PRACTICE C

Simple Harmonic Motion of a Mass-Spring System

1. A mass of 0.30 kg is attached to a spring and is set into vibration with a period of 0.24 s. What is the spring constant of the spring?
2. When a mass of 25 g is attached to a certain spring, it makes 20 complete vibrations in 4.0 s. What is the spring constant of the spring?
3. A 125 N object vibrates with a period of 3.56 s when hanging from a spring. What is the spring constant of the spring?
4. When two more people get into the car described in Sample Problem C, the total mass of all four occupants of the car becomes 255 kg. Now what is the period of vibration of the car when it is driven over a pothole in the road?
5. A spring of spring constant 30.0 N/m is attached to different masses, and the system is set in motion. Find the period and frequency of vibration for masses of the following magnitudes:
   a. 2.3 kg
   b. 15 g
   c. 1.9 kg

SECTION REVIEW

1. The reading on a metronome indicates the number of oscillations per minute. What are the frequency and period of the metronome's vibration when the metronome is set at 180?
2. A child swings on a playground swing with a 2.5 m long chain.
   a. What is the period of the child's motion?
   b. What is the frequency of vibration?
3. A 0.75 kg mass attached to a vertical spring stretches the spring 0.30 m.
   a. What is the spring constant?
   b. The mass-spring system is now placed on a horizontal surface and set vibrating. What is the period of the vibration?
4. **Critical Thinking** Two mass-spring systems vibrate with simple harmonic motion. If the spring constants are equal and the mass of one system is twice that of the other, which system has a greater period?