Answers energy Conservation on Spring and mass

1. ½ mv2 = ½ kx2 .980)(1.32)2/245 = x2 x = 0.083 m

b. T = 2(m/k)1/2 T = 2(.980/245)1/2 T = 0.397 s need ¼ T so 0.099 s

1. ½ kx2 = ½ kx2 + ½ mv2 (12.3)(.256)2 = 12.3)(.128)2 + (.321)v2

v = 1.37

1. ½ mv2 = ½ kx2 for v max .400v2 = 26(.032)2 v = 0.258m/s

when speed is half

½ mv2 = ½ kx2 + ½ mv2 .400(.258)2 = .400(.129)2 + 26x2

x = 0.028 m

1. ½ mv2 = ½ kx2 .540(1.13)2 = k(0.25)2 k = 11.0 N/m time to stop = T/4 2(.540/11.0)1/2 T = 1.39 stop = .348 s If k increases, tstop decreases
2. ½ kx2 = ½ mv2 19.6(.04m)2 = .40kg(v2) v = .28 m/s

b ½ kx2 = ½ kx2 + ½ mv2 19.6 (.04)2 = ½ (.40)v2 + 19.6(.015m)2

v = .259 m/s

c. same speed at 0.0125 m past equilibrium

d. ½ kx2 = ½ kx2 + ½ mv2 19.6 (.04)2 = ½ (.40).142 + 19.6(x)2

x = 0.0346 m

1. mgh = ½ mv2 2(9.8) = ½ v2 v = 6.26 m/s

spring ½ mv2 = ½ kx2 500(6.26)2 = 20x2 x = 31.3

1. ½ kx2 = ½ mv2 9.8 (.2)2 = .001v2 v = 19.8m/s

h=1/2 gt2 t = 0.45 s x = vt x = 19.8(.45s) = 8.9 m