

NAME:

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More SHM Problems

4. The hummingbird makes a humming sound with its wings, which beat with a frequency of 90 Hz. Suppose a mass is attached to a spring with a spring constant of 2.50×10^2 N/m. How large is the mass if its oscillation frequency is 3.00×10^{-2} times that of a hummingbird's wings?

5. A long, light piece of spring steel is clamped at its lower end and a 2.0 kg ball is fastened to its top end. A horizontal force of 8.0 N is required to displace the ball 20 cm to one side. Assume the system to undergo *SHM* when released. Find:

a. The force constant of the spring and

b. The period with which the ball will vibrate back and forth.

6. The 400-g piston in a compressor oscillates up and down through a total distance of 80 mm. Calculate the maximum force on the piston when it goes through 10 cycles/s.

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7. A boy holding on the end of a rope swings back and forth once every 4.0 s. What is the length of the rope?

8. Calculate the period and frequency of a 6.200 m long pendulum in Oslo, Norway, where
 $g = 9.819 \text{ m/s}^2$.

9. On Mars, a simple pendulum with a length of 65.0 cm would have a period of 2.62 s. Calculate the acceleration of gravity on Mars.