

Physics 1214, Homework #6: solutions

Answers to multiple choice questions: M1: C; M2: (a) D, (b) C.

$$\text{P1: } v = \sqrt{\frac{kx^2 - 2\mu mgx}{m}} = 1.42 \text{ m/s}$$

$$\text{P2: } 0 = \frac{1}{2}m_1v^2 + \frac{1}{2}m_2\left(\frac{v}{2}\right)^2 - m_1gH + m_2g\left(\frac{H}{2}\right)$$

$$v = \sqrt{\frac{8gH}{7}} = 1.06 \text{ m/s}$$

$$\text{P3: } t = \frac{mgh}{P} = 2.18 \times 10^8 \text{ s} \approx 7 \text{ years}$$

P4: (a) After first collision (1+2): $v_1 = -0.5 \text{ m/s}$, $v_2 = +0.5 \text{ m/s}$

After second collision (2+3): $v'_2 = -0.2 \text{ m/s}$, $v_3 = +0.3 \text{ m/s}$

(b) 0.09 m/s