

Quiz #10: Waves and Interference

Problem 1 (2 points)

A standing wave is formed on a guitar string fixed at both ends. What is the distance from a fixed end of the guitar string to the nearest antinode?

- a) $\lambda/4$
- b) $\lambda/2$
- c) $3\lambda/4$
- d) λ

Problem 2 (2 points)

A guitar string produces 4 beats/s when sounded with a 250 Hz tuning fork and 9 beats per second when sounded with a 255 Hz tuning fork. What is the frequency of the string?

- a) 241 Hz
- b) 246 Hz
- c) 254 Hz
- d) 259 Hz
- e) 263 Hz

Problem 3 (3 points)

Do the wavelength and frequency of the second harmonic on a string stretched between two supports increase, decrease, or remain the same if we (a) **decrease** the distance between the supports without increasing the tension, (b) **increase** the tension in the string without changing the distance between the supports, and (c) switch to a string with a **smaller** linear density without changing the tension or distance between the supports?

Problem 4 (3 points)

Two cars are moving directly away from each other along a straight road. Car A has a speed of 25 m/s and car B has a speed of 30 m/s. If car A sounds a horn whose frequency is 345 Hz, what is the frequency of the horn detected by Car B? Assume the speed of sound is 343 m/s.