \omega}{\Delta t} & a_T &= r\alpha & 1 \text{ rpm} &= 0.1047 \text{ rad/s} \\ \tau &= I\alpha & \tau &\equiv rF_\perp & & \\ L &= I\omega & a_C &= \omega^2 r & I &= mr^2 \\ I_{\text{hoop}} &= MR^2 & I_{\text{disc}} &= \frac{1}{2}MR^2 & I_{\text{sphere}} &= \frac{2}{5}MR^2 \\ \omega &= \omega_0 + \alpha t & \theta &= \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2 & \omega^2 &= \omega_0^2 + 2\alpha(\theta - \theta_0) \\ \text{"Old Faithful"} & & \text{"The Big Chalupa"} & & \text{"Ain't Got No Time"} & \end{aligned}$$

## Simple Harmonic Motion & Waves

$$\begin{aligned} F_S &= -kx & KE &= \frac{1}{2}mv^2 & PE_e &= \frac{1}{2}kx^2 & PE_g &= mgy \\ f_s &= \frac{1}{2\pi}\sqrt{\frac{k}{m}} & f_p &= \frac{1}{2\pi}\sqrt{\frac{g}{L}} & \omega &= 2\pi f & x(t) &= A \sin(\omega t + \phi) \\ & & v &= f\lambda & f_n &= \frac{nv}{2L} = nf_1 & f_{BEAT} &= |f_1 - f_2| \end{aligned}$$

## Electricity

$$\begin{aligned} F &= \frac{kq_1q_2}{r^2} & E &\equiv \frac{F}{q} = \frac{kq}{r^2} & I &\equiv \frac{\Delta q}{t} & V &= IR \\ & & k &= 9.0 \times 10^9 \text{ Nm/C}^2 & e &= 1.60 \times 10^{-19} \text{ C} & & \end{aligned}$$

## Optics

$$\begin{aligned} n &= \frac{c}{v} & n_1 \sin \theta_1 &= n_2 \sin \theta_2 & \sin \theta_c &= \frac{n_2}{n_1} \\ \frac{1}{d_i} + \frac{1}{d_o} &= \frac{1}{f} & m &\equiv \frac{h_i}{h_o} = -\frac{d_i}{d_o} & P &\equiv \frac{1}{f} \\ & & c &= 3.0 \times 10^8 \text{ m/s} & & \end{aligned}$$