Name: _____ Class: _____ Date: _____ ID: A

Ch 13 Review

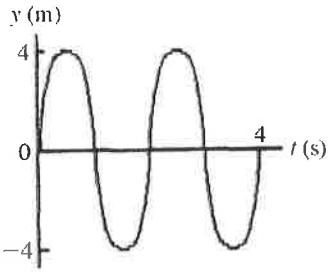
13.1 Conceptual Questions

____ 1) If we double the frequency of a system undergoing simple harmonic motion, which of the following statements about that system are true? (There could be more than one correct choice.)
A) The period is doubled. B) The angular frequency is doubled. C) The amplitude is doubled. D) The period is reduced to one-half of what it was. E) The angular frequency is reduced to one-half of what it was.

____ 2) Identical balls oscillate with the same period T on Earth. Ball A is attached to an ideal spring and ball B swings back and forth to form a simple pendulum. These systems are now taken to the Moon, where $g = 1.6$ m/s^2, and set into oscillation. Which of the following statements about these systems are true? (There could be more than one correct choice.)
A) Both systems will have the same period on the Moon as on Earth. B) On the Moon, ball A will take longer to complete one cycle than ball B. C) On the Moon, ball B will take longer to complete one cycle than ball A. D) On the Moon, ball A will execute more vibrations each minute than ball B. E) On the Moon, ball B will execute more vibrations each minute than ball A.

____ 3) Grandfather clocks are designed so they can be adjusted by moving the weight at the bottom of the pendulum up or down. Suppose you have a grandfather clock at home that runs slow. Which of the following adjustments of the weight would make it more accurate? (There could be more than one correct choice.)
A) Raise the weight. B) Lower the weight. C) Add more mass to the weight. D) Remove some mass from the weight. E) Increase the amplitude of swing by a small amount.

____ 4) What is the wavelength of the wave shown in the figure?



A) 8 m. B) 4 m. C) 2 m. D) 1 m. E) It cannot be determined from the given information.

13.2 Problems

____ 5) A leaky faucet drips 40 times in 30.0 s. What is the frequency of the dripping?
A) 1.3 Hz B) 0.75 Hz C) 1.6 Hz D) 0.63 Hz

____ 6) The quartz crystal in a digital watch has a frequency of 32.8 kHz. What is its period of oscillation?
A) 30.5 μs B) 15.3 μs C) 95.8 μs D) 0.191 ms E) 9.71 μs

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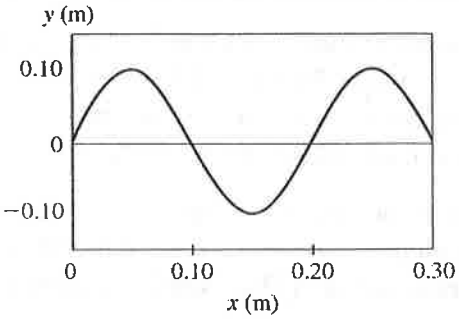
____ 7) A guitar string is set into vibration with a frequency of 512 Hz. How many oscillations does it undergo each minute?
A) 30,700 B) 8.53 C) 26.8 D) 1610 E) 512

____ 8) A 0.250-kg stone is attached to an ideal spring and undergoes simple harmonic oscillations with a period of 0.640 s. What is the force constant (spring constant) of the spring?
A) 2.45 N/m B) 12.1 N/m C) 24.1 N/m D) 0.102 N/m E) 0.610 N/m

____ 9) In a supermarket, you place a 22.3-N (around 5 lb) bag of oranges on a scale, and the scale starts to oscillate at 2.7 Hz. What is the force constant (spring constant) of the spring of the scale?
A) 650 N/m B) 600 N/m C) 330 N/m D) 820 N/m E) 410 N/m

10) The figure shows a "snapshot" of a wave at a given instant of time. The frequency of this wave is 120 Hz. What are the (a) amplitude, (b) wavelength, and (c) speed of this wave?



11) **A tuning fork has a frequency of 512 Hz. Assuming the air in the room is at STP and you are wearing a coat, calculate the wavelength of the sound produced by the fork**

Second Semester Reference:

Angular frequency $\omega = 2\pi f$
Speed of sound at STP = 331 m/s
Speed of light in vacuum (or air) = 3.00×10^8 m/s

$T = 1/f$
Pendulum: $T = 2\pi\sqrt{(L/g)}$
Spring/mass $T = 2\pi\sqrt{(m/k)}$
$v = f\lambda$

T = Period
L = length
g = acceleration due to gravity
m = mass
k = spring constant
v = velocity or speed
f = frequency
λ = wavelength