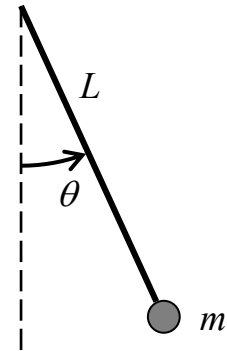

PHYS 1110 Worksheet: Pendulum

1. A torsional oscillator is a body with a restoring torque that is proportional to its angular distortion (torsion) from its equilibrium position. Identify the torsional (rotational) quantities characterizing a torsional oscillator that correspond to the quantities characterizing a linear Hooke's law oscillator.

Linear Oscillator		Torsional Oscillator	
Force	F		
Displacement	x		
Spring constant	k		
Angular frequency	$\omega^2 = k/m$	Angular frequency	$\omega^2 =$

2. A simple pendulum is constructed of a point mass of mass m hanging by an inextensible string of length L and negligible mass. When the pendulum is displaced an angle θ from equilibrium, find

A. The net force on the bob (the point mass).



B. The net torque on the bob (the point mass).

3. Under certain conditions, a simple pendulum acts as a Hooke's law torsional oscillator.

A. What are those conditions?

B. What is the "spring constant" of the pendulum?

C. What is the angular frequency of the pendulum?

D. What is the period of the pendulum?

4. What is the length of a simple pendulum with a period $T = 2$ seconds?