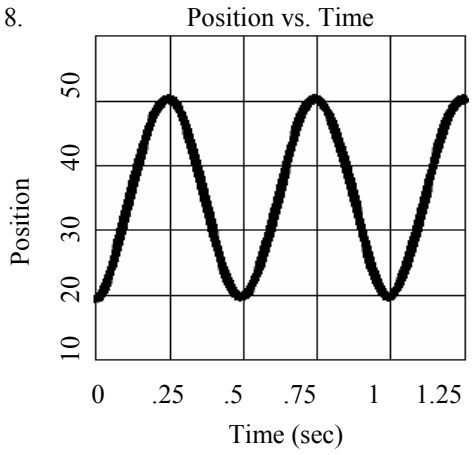
PreAP: Due: Wed., Feb 19 (Assigned: Fri., Feb 17)
Reg: Due: Thurs., Feb 23 (Assigned: Tues., Feb 21)

Harmonic Motion 7

1. Boundary	A. The part that is moved to give energy to the wave.
2. Standing wave	B. Where a harmonic's amplitude is greatest.
3. Harmonic	C. Where the harmonic has no motion.
4. Fundamental	D. A wave that is a multiple of another wave.
5. Driven end	E. A wave that is trapped within boundaries.
6. Node	F. The first harmonic of a standing wave, equal to 1/2 its wavelength.
7. Anti-node	G. A place that limits a wave's motion.

8.



# of cycles: _____

Period: _____

Frequency: _____

Amplitude: _____

9. A fellow student shows you the frequencies of four harmonics of a string: 12 Hz; 24 Hz; 29 Hz; 48 Hz. Which one would you question and why?

10. Use the Standing wave diagram at the right to answer the following.
    A. Find its period (f is below the harmonic).

    B. What harmonic is this? ____ C. Draw the wave form on the harmonic (as if freeze-framed).
    D. Mark the nodes (N) and anti-nodes (AN).
    E. Find the fundamental frequency of this harmonic (H_1).

    F. Find the frequency of harmonic 6.

    G. Can we hear this frequency? _____ H. How many wavelengths is the harmonic?

120 Hz

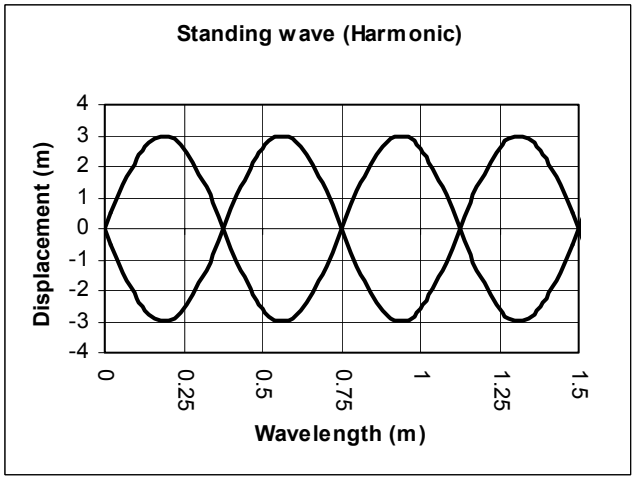
11. When hammering on steel, you hear your echo come back 2.4 seconds later. How far away is the object it echoed (reflected) off of?

12. A guitar has standing waves.
    A. Where are its boundaries?
    B. What is the driving force (that causes the vibration)?

13. A string with a natural frequency of 15 Hz. Give the next three frequencies of harmonics:

14. Use the graph to answer the following:
    A. Which harmonic is it?
    B. Mark the antinodes.
    C. What is its amplitude?
    D. What is its wavelength?
    E. If it is a sound wave use D to find its frequency.

    F. Find the frequency of H_1 (the natural frequency).

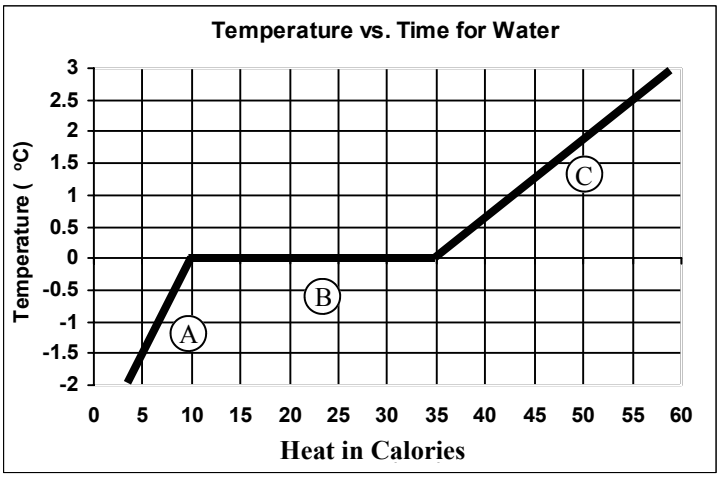


15. Which has more heat: a cold ocean or a hot cup of water?

16. Which has a higher temperature: a cold ocean or a hot cup of water?

17. Would you expect wood to have a high or low specific heat? Why?

18. Is segment B increasing in temperature?
19. What phase is segment A?
20. What phase is segment B?
21. What do we call the temperature of segment B?
22. Why isn't segment B rising?
23. What do we call the heat it is gaining at B?



HONORS PHYSICS CONTINUE; REGULARS PHYSICS IS FINISHED

24. Given this equation: $x = (4cm)\cos(2\pi t)$ answer the following:
    A. What is the wave's amplitude?
    B. Find the wave's period.

    C. Give the wave's velocity equation:

    D. Give the wave's acceleration equation:

    E. Find when the wave is at equilibrium (set $x = 0$).

    F. Find which direction it is moving at $t = 3$ sec.

25. Use the graph to answer the following.
    A. Find the graph's amplitude.

    B. Find the graph's period.

    C. Find the angular frequency.

    D. Write the three wave equations for this graph.