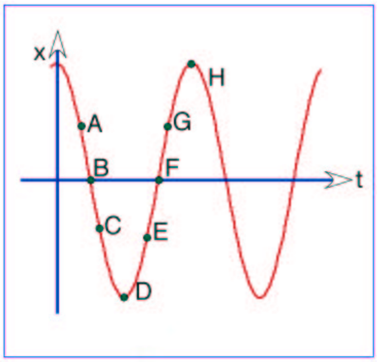
1 pt



The curve represents an object in simple harmonic motion. Match the points on the curve to the velocity and acceleration of the object.

▷ The velocity is positive, and the acceleration is zero.

1. **A**◯ Point A **B**◯ Point B **C**◯ Point C
D◯ Point D **E**◯ Point E **F**◯ Point F
G◯ Point G **H**◯ Point H

▷ The velocity is negative, and the acceleration is positive.

2. **A**◯ Point A **B**◯ Point B **C**◯ Point C
D◯ Point D **E**◯ Point E **F**◯ Point F
G◯ Point G **H**◯ Point H

▷ The velocity is positive, and the acceleration is negative.

3. **A**◯ Point A **B**◯ Point B **C**◯ Point C
D◯ Point D **E**◯ Point E **F**◯ Point F
G◯ Point G **H**◯ Point H

▷ The velocity is positive, and the acceleration is positive.

4. **A**◯ Point A **B**◯ Point B **C**◯ Point C
D◯ Point D **E**◯ Point E **F**◯ Point F
G◯ Point G **H**◯ Point H

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1 pt Shock absorbers are put on a car to damp out the oscillations that would occur when the springs are compressed. A car with no shocks has a spring on each wheel with k = 4500 N/m. It weighs 1000 kg, and holds 4 passengers, each with a mass of 70 kg. What would be the period of oscillation of the car (in sec) if it were to hit a rock or pot hole?

5.A◯ 1.675 **B**◯ 2.228 **C**◯ 2.964
D◯ 3.942 **E**◯ 5.243 **F**◯ 6.973
G◯ 9.274 **H**◯ 12.334

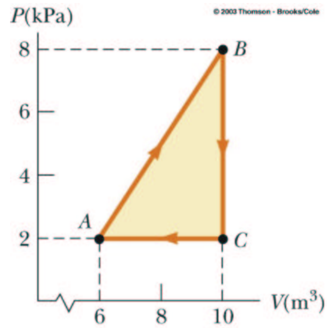
---

1 pt A stationary whistle emits a sound of 182 Hz. If a car hears the whistle with a frequency of 200 Hz, how fast was it moving (in m/s)? Use 340 m/s for the sound velocity.

6.A◯ 21.00 **B**◯ 24.56 **C**◯ 28.74 **D**◯ 33.63
E◯ 39.34 **F**◯ 46.03 **G**◯ 53.86 **H**◯ 63.01

Scott Pratt - PHY 231 - Spring 2004

1 pt



A gas is taken through the cyclic process described by the figure above. How much work was done by the gas during the cycle ABCA? *(in* J*)*

7.A◯ 8317 **B**◯ 9398 **C**◯ 10619 **D**◯ 12000
E◯ 13560 **F**◯ 15323 **G**◯ 17315 **H**◯ 19566

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1 pt The motion of an object is described by the equation:
$x = (2.5\text{ m})\cos(\pi t/3.1)$,
where t is assumed to be measured in seconds. What is the frequency (in Hz) of the motion?

8.A◯ 0.069 **B**◯ 0.077 **C**◯ 0.088 **D**◯ 0.099
E◯ 0.112 **F**◯ 0.126 **G**◯ 0.143 **H**◯ 0.161

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1 pt A piano emits sound waves with frequencies that range from a low of about 28 Hz to a high of about 4,200 Hz. What is the longest wavelength of sound produced by a piano? (The speed of sound in air is approximately 343 m/s.) *(in* m*)*

9.A◯ 9.80 **B**◯ 12.25 **C**◯ 15.31 **D**◯ 19.14
E◯ 23.93 **F**◯ 29.91 **G**◯ 37.38 **H**◯ 46.73

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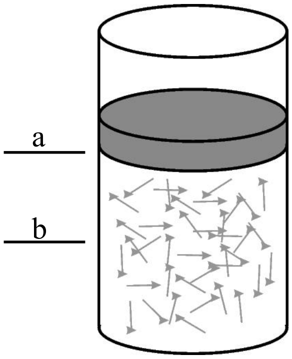
1 pt



A massive piston traps a fixed amount of helium gas as shown. After being brought to point (a) the system equilibrates to room temperature. The gas is then cooled ISOBARICALLY compressing the gas to half of its original volume (b).

▷ the pressure P_b ________________ P_a.

10. **A**◯ greater than **B**◯ less than **C**◯ equal to

▷ The entropy of the gas at "b" is ________________ the entropy of the gas at "a".

11. **A**◯ greater than **B**◯ less than **C**◯ equal to

▷ The temperature T_b ________________ T_a.

12. **A**◯ greater than **B**◯ less than **C**◯ equal to

▷ The internal energy U_b ________________ U_a.

13. **A**◯ greater than **B**◯ less than **C**◯ equal to

---

1 pt A large steam pipe is covered with 1.5-cm-thick insulating material of thermal conductivity 0.21 J/(s m °C). How much energy (in J) is lost every second when the steam is at 220 °C and the outside of the pipe has a temperature of 20°C? The pipe has a circumference of 7.5 m and a length of 50 m. Neglect losses through the ends of the pipe.

14. **A**◯ 6.56×10^5 **B**◯ 7.67×10^5 **C**◯ 8.97×10^5 **D**◯ 1.05×10^6 **E**◯ 1.23×10^6 **F**◯ 1.44×10^6 **G**◯ 1.68×10^6 **H**◯ 1.97×10^6

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1 pt At high noon, the Sun delivers 1.1 kW to each square meter of a blacktop road. If the hot asphalt loses energy only by radiation, what is its equilibrium temperature (in degrees Celsius) of the road surface?

15. **A**◯ 78.4 **B**◯ 88.6 **C**◯ 100.1 **D**◯ 113.1 **E**◯ 127.8 **F**◯ 144.4 **G**◯ 163.2 **H**◯ 184.4

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1 pt A figure skater is spinning with her arms and one leg extended as far as she can. She then pulls them in tight to her body. As her position contracts,

▷ her angular velocity ___________.

16. **A**◯ decreases **B**◯ increases **C**◯ remains the same

▷ her rotational kinetic energy ________________.

17. **A**◯ decreases **B**◯ increases **C**◯ remains the same

▷ her angular momentum ___________.

18. **A**◯ decreases **B**◯ increases **C**◯ remains the same

▷ her moment of inertia ______________.

19. **A**◯ decreases **B**◯ increases **C**◯ remains the same

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1 pt

Two sounds have intensities $4 \cdot 10^{-3}$ and $6.5 \cdot 10^{-7}$ W/m^2. What is the magnitude of the difference in intensity levels between the two sounds in dB?

20. **A**◯ 12.11 **B**◯ 16.11 **C**◯ 21.42 **D**◯ 28.49 **E**◯ 37.89 **F**◯ 50.40 **G**◯ 67.03 **H**◯ 89.15
