Quiz 8

Saturday, June 11, 2005
8:26 AM

Chapter 9

Second Law for Rotational Motion

$$\sum \tau = I\alpha$$

Know $\tau = Fl$

$I = mr^2$ point mass

$I = \frac{2}{5}MR^2$ sphere

$I = \frac{1}{2}MR^2$ disk

$I = MR^2$ hoop

$I = \frac{1}{12}ML^2$ thin rod

Rotational Analogs

$x \to \theta$, $v \to \omega$, $a \to \alpha$, $m \to I$, $F \to \tau$

Thus $KE = \frac{1}{2}mv^2 \to \frac{1}{2}I\omega^2$

$p = mv \to I\omega \ (= L)$

Conservation Principles

Energy $E = mgh + \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2 = \text{const}$

Momentum $L = I\omega = \text{const}$

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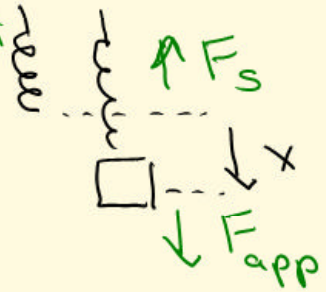
Chapter 10

Hooke's Law

spring const

$F_s = -Kx$



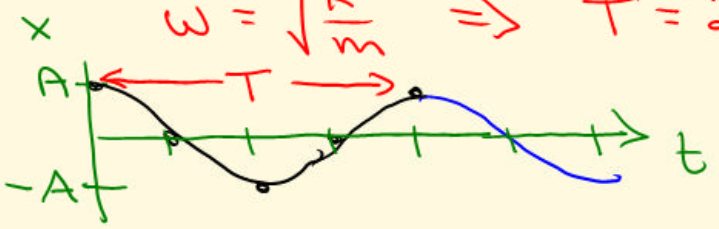
Simple Harmonic Motion

$x = A\cos\omega t, \quad \omega = 2\pi f$

$f = \frac{1}{T}$

$v_{max} = \omega A$

$\omega = \sqrt{\frac{k}{m}} \Rightarrow T = 2\pi\sqrt{\frac{m}{k}}$



A - amplitude
T - period
f - frequency

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Know how to read a graph x vs t to find A, T, f