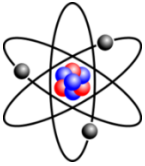


Name: _____



Waves, Physical Science

I pledge that I have neither given nor received any information beyond that permitted by the instructor, signed:

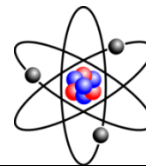
$V = \lambda f$ or $V = x/t$
 $c = \lambda f$
 $T = 1/f$
 λ : Wave length m
 V : Velocity m/s
 T : Period in seconds
 f : Cycles /s in Hz
 t : seconds
 c : 3.00×10^8 speed of light

Directions: Show all work. Circle your final answer.

- 1. What is the velocity of a wave with a frequency of 760 Hz and wavelength of 0.45 m?
- 2. A sound wave in a steel rail has a frequency of 620 Hz and a wavelength of 10.5 m. What is the speed of sound in steel?
- 3. What is the wavelength of a sound wave with a frequency of 50 Hz? The speed of sound is 342 m/s.
- 4. What is the wavelength of a sound wave moving at 340 m/s with a frequency of 256 Hz?



Name:



5. What is the frequency of a pendulum that is moving at 30 m/s with a wavelength of 0.35 m?

Directions: For the following questions do calculations on electromagnetic waves.

These travel at the speed of light in a vacuum, and is symbolized by **c** as shown in the notes above.

After calculating an answer, look up the wave in the chart to the right and write its category name in the space provided in the table below.

Wave	λ	f	E
AM radio	10^2 m	1 MHz	10^{-9} eV
FM, TV	1 m	100 MHz	10^{-7} eV
Radar	0.1 m	1000 MHz	10^{-6} eV
Microwaves	10^{-2} m	10^{10} Hz	10^{-5} eV
Infrared	10^{-5} m	10^{13} Hz	10^{-2} eV
Visible light	10^{-7} m	10^{15} Hz	1 eV
Ultraviolet	10^{-8} m	10^{16} Hz	10 eV
X rays	10^{-10} m	10^{18} Hz	1 keV
Gamma rays	10^{-13} m	10^{21} Hz	1 MeV

Question	Calculations	What type of wave is it?
6. The wave frequency is 3.67×10^{-14} cycles per second. What is its wavelength?	Wavelength?	
7. A wave has a wavelength of 3.33×10^{-8} m. What is its frequency?	Frequency?	
8. A wave has a frequency of 1.28×10^{17} , What is its wavelength?	Wavelength?	

Light moving from an optical cable into air changes wavelength from 4.52×10^{-8} m in the cable to 6.33×10^{-8} m in air. Light travels more slowly in glass. Calculate the speed of light in the optical cable.

9. Calculate the light's frequency in air using $c=3.00 \times 10^8$ m/s.

10. Use the frequency from #1 to calculate c, the speed of light in the optical cable.

