**Physics 3 Unit 9– SHM and Rotation Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**4.1 SHM Worksheet**

1. Does Hooke’s Law apply to stretch springs, compressed springs or both?

2. a) A load of 45 N is attached to a spring that is hanging vertically. The spring is stretched 0.14 m from its equilibrium position. What is the spring constant? \

b) If a 60 N weight is used instead, what would you expect the spring stretch to be instead?

3. a) A slingshot consists of a light leather cup attached between two rubber bands. If it takes a force of 32 N to stretch the bands 1.2cm, what is the equivalent spring constant of the rubber bands?

b) How much force is required to pull the cup of the slingshot 3.0 cm from the equilibrium position?

4. If a spring constant is 40 N/m and an object hanging from it stretches it 0.50 m, what is the mass of the object?

5. In problem #4, what would be the period of oscillation associated with the spring pendulum? In your work show the unit cancelation.

6. A 1.0 kg mass on a spring is stretched and released. The period of oscillation is measured to be 0.46 s. What is the spring constant?

7. A block of unknown mass is attached to a spring with a spring constant of 6.5 N/m and undergoes SHM with an amplitude of 10.0 cm. When the block is halfway between its equilibrium and endpoint, its speed is measured to be 30.0 cm/s. Calculate the mass of the block, the period of the motion and the maximum acceleration of the block.

8. A 50.0 g object connected to a spring (k= 35.0 N/m) oscillates on a horizontal frictionless surface with an amplitude of 4.00 cm. Find the total energy of the system, the speed when x=1.0 cm, the kinetic and potential energies when x=3.0 cm.