

Show all of your work as you complete these questions.

1. The speed of electromagnetic waves in empty space is 3×10^8 m/s. Calculate the wavelength of electromagnetic waves emitted at the following frequencies.
 - a. Radio waves at 88 MHz

 - b. Visible light at 6×10^8 MHz

 - c. X-rays at 3×10^{12} MHz

2. The red light emitted by a He-Ne laser has a wavelength of 633 nm in air and travels at 3×10^8 m/s. Find the frequency of the laser light.

3. A tuning fork produces a sound with a frequency of 256 Hz and a wavelength in air of 1.35 m.
 - a. What value does this give for the speed of sound in air?

 - b. What would be the wavelength of the wave produced by this tuning fork in water in which sound travels at 1500 m/s?

4. A wave of amplitude 0.30 m interferes with a second wave of amplitude 0.20 m. What is the largest resultant displacement that may occur?

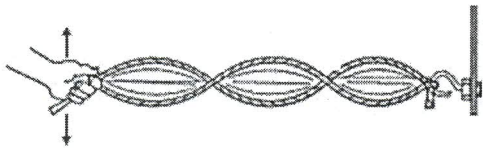
5. A string is rigidly attached to a post at one end. Several pulses of amplitude 0.15 m sent down the string are reflected at the post and travel back down the string without a loss of amplitude.

a. What is the amplitude at a point on the string where the maximum displacement points of two pulses cross?

b. What type of interference is this?

6. a) How many nodes are in the wave shown below?

b) How many antinodes are in the wave shown below?



7. A stretched string fixed at both ends is 2.0 m long.

a) What are three wavelengths that will produce standing waves on this string? (Hint: Drawing and labeling a picture will help.)

b) Name at least one wavelength that would not produce a standing wave pattern. Explain your answer.

Answers: 1) a) 3.41m b) 5×10^{-7} m c) 1×10^{-10} m 2) 4.74×10^{14} Hz 3) a) 346m/s b) 5.86m
4) 0.5m 5) a) 0m 6) a) 4 b) 3 7) a & b) There are many correct answers.