PHYS 211 Homework Assignment
Chapter 16

Instructions:

- Working in a group is encouraged

- Everyone must turn in their **own version** of the assignment

- Every problem must be completed

- Due at beginning of class on _____

Problem 1 Describe the difference between a transverse and a longitudinal wave. Give examples of each.

Problem 2 A transverse traveling wave on a cord is represented by $D = 0.22 \sin(5.6x + 34t)$, where D and x are measured in meters and t in seconds. Find:

(a) the wavelength,

(b) the frequency,

(c) the velocity,

(d) the amplitude,

(e) maximum and minimum speeds of a particle in the cord

Problem 3 A 524 Hz longitudinal wave in air has a speed of 345 m/s.

(a) What is its wavelength?

(b) How much time is required for the phase to change by $90°$ a given point in space?

(c) At a particular moment in time, what is the phase difference between two points 4.4 cm apart?

Problem 4 Two waves of identical wavelength λ and amplitude A travel along a common string.

(a) At what phase difference does their superposition create a new wave with amplitude 1.5A?

(b) If the phase difference is $\pi/2$, what is the new amplitude?

(c) If the two waves are traveling in opposite directions, what will happen?

Problem 5 A 15 g guitar string is held under a tension of 300 N with a length of about 2 ft. The string is plucked at one end ($x = 0$ ft) at $t = 0$ s. 2 ms later, the string is plucked from the other end ($x = 2$ ft). The two pulses propagate along the string.

(a) Where do they meet?

(b) If the tension is doubled, where do they meet?

(c) If a 30 g string is used at 300 N, where do they meet?