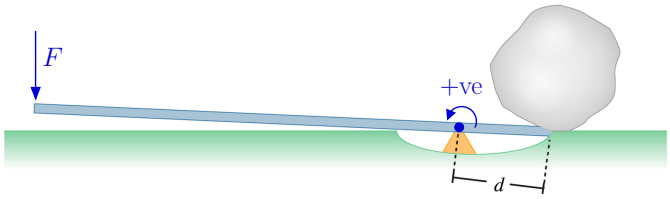
Phys 206 – Fall 2019

All *University Physics* Sections

Exam III

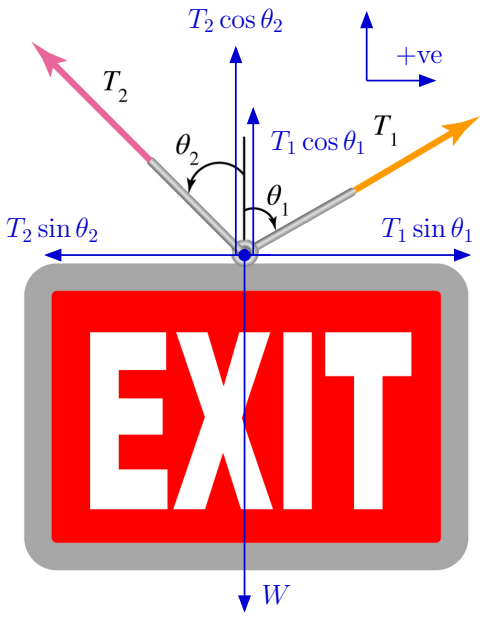
Short answer

A) i) [LO 9.1, 54.1]



ii) $F > 250$ N [LO 54.2, 54.3, 55.1]

B) i) [LO 1.1, 1.2, 9.2, 23.1]



ii) $T_1 = \frac{3}{5}W$ and $T_2 = \frac{4}{5}W$ [LO 4.1, 21.1, 21.2, 24.1, 24.2]

C) i) "*The puck loses some, but not all, of its original momentum and mechanical energy.*" [LO 40.1, 46.1, 48.1, 50.1]

ii) "*The system conserves its original momentum and loses some, but not all, of its mechanical energy.*" [LO 40.2, 46.2, 48.2, 50.2]

D) i) $I_{\text{rod}} = \frac{1}{12}ML^2$ [LO 51.1]

ii) $I_{\text{bead}} = \frac{1}{4}mL^2$ [LO 51.2]

iii) $I_{\text{tot}} = \frac{1}{2}\left(\frac{1}{6}M + m\right)L^2$ [LO 53.1]

iv) $L = \frac{F}{\left(\frac{1}{6}M+m\right)\alpha}$ [LO 54.4, 55.2]

Problem 1:

a) $p = 10$ kg m/s [LO 3.1, 10.1, 46.3]

b) Completely inelastic [LO 50.3]

c) $v_f = \frac{2}{3}$ m/s [LO 46.4, 48.3]

d) $\Delta x = \frac{1}{15}$ m [LO 3.2, 34.1, 38.1, 39.1]

Problem 2:

a) $I_P = \frac{1}{4}$ kg m^2 [LO 10.2, 51.3]

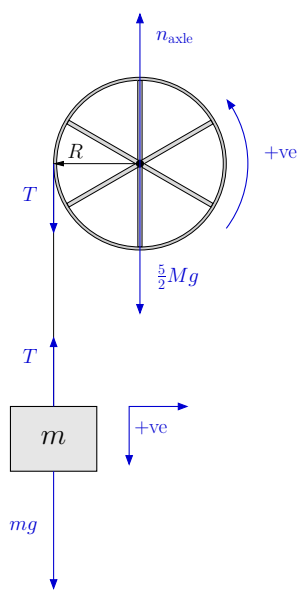
b) $\omega_P = 8$ rad/s and $K_P = 8$ J [LO 16.1, 35.1]

c) $v = 8$ m/s [LO 3.3, 16.2, 34.2, 35.2, 38.2, 38.3, 39.2]

d) A slower speed [LO 51.4]

Problem 3:

a) [LO 9.3, 9.4, 23.2, 23.3, 24.3, 24.4, 26.1]



b) *i.* $I_{\text{cyl}} = MR^2$ [LO 51.5]

ii. $I_{\text{spoke}} = \frac{1}{6}MR^2$ [LO 51.6]

iii. $I_{\text{tot}} = 2MR^2$ [LO 53.2]

c) $T = (2MR)\alpha$ [LO 54.5, 55.3]

d) $\alpha = \frac{a}{R}$ [LO 16.3]

e) $a = \left(\frac{m}{m+2M}\right) g$ [LO 4.2, 21.3, 22.1]