PHYSICS 1 - Self Test Chapter 25 & 26 Name _____

CHAPTER 25 and CH 26 – VOCABULARY

Chapter 25 - Waves

Longitudinal wave:	vibrations are back and forth (parallel to) the direction of travel. The place where the medium is compressed is called a condensation; where the medium is expanded is called a rarefaction.
Transverse wave:	vibrations are at right angles to the direction of travel. The crests are the high points of the wave and the troughs are the low points of the wave.
Wavelength:	distance from Crest to Crest (compression to compression) or Trough to Trough (rarefaction to rarefaction)
Frequency:	number of vibrations/time interval
Period:	Time for one complete vibration to be sent out. Period = 1/frequency (T = 1/f)
Wave velocity:	$v = f\lambda$
Amplitude:	Maximum displacement of the medium from its happy or equilibrium position.
Interference:	The result of waves crossing over each other can be "constructive" when the waves reinforce each other, or "destructive" when the waves tend to cancel each other out.
Standing wave:	wave in which there are places of maximum disturbance (anti-nodes) and places of no disturbance (nodes). These waves are produced by waves of the same frequency traveling back and forth. The wavelength (λ) of a standing wave is twice the distance between 2 adjacent nodes.
Reflection:	When a wave meets a boundary it bounces off that boundary in such a way that the angle of incidence equals the angle of reflection.
Doppler Effect:	This is the change in observed frequency when there is relative motion between a wave source and the observer. The frequency increases then the source and observer are approaching each other and decreases when they are moving apart.

Chapter 26 - Sound

Pitch:	The highness or lowness of a sound. Pitch is essentially the frequency of the wave.
Loudness:	A subjective quantity that depends on the amplitude of the wave. The relative loudness of a sound is called the intensity level or decibel level. An increase of 10 dB means the energy of the sound is increased by 10 times: however, it sounds only about 2 times as loud.
Forced Vibration:	When an object is forced to vibrate at a certain frequency
Resonance:	When one vibrating source (sound) makes another medium vibrate at the same frequency resulting in greater wave motion. Example: A person plays a clarinet by blowing in a mouthpiece that has a wooden reed mounted on it. The reed vibrates and causes the air in the clarinet to vibrate at the same frequency resulting in an increased loudness. When the frequency impressed on an object is the same as the object's natural frequency, the object will vibrate with increased amplitude.
Beats:	These are the pulsating sound made when 2 bodies of nearly the same natural frequency are sounded together. The beat frequency is the difference between the two frequencies.
Quality of Sound:	This is the property that enables us to identify the source of a sound. Quality depends on the base frequency (fundamental) and the whole-number multiples of the fundamental (harmonics or overtones) that make-up the sound.

$f = 1/T$ $v = f\lambda$ Speed of sound in air = 340 m/s Speed of light = 3.0×10^8 m/s

Matching Game

a.	amplitude	____	requires a medium for transmission
b.	frequency	____	number of waves passing a given point per second
c.	longitudinal wave	____	particles of the medium vibrate perpendicular to the direction in which wave is moving
d.	mechanical wave	____	has stationary nodes produced by identical waves moving in opposite directions
e.	node	____	point of no vibration
f.	period	____	particles of the medium vibrate parallel to the direction of travel of the wave
g.	standing wave	____	time for one complete vibration
h.	transverse wave	____	maximum displacement from rest point
i.	wavelength	____	distance between two identical points on a wave
j.	resonance	____	change in frequency of a wave as it moves toward or away from the observer
k.	beats	____	resulting sound produced when two slightly different frequency sounds are heard together
l.	interference	____	when the frequency of a forced vibration on an object matches the object's natural frequency, the object undergoes _____
m.	Doppler Effect	____	the result of waves passing through each other

Multiple Choice

____ 1. A wave:
- a. has a velocity
- b. has a period
- c. has a wavelength
- d. transmits energy
- e. has a frequency
- f. all of these

____ 2. Waves provide a means for transferring
a. matter b. energy c. both d. neither

____ 3. The time needed for a wave to make one complete cycle is called its:
a. frequency b. period c. amplitude d. wavelength e. velocity

____ 4. The number of vibrations per second is called the:
a. frequency b. period c. amplitude d. wavelength e. velocity

____ 5. The distance between 2 successive identical parts of a wave is called its:
a. frequency b. period c. amplitude d. wavelength e. velocity

____ 6. The rate at which a wave travels through a medium is called its:
a. frequency b. period c. amplitude d. wavelength e. velocity

____ 7. Hertz is a:
a. type of car b. unit of period c. unit of frequency d. unit of wavelength e. special kind of radio wave

____ 8. The maximum height of a wave is its:
a. frequency b. period c. amplitude d. wavelength e. velocity

____ 9. A certain ocean wave has a frequency of 0.05 Hertz and a wavelength of 10 meters. What is the time that it takes to generate one wave?
a. .05 s b. 10 s c. 20 s d. 100 s

____ 10. A certain ocean wave has a frequency of 0.05 Hertz and a wavelength of 10 meters. What is the wave's speed?
a. 0.005 m/s b. 0.05 m/s c. 0.5 m/s d. 10 m/s e. 200 m/s

____ 11. A leaf on a pond moves up and down two times each second as series of waves passes. What is the wave's frequency?
a. 0.5 Hz b. 1 Hz c. 2 Hz d. 4 Hz

____ 12. The frequency of the second hand of the wall clock in this room is:
a. 1/60 Hz b. 1 Hz c. 60 Hz

____ 13. A cork floating in the ocean bobs up and down once every two seconds. The crests of the waves are 2 m apart. What is the wave's speed?
a. 0.5 m/s b. 1 m/s c. 2 m/s d. 4 m/s

____ 14. If you double the frequency of a wave, its period:
a. doubles b. is halved c. can't tell without knowing the wave speed d. remains the same

____ 15. A wave oscillates up and down at a rate of 2 Hz. If the wave travels a distance of 6 meters in 1 s, its wavelength is:
a. 0.5 m b. 1 m c. 2 m d. 3 m e. 6 m

____ 16. In a longitudinal wave, compressions and rarefactions:
a. move in the same direction
b. move in opposite directions
c. cancel each other
d. do not exists

____ 17. A wave created by shaking a rope from side to side is called a:
a. longitudinal b. transverse wave c. standing wave d. constructive wave

____ 18. Sound is an example of a:
a. longitudinal b. transverse wave c. standing wave d. constructive wave

____ 19. Sound waves can interfere so that no sound results:
a. yes b. no

____ 20. When two or more waves are at the same place at the same time, the resulting effect is called:
a. interference b. reflection c. Doppler effect

____ 21. A car's horn is stuck. As the car approaches you the pitch of the horn seems to:
a. increase b. decrease c. stay the same.

____ 22. A car's horn is stuck. Just as the car passes and goes away from you, the pitch of the horn seems to:
a. increase b. decrease c. stay the same.

____ 23. When a source of sound moves toward you, what happens to the speed of the sound wave?
a. increases b. decreases c. stays the same

____ 24. When a source of sound moves away from you, what happens to the speed of the sound wave?
a. increases b. decreases c. stays the same

____ 25. What happens when an airplane flies faster than the speed of sound?
a. a shock wave forms behind the plane resulting in a "boom"
b. it becomes very quiet inside the plane
c. the pilot hears a loud noise
d. no one on the ground is able to hear the plane

____ 26. Compared to the speed of light, sound travels:
a. faster b. slower c. same speed

____ 27. An explosion occurs 1.7 km away. If sound has a speed of 340 m/s, how much time does it take for the sound to reach you?
a. 0.2 s b. 0.5 s c. 1 s d. 2 s e. 5 s

____ 28. The echo of a loud noise is heard 1.0 s after the sound was made. The distance between the sound and the reflecting surface is: (Remember that echoes involve a round trip.)
a. 85 m b. 170 m c. 340 m d. 680 m

____ 29. Which of these is most likely to transmit sound the best?
a. water in swimming pool b. water in the ocean c. air in the classroom d. steel in a bridge

____ 30. When the crests of one wave meet the crest of another wave, the result is constructive interference. What happens if two sound waves interfere constructively?
a. louder sound b. softer sound c. beats d. no noticeable effect.

____ 31. When the crests of one wave meet the trough of another wave, the result is destructive interference. What happens if two sound waves interfere destructively?
a. louder sound b. softer sound c. beats d. no noticeable effect.

____ 32. Two tuning forks of slightly different frequency are sounded together. What will we hear?
a. louder sound b. softer sound c. beats d. no noticeable effect.

____ 33. If the sounding board were left out of a music box, it would:
a. sound the same as usual b. not sound at all c. be very hard to hear

____ 34. A common example of resonance is:
a. pumping on a swing
b. picking a guitar string
c. bowing a violin string
d. none of these

____ 35. The speed of a sound wave in air depends on:
a. frequency b. its wavelength c. the air temperature d. all of these

____ 36. When pulses started at opposite ends of a stretched slinky spring meet, they:
a. pass through each other b. bounce off each other c. stop

____ 37. A car is sounding its horn and moving toward observer A and moving away from observer B. What will each observer hear?
a. A will hear the same thing as B
b. A will hear a higher pitch than B
c. A will hear a lower pitch than B
d. Can't tell unless you know how fast the car is traveling.

____ 38. Where can you touch a standing wave on a rope without disturbing the wave?
a. at a node b. at an antinode c. any place along the wave

____ 39. When the handle of a tuning fork is held solidly against a chair seat, the sound becomes louder and the length of time the fork vibrates:
a. becomes longer b. becomes shorter c. remains the same

Questions/Problems

1. What is transferred by waves?

2. Does the medium in which the wave travels move along with the wave?

3. What is it that moves along a wave?

4. What can you do to a slinky to increase the speed of a wave in it?

5. What is a standing wave and how is it formed?

6. Sketch the result at the instant the two pulses overlap.

7. Sketch the result shortly after the two pulses have met.

8. If a wave vibrates back and forth four times each second, and its wavelength is 2 meters:
   a. What is its frequency in Hz?

   b. What is its period in s?

   c. What is its speed in m/s?

9. Sound waves travel at approximately 340 m/s.
   a. What is the wavelength of a sound with a frequency of 20 Hz?

   b. What is the wavelength of a sound with a frequency of 20,000 Hz?

10. Two notes are sounding, one 330 Hz and the other 333 Hz. What is the beat frequency?