# MECH230 - Fall 2024
Recommended Problems - Set 10

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The problems are taken from J. L. Meriam, L. G. Kraige, and J. N. Bolton (MKB), Engineering Mechanics: Dynamics, Ninth Edition, Wiley, New York, 2018.

1. [MKB 03-142]

3/142 A 75-g projectile traveling at 600 m/s strikes and becomes embedded in the 50-kg block, which is initially stationary. Compute the energy lost during the impact. Express your answer as an absolute value $|\Delta E|$ and as a percentage n of the original system energy E.

75 g   600 m/s   50 kg
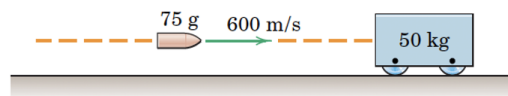
PROBLEM 3/142

2. [MKB 03-196]

3/196 Compute the final velocities v_1' and v_2' after collision of the two cylinders which slide on the smooth horizontal shaft. The coefficient of restitution is $e = 0.8$.

$v_1 = 20$ ft/sec $v_2 = 3$ ft/sec

$W_1 = 4$ lb $W_2 = 10$ lb
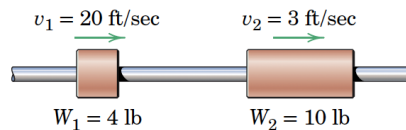
PROBLEM 3/196

3. [MKB 03-197]

3/197 The two bodies have the masses and initial velocities shown in the figure. The coefficient of restitution for the collision is $e = 0.3$, and friction is negligible. If the time duration of the collision is 0.025 s, determine the average impact force which is exerted on the 3-kg body.
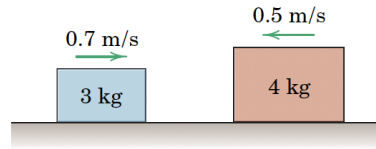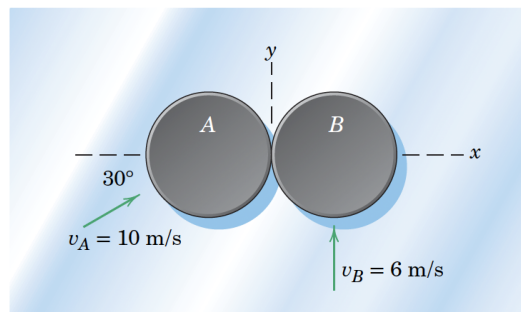

PROBLEM 3/197

4. [03-201]

3/201 Determine the value of the coefficient of restitution e for which the outgoing angle is one-half of the incoming angle θ as shown. Evaluate your general expression for $\theta = 40°$.
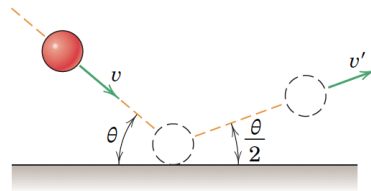
PROBLEM 3/201

5. [03-212]

3/212 Two identical hockey pucks moving with initial velocities v_A and v_B collide as shown. If the coefficient of restitution is $e = 0.75$, determine the velocity (magnitude and direction θ with respect to the positive x-axis) of each puck just after impact. Also calculate the percentage loss n of system kinetic energy.

PROBLEM 3/212

Compiled on 10/14/2024 at 12:27 Noon