BoxSand Waves & Oscillations Simple Harmonic Motion Qualitative Practice Problems

*Waves-Oscillations.SHO***.BS.QP.1:** A loudspeaker diaphragm is producing a sound for 3.1 s by moving back and forth in simple harmonic motion. The angular frequency of the motion is 5.23 X 10^5 rad/s. How many times does the diaphragm move back and forth?

*Waves-Oscillations.SHO***.BS.QP.2:** Objects of equal mass are oscillating up and down in simple harmonic motion on two different springs hung from the ceiling. The spring constant of spring A is 165 N/m. The motion of the object on spring A has twice the amplitude as the motion of the object on spring B. The magnitude of the maximum velocity is the same in each case. Find the spring constant of spring B.

*Waves-Oscillations.SHO***.BS.QP.3:** A vertical spring with a spring constant of 350 N/m is mounted on the floor. From directly above the spring, which is unstrained, a 0.20 kg block is dropped from rest. It collides with and sticks to the spring which is compressed by 3.6 cm in bringing the block to a momentary halt. Assuming that air resistance is negligible, from what height (in cm) above the now compressed spring was the block dropped?

*Waves-Oscillations.SHO***.BS.QP.4:** A spring stretches by 3.0 cm when a 1.6 kg object is suspended from its end. How much mass should be attached to this spring so that its frequency is f = 2.4 Hz?

*Waves-Oscillations.SHO***.BS.QP.5:** A vertical spring (k = 123 N/m) is mounted on the flood. A 0.60 kg block is placed on top of the spring and pushed down to start it oscillating in simple harmonic motion. The block is *not* attached to the spring. **(a)** Obtain the frequency (in Hz) of the motion. **(b)** Determine the amplitude at which the block will lose contact with the spring.