Test 2 2007 (Answers)

1. b) $a = \dfrac{m_1 g(\sin\theta - \mu\cos\theta) - m_2 g}{m_1 + m_2}$

c) $v(t) = at$

2. a) $\dfrac{\alpha}{x_s} - \dfrac{\alpha}{A} - \mu m g(x_s - A) + \dfrac{m v_1^2}{2} = 0$

b) $v_f = \sqrt{\dfrac{2}{m}\left(\dfrac{m v_1^2}{2} - 2\mu m g(x_s - A)\right)}$

or

$v_f = \sqrt{\dfrac{2}{m}\left(\mu m g(A - x_s) + \dfrac{\alpha}{A} - \dfrac{\alpha}{x_s}\right)}$

3. a) $v_f = \sqrt{\dfrac{2}{m}\left(C_1 A + \dfrac{kA^2}{2}\right)}$

b) $v_f = \sqrt{\dfrac{2}{m}\left(C_1(B+A) + \dfrac{kA^2}{2}\right)}$

c) $v_f = \sqrt{\dfrac{2}{m}\left(C_1(L+A) + \dfrac{kA^2}{2} + C_2 H - mgH\right)}$

4. a) $U(x) = \dfrac{\alpha}{2x^2} - \dfrac{\beta}{x} + C$

b) $v(A) = \sqrt{\dfrac{2}{m}\left(\dfrac{m v_1^2}{2} - \dfrac{\alpha}{2A^2} + \dfrac{\beta}{A}\right)}$