Physics 4A | Winter 2006 | February 6, 2006
Professor C. M. Surko | Sample Formula Sheet

Potentially useful information:

- $g = 9.8\ m/s^2$
- $\vec{A} \bullet \vec{B} = A_x B_x + A_y B_y + A_z B_z$
- $\vec{A} x \vec{B} = (A_y B_z - A_z B_y) . \hat{i} + (A_z B_x - A_x B_z) . \hat{j} + (A_x B_y - A_y B_x) . \hat{k}$
- If a_x is constant:
  $v_x = v_{xo} + a_x t$
  $x = x_o + v_{xo} t + \frac{1}{2} a_x t^2$
  $v_x^2 = v_{xo}^2 + 2a_x (x - x_o)$
- $F_{fr} = \mu F_N$
- $a_{cen} = - \omega^2 r = - v^2/r$
- $F = -\frac{dU}{dx}$
- $W = \int \vec{F} \bullet d\vec{s}$
- $P = \frac{dE}{dt} = \vec{F} \bullet \vec{v}$
- $J = \int F dt = \Delta p$
- $F = -\frac{G m_1 m_2}{r_{12}^2}$
- $U = -\frac{G m_1 m_2}{r_{12}}$
- $G = 6.7 \times 10^{-11}\ Nm^2/kg^2$
- $\vec{r}_{cm} = \frac{\Sigma m_i \vec{r}_i}{\Sigma m_i}$
- $I = \Sigma m_i r_i^2$
- If α is constant:
  $\omega = \omega_o + \alpha t$
  $\theta = \theta_o + \omega_o t + \frac{1}{2} \alpha t^2$
  $\omega^2 = \omega_o^2 + 2 \alpha (\theta - \theta_o)$
- $K = \frac{1}{2} I \omega^2 + \frac{1}{2} m v^2$
- $\vec{\tau} = \vec{r} x \vec{F}$
- $\vec{\tau} = I \vec{\alpha}$ [fixed axis]
- $\vec{L} = I \vec{\omega}$ [fixed axis]
- $W = \int \tau d\theta$
- Moments of inertia
  Rod (about center): $I = (1/12) ML^2$
  Uniform disk: $I = (1/2) MR^2$
  Sphere: $I = (2/5) MR$