

PRACTICE EXAM 2 – SOLUTIONS TO WORD PROBLEMS

Problem 1

$$\omega_i = 2000 \text{ rpm} = 209.44 \text{ rad/s}; \omega_f = 6600 \text{ rpm} = 691.15 \text{ rad/s}; t = 9.00 \text{ sec} = 0.150 \text{ min}$$

$$(A) \alpha = \frac{\omega_f - \omega_i}{t} = \underline{\underline{53.5 \text{ rad/s}^2}}$$

$$(B) \Delta\theta = \frac{1}{2}(\omega_i + \omega_f)t = 0.5(2000 + 6600)(0.150) = \underline{\underline{645 \text{ rev}}}$$

Problem 2

$$(A) E_A = E_C$$

$$\frac{1}{2}mv_A^2 + mgh_A = \frac{1}{2}mv_C^2 + mgh_C \rightarrow v_C = \underline{\underline{2.35 \text{ m/s}}}$$

$$(B) \Delta E = E_A - E_C = \frac{1}{2}mv_A^2 + mgh_A - mgh_C = \underline{\underline{0.831 \text{ J}}}$$

Problem 3

(A)



$$(B) m_1v_{1i} + m_2v_{2i} = m_1v_{1f} + m_2v_{2f}$$

$$(7.00 \times 10^{-3})(200) + 0 = (7.00 \times 10^{-3})v_{1f} + (0.150)(0.180) \rightarrow v_{1f} = \underline{\underline{196 \text{ m/s}}}$$

$$(C) \Delta p = m_2(v_{2f} - v_{2i}) = \underline{\underline{0.0270 \text{ kg}\cdot\text{m/s}}}$$

Problem 4

$$(A) \tau_{net} = T\sin 55^\circ(0.80) - 500(1.00) - 700(2.00) = 0 \rightarrow T = \underline{\underline{2899 \text{ N}}}$$

$$(B) (F_{net})_x = F_x - T\cos 55^\circ = 0 \rightarrow F_x = \underline{\underline{1663 \text{ N}}}$$

$$(C) (F_{net})_y = F_y + T\sin 55^\circ - 500 \text{ N} - 700 \text{ N} = 0 \rightarrow F_y = \underline{\underline{-1125 \text{ N}}}$$