

Physics 2314, Midterm II: solutions

Answers to multiple choice questions: 1: (a) C, (b) A; 2: A.

P1 $v = \sqrt{2gd \sin \theta} = 4.43 \text{ m/s}$

P2 (a) $W = 1 \text{ J}$; (b) $W = 0$. Since the work depends on the path, the force is not conservative.

P3 (a) $v_{1f} = -3 \text{ m/s}$, $v_{2f} = +6 \text{ m/s}$

(b) $v_f = \frac{m_1 v_{1i} + m_2 v_{2i}}{m_1 + m_2} = 0$, therefore $\frac{1}{2} k x^2 = \frac{1}{2} m_1 v_{1i}^2 + \frac{1}{2} m_2 v_{2i}^2$

$$x = \sqrt{\frac{m_1 v_{1i}^2 + m_2 v_{2i}^2}{k}} = 0.3 \text{ m}$$

P4 $v = \sqrt{\frac{LT}{m} \left[1 - \left(\frac{mg}{T} \right)^2 \right]} = 4.09 \text{ m/s}$