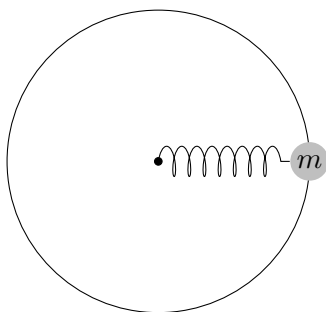


**Physics 111-01: General Physics I—Mechanics and Thermodynamics**  
**Test 2**  
**October 25, 2017**

Name: \_\_\_\_\_

All problems *must* begin with either a fundamental principle or with an equation from the equation sheet. If any question is unclear, please ask immediately. Be sure to show your work **clearly**. Partial credit may be given for work *if* it can be understood.

**Problem 1:** (20 pts.) A 0.0800 kg mass is attached to a spring with a spring constant of 5.00 N/m and a relaxed length of 0 m. The mass is on a horizontal frictionless table and is rotating around in a circle of radius 0.250 m.



a. (15 pts.) What is the velocity of the ball?

b. (5 pts.) What is the period of the ball's motion?

Physics 111-01: General Physics I—Mechanics and Thermodynamics

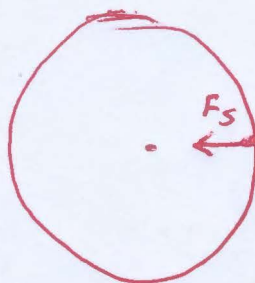
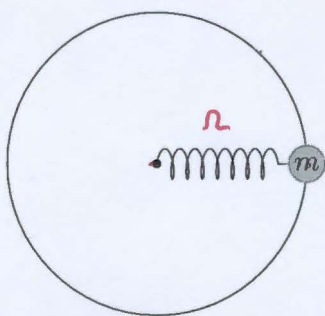
Test 2

October 25, 2017

Name: SOLUTIONS

All problems *must* begin with either a fundamental principle or with an equation from the equation sheet. If any question is unclear, please ask immediately. Be sure to show your work **clearly**. Partial credit may be given for work *if* it can be understood.

**Problem 1:** (20 pts.) A 0.0800 kg mass is attached to a spring with a spring constant of 5.00 N/m and a relaxed length of 0 m. The mass is on a horizontal frictionless table and is rotating around in a circle of radius 0.250 m.



a. (15 pts.) What is the velocity of the ball?

$$\begin{aligned} \Sigma F &= ma \\ -kr &= -m\nu^2/r \\ \nu^2 &= \frac{kr^2}{m} \\ \nu &= \sqrt{\frac{k}{m}} r = \sqrt{\frac{5.00 \text{ N/m}}{0.080 \text{ kg}}} \cdot (0.25 \text{ m}) \\ \nu &= 1.98 \text{ m/s} \end{aligned}$$

b. (5 pts.) What is the period of the ball's motion?

$$T = \frac{2\pi r}{\nu} = \frac{2\pi (0.250 \text{ m})}{1.98 \text{ m/s}} = 0.795 \text{ s}$$