Sample Exam #4 Answers

Problem 1)

α = 13.7 rad/s

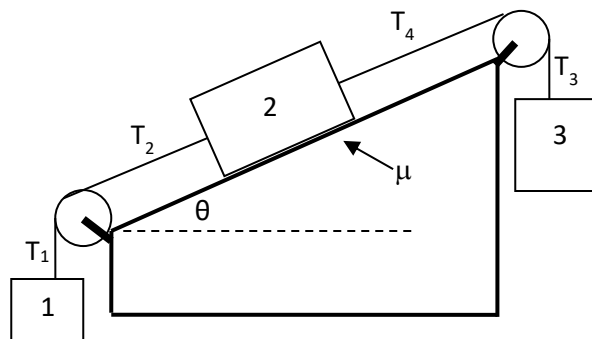Problem 2)

a) F L (out of page)
b) F L cos30° (out of page)
c) F L sin30° (out of page)
d) F (L/2) sin60° (into page)
e) Zero
f) Zero

Problem 3)

a) 30 kg m²/s
b) 30 kg m²/s

Problem 4)

$$T_1 - m_1 g = m_1 a$$

$$T_4 - T_2 - \mu_k m_2 g \cos\theta - m_2 g \sin\theta = m_2 a$$

$$m_3 g - T_3 = m_3 a$$

$$T_2 - T_1 = \frac{m_p}{2} a$$

$$T_3 - T_4 = \frac{m_p}{2} a$$

Problem 5)

  V (just before collision) of box = 3.96 m/s

  ω (just after collision) = 2.59 rad/s

  H (final height of box) = 0.364 m

  θ (maximum angle) = 48°