

F2009 Final Exam Solutions

- 1-1)B
 1-2)A
 1-3)3
 1-4)8m
 1-5)24m/s
 1-6)+x
 2 (b) $F_N = 710N$
 2 (c) $F_{pull} = 331.3N$
 2 (d) $x(t) = .429t^2 m$
 3 (a) $v_B = 14 m/s$
 3 (b) $\Delta x = 66.6m$
 4 (a) $k = 39.5 N/m$
 4 (b) $A = 2.228m$
 4 (c) $x(t) = 2.228 \cos(\pi t - \pi/2)$,
 $v(t) = -2.228\pi \sin(\pi t - \pi/2)$
 5 $(x, y)_{cm} = (0, -1.875)m$
 6(a) $\omega_c = 0.0523 rad/s$
 6(b) $I_s = 109.375 kgm^2$
 6(c) $v = 23.93 m/s$
 7(a) $I = 3.63 kgm^2$
 7(b) $a = 0.794 m/s^2$
 7(c) $\alpha = 3.96 rad/s^2$
 7(d) $KE_{mass} = 2.52t^2$, $KE_{rot} = 28.6t^2$
 8(a) $38.3\hat{i} + 32.13j m/s$
 8(b) $125.6\hat{i} + 52.7j m$
 8(c) $38.3\hat{i} + 6.2j m/s$
 8(d) 2.515m

S2010 Final Exam Solutions

- 1-1) $\vec{F} = 6\hat{i} - 4\hat{j} + 10\hat{k} A$
 1-2) $\vec{r} = 13.5\hat{i} - 9\hat{j} + 22.5\hat{k}$
 1-3) $A = 2m$
 1-4) $\lambda = 8m$
 1-5) $T = 4s$
 1-6) $v = +2m/s$
 2 (b) $F_{min} = 47.7N$
 2 (c) $a = 3.03m/s^2$
 2 (d) $W_{net} = 1760.95J$
 3 (a) $F_g = 14199N$
 3 (b) $v_s = 6899 m/s$
 3 (c) $U_g = -1.19 \times 10^{11} J$
 3 (d) $E = -0.594 \times 10^{11} J$
 4 (a) $v_B = 10.6 m/s$
 5 (b) $v_C = 7.32 m/s$
 5(c) $H_D = 2.74m$
 5(d) No, it only makes it 18.26m of L
 6(a) $v_2 = 25.17 m/s$
 6(b) $\theta_2 = 11.45^\circ$
 6(c) $E = +301J$
 7(a) $\omega_c = 0.0349 rad/s$
 7(b) $I_s = 300 kgm^2$
 7(c) $v = 7.27 m/s$
 7(d) yes $\Delta\theta = 2.16 rad$
 8(a) $T = 0.8s$, $\omega = 2.5\pi rad/s$
 8(b) $k = 308.4 N/m$
 8(c) $E = 62.5J$
 8(d) $A = 0.636m$