Answers Exam 1 2014

1. $R_x = -kB\sin\theta + B\cos\theta$

2. $v_1 T + L = \frac{\alpha T^2}{2} + \frac{\beta T^3}{6}$

$$T = \sqrt{\frac{6v_1}{\beta}}$$

3. $a_x(t) = 3C_1 t^2 + C_2$

$a_y(t) = 2C_3 t + C_4$

$$x(t) = \frac{C_1 t^4}{4} + \frac{C_2 t^2}{2} + 4 - \left(\frac{C_1}{4} + \frac{C_2}{2}\right)$$

$$y(t) = \frac{C_3 t^3}{3} + \frac{C_4 t^2}{2} + 2 - \left(\frac{C_3}{3} + \frac{C_4}{2}\right)$$

$\vec{a} = a_x \vec{i} + a_y \vec{j}$; $\vec{r}(t) = x(t)\vec{i} + y(t)\vec{j}$

4. $\frac{\alpha T^3}{6} = v_1 T$

$-\frac{1}{2} g T^2 + H = 0 \Rightarrow T = \sqrt{\frac{2H}{g}}$

$$\alpha = \frac{3v_1 g}{H}$$