Phys 218 – Fall 2017

Exam III – All *University Physics* Sections

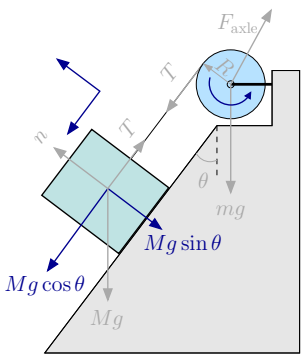
Short Answer: A) $v_{\text{cm}} = \sqrt{6gH/5}$ [LO 3.1, 34.1, 35.1, 38.1, 40.1, 51.1]

B) $I_A = M(\frac{3}{2}R_1^2 + \frac{1}{2}R_2^2)$ [LO 52.1]
$I_B = M(\frac{3}{2}R_1^2 + \frac{3}{2}R_2^2)$ [LO 52.2]
$I_C = M(\frac{1}{2}R_1^2 + \frac{3}{2}R_2^2)$ [LO 52.3]

C) (a) $v_A = \frac{8}{3}$ m/s [LO 3.2, 46.1, 46.2, 48.1]
(b) $\vec{J}_A = -160\hat{\imath}$ kg m/s [LO 49.1]
$\vec{J}_B = +160\hat{\imath}$ kg m/s [LO 49.2]

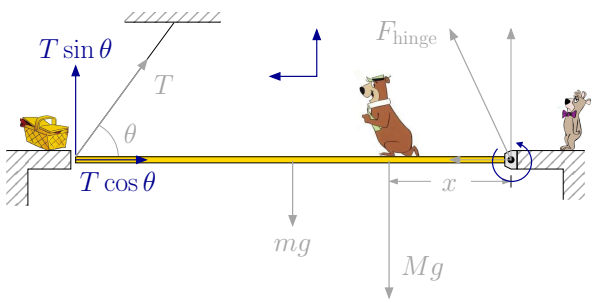
D) (a) $I_{\text{tot}} = (\frac{1}{2}M + \frac{4}{3}m)R^2$ [LO 51.2, 51.3, 53.1]
(b) $\omega_f = \frac{m(v_0+v_f)}{(\frac{1}{2}M+\frac{4}{3}m)R}$ [LO 57.1, 57.2, 59.1, 3.3]

Problem 1: (a) [LO 1.1, 9.1, 9.2]



(b) $\alpha = 5$ rad/s^2 [LO 4.1, 10.1, 21.1., 51.4, 54.1, 55.1]

Problem 2: (a) [LO 1.2, 9.3, 9.4]



(b) $T = \frac{(M+2m)g}{4\sin\theta}$ [LO 3.4, 54.2, 54.3, 54.4, 55.2]
(c) $I = (\frac{1}{3}m + M)L^2$ [LO 53.2]
(d) $\alpha = \dfrac{M + \frac{1}{2}m}{M + \frac{1}{3}m}\left(\dfrac{g}{L}\right)$ [LO 3.5, 54.5, 55.3]

Problem 3: (a) $\vec{p}_{0,\text{McDavid}} = M(v_{0,x}\hat{\imath} + v_{0,y}\hat{\jmath})$ and $\vec{p}_{0,\text{Weber}} = -\frac{4}{3}Mu_{0,x}\hat{\imath}$ [LO 46.3, 46.4]
(b) $\vec{J}_{\text{McDavid}} = -M\left(\frac{11}{10}v_{0,x}\hat{\imath} + v_{0,y}\hat{\jmath}\right)$ [LO 46.5, 49.3]
(c) $u_{f,x} = \frac{33}{40}v_{0,x} - u_{0,x}$ and $u_{f,y} = \frac{3}{4}v_{0,y}$ [LO 3.6, 3.7, 48.2, 48.3]