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DUE Mon, Oct 14, 2013 at 22:00

1. [1pt]
A pendulum set up in the stairwell of a tall building consists of a heavy weight suspended on a 33.3 m wire. Using $g = 9.8\, m/s^2$, find the period of oscillation.

$$ T = 2\pi \sqrt{\frac{L}{g}} = 2\pi \sqrt{\frac{33.3\, m}{9.8\, m/s^2}} = 11.6\, s $$

Answer: 11.59 s

2. [1pt]
If the period of a pendulum 89.0 cm long is 1.86 s, what is the value of $g$ at the location of the pendulum?

$$ T = 2\pi \sqrt{\frac{L}{g}} \Rightarrow \frac{T^2}{4\pi^2} = \frac{L}{g} \Rightarrow g = \frac{4\pi^2 \cdot L}{T^2} $$

Answer: 10.16 m/s^2

3. [1pt]
A simple pendulum is made from a 0.671 m-long string and a small ball attached to its free end. The ball is pulled to one side through a small angle and then released from rest. After the ball is released, how much time elapses before it attains its greatest speed?

Answer: 4.11E-01 s

4. [1pt]
The maximum displacement of a mass hanging on a spring is the

A) period.
B) wavelength.
C) speed.
D) frequency.
E) amplitude.

Answer: E
5. [1pt]
A mass of 0.82 kg is hung from a spring with spring constant 19.4 N/m. What is the period of oscillation?

Answer: \( T = \frac{2\pi}{T} \sqrt{\frac{m}{k}} = 1.29 \text{ s} \)

6. [1pt]
What is the frequency of oscillation for the hanging mass?

Answer: 0.7741 Hz

7. [1pt]
A mass of 0.46 kg is hung from a spring and has a frequency of oscillation of 0.082 Hz. The mass is replaced with a second unknown mass and the frequency of oscillation is found to be 0.128 Hz. What is the spring constant?

Answer: 1.6 \times 10^5 m

8. [1pt]
What is the unknown mass?

Answer: 1.7 \times 10^{-4} kg

9. [1pt]
Two children stretch a jump rope between them and send wave pulses back and forth on it. The rope is 2.0 m long, has a mass of 0.50 kg, and the tension exerted on it by the children is 33 N. What is the speed of the waves on the rope? HINT: You need to find the linear mass density first.

Answer: 11.5 m/s

10. [1pt]
If the wavelength is 1.0 m, what is the frequency of the wave?

Answer: 11.5 Hz

11. [1pt]
A wave has a speed of 67 m/s and a frequency of 19.1 Hz. What is the wavelength?

Answer: 3.5 m

12. [1pt]
The maximum displacement of points on a wave, measured from the equilibrium position is the

A) frequency.
B) amplitude.
C) wave's speed.
D) loudness.
E) wavelength.

**Answer:** B

13. [1pt]
The number of cycles of a wave passing a point per unit time is the

A) wave's speed.
B) frequency.
C) loudness.
D) wavelength.
E) amplitude.

**Answer:** B

14. [1pt]
The distance between two successive peaks on a wave is the

A) wavelength.
B) frequency.
C) loudness.
D) wave's speed.
E) amplitude.

**Answer:** A

15. [1pt]
A wave in which the oscillations are perpendicular to the direction the wave travels

A) is a different wave.
B) is a transverse wave.
C) is a sound wave.
D) does not exist.
E) is a longitudinal wave.

**Answer:** B
16. [1pt]
A common feature of all types of simple harmonic motion is that they have (include all that apply).

A) a fixed speed.
B) a period of 1 second.
C) a constant kinetic energy.
D) a fixed frequency.
E) a restoring force.

**Answer:** DE

17. [1pt]
The position of a particle is given by \( x = (5.9 \text{ cm}) \cos(6.4t) \), where \( t \) is in seconds. What is the frequency of the particle's motion?

**Answer:** 1.0 Hz

18. [1pt]
What is the period of the particle's motion?

**Answer:** 0.98 s

19. [1pt]
What is the amplitude of the particle's motion?

**Answer:** 0.06 m