Practice Final focused on Ch10,11,13,14 (Ungraded) (3103262)

Due: Fri Apr 29 2016 01:00 PM EDT

Question   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Description

This assignment will not be graded, but it is in your best interest to practice for the final
exam. The format of the final will be very similar to previous exams. The focus of the
final will be on the last third of the class. There will be a few questions from earlier
sections of the class (Chapters 1-8 possible), representing roughly 25% of the final
exam.

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1.   Question Details   SerCP8 3.MC.007. [3498816]

A NASA astronaut hits a golf ball on the Moon. Which of the following quantities, if any, remain constant as the ball travels
through the lunar vacuum?

☐ vertical component of velocity

☐ speed

☐ 🔑 acceleration

☐ 🔑 horizontal component of velocity

☐ velocity

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2.   Question Details   SerCP8 3.MC.010. [3498758]

A baseball is thrown from the outfield toward the catcher. When the ball reaches its highest point, which statement is true?

- ○ Its velocity is not zero, but its acceleration is zero.

- ○ Its velocity and its acceleration are both zero.

- ○ 🔑 Its velocity is perpendicular to its acceleration.

- ○ Its acceleration depends on the angle at which the ball was thrown.

- ○ None of the above statements are true.

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3.   Question Details   SerCP8 5.MC.005. [3499356]

The work required to accelerate an object on a frictionless surface from a speed v to a speed 2v is

- ○ four times the work required to accelerate the object from 2v to 3v.

- ○ twice the work required to accelerate the object from v = 0 to v.

- ○ equal to the work required to accelerate the object from v = 0 to v.

- ○ not known without knowledge of the acceleration.

- ○ 🔑 three times the work required to accelerate the object from v = 0 to v.

4.   Question Details   SerCP8 13.MC.002. [3496475]

The position of an object moving with simple harmonic motion is given by $x = 4 \cos(6\pi t)$, where x is in meters and t is in seconds. What is the period of the oscillating system?

- ○ 🔑 1/3 s

- ○ 1/6 s

- ○ impossible to determine from the information given

- ○ 6π s

- ○ 4 s

5.   Question Details   SerCP8 13.MC.011. [3496354]

Which of the following statements is *not* true regarding a mass-spring system that moves with simple harmonic motion in the absence of friction?

- ○ 🔑 The potential energy stored in the system is greatest when the mass passes through the equilibrium position.

- ○ The total energy of the system remains constant.

- ○ The energy of the system is continually transformed between kinetic and potential energy.

- ○ The velocity of the oscillating mass has its maximum value when the mass passes through the equilibrium position.

- ○ The total energy of the system is proportional to the square of the amplitude.

6.   Question Details   SerCP8 14.MC.005. [3496856]

A point source broadcasts sound into a uniform medium. If the distance from the source is tripled, how does the intensity change?

- ○   It becomes three times larger.

- ○   🔑 It becomes one-ninth as large.

- ○   It is unchanged.

- ○   It becomes nine times larger.

- ○   It becomes one-third as large.

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7.   Question Details   SerCP8 11.MC.009. [3496043]

An amount of energy is added to ice, raising its temperature from -10°C to -5°C. A larger amount of energy is added to the same mass of water, raising its temperature from 15°C to 20°C. From these results, what can we conclude?

- ○   More information is needed to draw any conclusion.

- ○   Overcoming the latent heat of fusion of ice requires an input of energy.

- ○   The specific heat of ice is greater than that of water.

- ○   🔑 The specific heat of ice is less than that of water.

- ○   The latent heat of fusion of ice delivers some energy to the system.

8.   Question Details   SerCP8 13.P.042. [3496491]

An object attached to a spring vibrates with simple harmonic motion as described by the figure below.
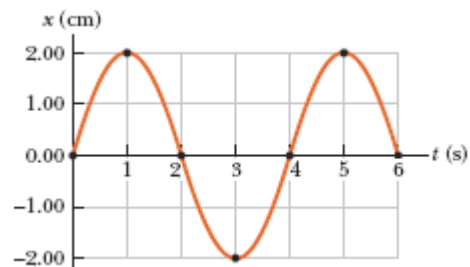
For this motion, find the following.

(a) the amplitude

[   ] 🔑 2 cm

(b) the period

[   ] 🔑 4 s

(c) the angular frequency

[   ] 🔑 1.57 rad/s

(d) the maximum speed

[   ] 🔑 3.14 cm/s

(e) the maximum acceleration

[   ] 🔑 4.93 cm/s^2

(f) an equation for its position x in terms of a sine function (Do this on paper. Your instructor may ask you to turn in this work.)

9.   Question Details   SerCP8 11.P.038. [3496084]

A glass windowpane in a home is 0.62 cm thick and has dimensions of 0.9 m × 2.3 m. On a certain day, the indoor temperature is 29°C and the outdoor temperature is 0°C.

(a) What is the rate at which energy is transferred by heat through the glass?

[_____] 🔑 8130 W

(b) How much energy is lost through the window in one day, assuming the temperatures inside and outside remain constant?

[_____] 🔑 7.03e+08 J

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10.   Question Details   SerCP8 13.P.012. [3496430]

An automobile having a mass of 1000 kg is driven into a brick wall in a safety test. The bumper behaves like a spring with constant 4.25 × 10^6 N/m and is compressed 2.57 cm as the car is brought to rest. What was the speed of the car before impact, assuming no energy is lost in the collision with the wall?

[_____] 🔑 1.68 m/s

11.   Question Details   SerCP8 13.P.037.ssm. [3496362]

A pendulum clock that works perfectly on Earth is taken to the Moon. Assume that the free-fall acceleration on the Moon is 1.63 m/s^2.

(a) Does it run fast or slow there?

○ 🔑 slow

○ neither; it runs the same as on Earth

○ fast

(b) If the clock is started at 12:00 midnight, what will it read after 20.0 h? (Enter the time to the nearest minute.)

[_____] 🔑 8 : [_____] 🔑 9 AM

Solution or Explanation

Note the values in this solution reflect those of the text book question, not the values you may have received for this question above.

13.37 (a) The period of the pendulum is $T = 2\pi\sqrt{L/g}$. Thus, on the Moon where the free-fall acceleration is smaller, the period will be longer and the clock will run $\boxed{\text{slow}}$.

(b) The ratio of the pendulum's period on the Moon to that on Earth is

$$\frac{T_{\text{Moon}}}{T_{\text{Earth}}} = \frac{2\pi\sqrt{L/g_{\text{Moon}}}}{2\pi\sqrt{L/g_{\text{Earth}}}} = \sqrt{\frac{g_{\text{Earth}}}{g_{\text{Moon}}}} = \sqrt{\frac{9.80}{1.63}} = 2.45$$

Hence, the pendulum of the clock on Earth makes 2.45 "ticks" while the clock on the Moon is making 1.00 "tick." After the Earth clock has ticked off 24.0 h and again reads 12:00 midnight, the Moon clock will have ticked off 24.0 h/2.45 = 9.80 h and will read $\boxed{9:48\text{ AM}}$.

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12. Question Details   SerCP8 13.P.061. [3496334]

A wave of amplitude 0.40 m interferes with a second wave of amplitude 0.28 m traveling in the same direction.

(a) What is the largest resultant amplitude that can arise, and under what conditions will this maximum occur?

[_____] 🔑 0.68 m

○ The two waves interfere destructively.

○ 🔑 The two waves interfere constructively.

(b) What is the smallest resultant amplitude that can arise, and under what conditions will this minimum occur?

[_____] 🔑 0.12 m

○ 🔑 The two waves interfere destructively.

○ The two waves interfere constructively.

13.   Question Details   SerCP8 14.P.001. [3496893]

Suppose you hear a clap of thunder 15.3 s after seeing the associated lightning stroke. The speed of sound waves in air is 343 m/s, and the speed of light in air is 3.00×10^8 m/s.

(a) How far are you from the lightning stroke?

[_____]   🔑 5.25 km

(b)Do you need to know the value of the speed of light to answer? Explain.

Key: The time required for the flash of light to reach the observer is negligible in comparison to the time required for the sound to arrive. Thus, we can ignore the time required for the lightning flash to arrive, and knowledge of the actual speed of light is not needed.

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14.   Question Details   SerCP8 4.MC.004. [3499137]

A force of 70.0 N is exerted at an angle of 30.0° below the horizontal on a block of mass 8.00 kg that is resting on a table. What is the magnitude of the normal force acting on the block?

○   43.4 N

○   🔑 113 N

○   126 N

○   92.4 N

○   78.4 N

15.   Question Details   SerCP8 4.MC.006. [3499239]

A crate remains stationary after it has been placed on a ramp inclined at an angle with the horizontal. Which of the following statements must be true about the magnitude of the frictional force that acts on the crate?

○   It is larger than the weight of the crate.

○   🔑 It is equal to the component of the gravitational force acting down the ramp.

○   It is at least equal to the weight of the crate

○   It is greater than the component of the gravitational force acting down the ramp.

○   It is equal to $\mu_s n$.

16.   Question Details   SerCP8 6.MC.003. [3499427]

A car of mass m traveling at speed v crashes into the rear of a truck of mass $2m$ that is at rest and in neutral at an intersection. If the collision is perfectly inelastic, what is the speed of the combined car and truck after the collision?

○   none of these

○ v

○ $2v$

○ $v/2$

○   🔑 $v/3$

17.   Question Details   SerCP8 5.P.062. [3499260]

A raw egg can be dropped from a third-floor window and land on a foam-rubber pad on the ground without breaking. A 75-g egg is dropped from a window located 27.3 m above the ground and a foam-rubber pad that is 15.0 cm thick stops the egg in 9.2 ms.

       (a) By how much is the pad compressed?

       [   ]   🔑 10.6 cm

       (b) What is the average force exerted on the egg after it strikes the pad? *Note*: Assume constant upward acceleration as the egg compresses the foam-rubber pad.

       [   ]   🔑 189 N

18.   Question Details   SerCP9 10.MC.002. [3500310]

A hole is drilled in a metal plate. When the metal is heated, what happens to the diameter of the hole?

     ○ It decreases.

     ○ 🔑 It increases.

     ○ It remains the same.

     ○ The answer depends on the initial temperature of the metal.

     ○ none of these

19.   Question Details   SerCP9 10.MC.009. [3500111]

Suppose you empty a tray of ice cubes into a bowl partly full of water and cover the bowl. After one-half hour, the contents of the bowl come to thermal equilibrium, with more liquid water and less ice than you started with. Which of the following is true? (Select all that apply.)

☐   The temperature of the liquid water is less than that of the ice.

☐   🔑 The temperature of the liquid water is the same as that of the ice.

☐   The temperature of the liquid water is higher than the temperature of the remaining ice.

☐   The comparative temperatures of the liquid water and ice depend on the amounts present.

20.   Question Details   SerCP9 11.MC.003. [3500061]

A wall made of wood 4.00 cm thick has area of 48.0 m^2. If the temperature inside is 25°C and the temperature outside is 14°C, at what rate is thermal energy transported through the wall by conduction? (Use 0.08 J/s · m · °C for the thermal conductivity of wood.)

○   82 W

○   210 W

○   690 W

○   🔑 1.1×10^3 W

○ 2.1×10^3 W

21. Question Details   SerCP9 11.MC.004. [3500332]   -

If 9.30×10^5 J of energy are transferred to 2.00 kg of ice at 0°C, what is the final temperature of the system?

- ○ 22.4°C

- ○ 14.2°C

- ○ 🔑 31.5°C

- ○ 18.0°C

- ○ 0°C

22. Question Details   SerCP9 11.MC.010. [3500140]   -

A poker is a stiff, nonflammable rod used to push burning logs around in a fireplace. Suppose it is to be made of a single material. For best functionality and safety, which of the statements is true?

- ○ The poker should be made from material with high specific heat and high thermal conductivity.

- ○ 🔑 The poker should be made from material with high specific heat and low thermal conductivity.

- ○ The poker should be made from material with low specific heat and low density.

- ○ The poker should be made from material with low specific heat and high thermal conductivity.

- ○ The poker should be made from material with low specific heat and low thermal conductivity.

23. Question Details   SerCP9 13.MC.001. [3500396]

The distance between the crest of a water wave and the next trough is 2 m. If the frequency of a particular wave is 2 Hz, what is the speed of the wave?

- ○ 1 m/s

- ○ 2 m/s

- ○ 4 m/s

- ○ 🔑 8 m/s

- ○ impossible to determine from the information given

24. Question Details   SerCP9 13.MC.004. [3500483]

A mass of 0.40 kg, hanging from a spring with a spring constant of 80.0 N/m, is set into an up-and-down simple harmonic motion. If the mass is displaced from equilibrium by 0.10 m and released from rest, what is its speed when moving through the equilibrium point?

- ○ 3.4 m/s

- ○ 🔑 1.4 m/s

- ○ 4.2 m/s

- ○ 2.0 m/s

- ○ 0

25.   Question Details   SerCP9 13.MC.006. [3500496]

An object of mass 0.40 kg, hanging from a spring with a spring constant of 8.0 N/m, is set into an up-and-down simple harmonic motion. What is the magnitude of the acceleration of the object when it is at its maximum displacement of 0.10 m?

- ○ 1.0 m/s^2
- ○ 2.40 m/s^2
- ○ 🔑 2.0 m/s^2
- ○ 0.45 m/s^2
- ○ 0

26.   Question Details   SerCP9 13.MC.007. [3500450]

A runaway railroad car with mass 3.0×10^5 kg coasts across a level track at 2.0 m/s when it collides elastically with a spring-loaded bumper at the end of the track. If the spring constant of the bumper is 2.0×10^6 N/m, what is the maximum compression of the spring during the collision?

- ○ 0.34 m
- ○ 1.24 m
- ○ 1.07 m
- ○ 0.58 m
- ○ 🔑 0.77 m

27.   Question Details   SerCP9 13.MC.009. [3500538]

A simple pendulum has a period of 2.5 s. What is its period if its length is made four times as large?

- ○ 1.25 s

- ○ 2.5 s

- ○ 3.54 s

- ○ 🔑 5.0 s

- ○ 0.625 s

28.   Question Details   SerCP9 14.MC.001. [3500985]

A sound wave traveling in air has a frequency f and wavelength λ. A second sound wave traveling in air has wavelength $\lambda/2$. What is the frequency of the second sound wave?

- ○ $4f$

- ○ 🔑 $2f$

- ○ f

- ○ $\dfrac{1}{2}f$

- ○ $\dfrac{1}{4}f$

29. Question Details   SerCP9 14.MC.002. [3501007]

The temperature at Furnace Creek in Death Valley reached 134°F on July 10, 1913. What is the speed of sound in air at this temperature?

- ○ 321 m/s

- ○ 343 m/s

- ○ 375 m/s

- ○ 🔑 364 m/s

- ○ 405 m/s

30. Question Details   SerCP9 14.MC.003. [3500982]

Ethyl alcohol has a density of 0.806×10^3 kg/m^3 and a bulk modulus of 1.0×10^9 Pa. Compute the speed of sound in ethyl alcohol.

- ○ 🔑 1,100 m/s

- ○ 450 m/s

- ○ 1,300 m/s

- ○ 820 m/s

- ○ 340 m/s

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31.   Question Details   SerCP9 14.MC.006. [3500795]

A point source broadcasts sound into a uniform medium. If the distance from the source is tripled, how does the intensity change?

- ○ It becomes nine times larger.

- ○ It is unchanged.

- ○ It becomes one-third as large.

- ○ It becomes three times larger.

- ○ 🔑 It becomes one-ninth as large.

Assignment Details

Name (AID): **Practice Final focused on Ch10,11,13,14 (Ungraded) (3103262)**   **Feedback Settings**

Submissions Allowed: **10**

Category: **Homework**

Code:

Locked: **Yes**

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