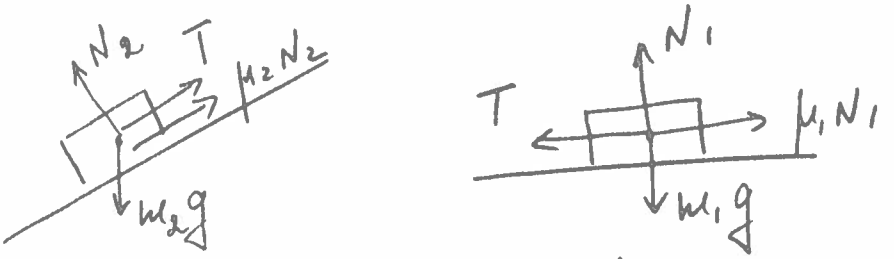
Answers Exam 2 2010

1.

a)



b) $$a = \frac{m_2 g \sin\theta - \mu_2 m_2 g \cos\theta - \mu_1 m_1 g}{m_1 + m_2}$$

$$T = \mu_1 m_1 g + m_1 a$$

2. $$\frac{C_1}{C_2} = S^2$$

3. a) $$U(x) = \frac{k_1 x^2}{2} + \frac{k_2 x^4}{4} + C$$

b) $$v_2 = \sqrt{\frac{2}{m}\left(\frac{kA^2}{2} + \frac{k_2 A^4}{4} - mgA\sin\theta\right)}$$

c) $$H = \left(\frac{m v_2^2}{2} - \frac{m v_2^2 \cos^2\theta}{2}\right)\frac{1}{mg}$$

4. a) $$v_x(t^*) = \frac{C_1}{2m}\left(\frac{6mA}{C_1}\right)^{2/3}$$

b) $$T = \frac{\mu m g}{C_1}$$

$t \le T \quad v = 0$

$t > T \quad v_x(t) = \frac{C_1 t^2}{2m} - \mu g t + \frac{1}{2}\frac{C_1 T^2}{m}$