General Physics I Laboratory, Section 7 Due November 20, 2024
Dr. Pogo

Quiz #11

Name:_____ **Use a pencil, not a pen.**

Springs and Oscillations

1. When hanging vertically, a spring has a length of 35 cm. Then, a mass of 200 g is added to it. The mass causes the spring to stretch by 5 cm. What is the elastic "spring" constant? Note that you'll want to do some unit conversions… and remember that mass is not weight!

k_{spring} = N/m

2. A certain spring hangs vertically. A mass of 200 g is added to it, and then pulled and released so that the mass bounces up and down. The period for each bounce is T = 1.2 s. First, find the angular frequency using $\omega = \frac{2\pi}{T}$.

ω = rad/s

3. Now that we have a value for ω, determine k using $\omega = \sqrt{\frac{k}{m}}$.

κ_{spring} = N/m

4. Algebra: use both formulas given in the previous two problems to symbolically solve for T^2 in terms of m. This is symbolic, so forget that you already found some numbers! I already wrote the "m" for you in the answer box. The result may not include ω.

T^2 = _____ $\cdot m$

5. Algebra: the entire fraction in front of the "m" is the slope "s" (if you plot T^2 vs m). Symbolically solve for k in terms of the slope s. Your answer may not include either m or T. Make sure your s doesn't look like a 5.

k = _____

6. A pendulum (not a spring!) has a small mass of 17 g suspended on a thin string of length 22 cm. What is the period of the pendulum's swing?

$T_{pendulum}$ = s

7. Algebra: re-arrange the same equation that you just used to find T^2 in terms of L.

T^2 = _____ $\cdot L$