

COVER SHEET - EXAM 3

DATA

$$g = 9.80 \text{ m/s}^2$$

$$2 \pi \text{ rad} = 1 \text{ rot.} = 360^\circ$$

$$60 \text{ s} = 1 \text{ min}$$

$$1 \text{ gram} = 1.0 \times 10^{-3} \text{ kg}$$

EQUATIONS

$$x = x_0 + \frac{v + v_0}{2} t$$

$$x = x_0 + v_0 t + \frac{1}{2} a t^2$$

$$v = v_0 + a t$$

$$v^2 = v_0^2 + 2a(x - x_0)$$

Work-Energy Formula

$$W_{F_{\text{net}}} = KE - KE_0$$

Work

$$W_F = (F \cos \theta) \Delta x$$

$$\Delta \theta = \frac{\Delta s}{r}$$

$$\theta = \theta_0 + \frac{\omega + \omega_0}{2} t$$

$$\theta = \theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2$$

$$\omega = \omega_0 + \alpha t$$

$$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$$

$$v_T = r\omega$$

$$a_T = r\alpha$$

$$a_c = \frac{v_T^2}{r} = \omega^2 r$$

$$\vec{p} = m\vec{v}$$

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

$$f_k = \mu_k F_N$$

Impulse

$$\vec{I} = \vec{F}_{\text{av}} \Delta t = \Delta \vec{P} = \vec{P} - \vec{P}_0$$

$$\vec{r}_{\text{cm}} = x_{\text{cm}} \hat{i} + y_{\text{cm}} \hat{j}$$

$$x_{\text{cm}} = \frac{\sum x_i m_i}{M_{\text{tot}}} \quad y_{\text{cm}} = \frac{\sum y_i m_i}{M_{\text{tot}}}$$

Momentum Conservation

$$\text{When } \vec{F}_{\text{net}} = 0$$

$$\vec{P}_{\text{tot}} (\text{initial}) = \vec{P}_{\text{tot}} (\text{final})$$

Energy Conservation

$$W_{\text{NCF}} = ME - ME_0$$

$$ME = \sum KE_{\text{tot}} + \sum PE_G$$

$$KE = \frac{1}{2} m v^2$$

$$PE_G = mgh$$

$$P_{\text{AV}} = \frac{\Delta W}{\Delta t} = \frac{\Delta E}{\Delta t}$$

$$P_{\text{AV}} = F v_{\text{AV}}$$