Practice Quiz 5

These are Q's from old quizzes. I do not guarantee that the Q's on this year's quiz will be the same, or even similar.

The maximum frequency the human ear can detect is about 20kHz. If you walk into a room in which there are two sources, one at 100kHz and one at 102kHz. Will you hear anything? What if the second source is at 125kHz?

A) Yes, yes.
B) No, no.
C) Yes, but only in certain places in the room for the first case, and no in the second case.
D) Yes, no.
E) No, yes.

If the pressure amplitude of a sound wave doubles, what happens to the decibel level?

A) –2dB B) 0dB C) 2dB D) 4dB E) 6dB

At a soccer game, the "wave" might circulate through the stands and move around the stadium. In this wave motion, people stand up and sit down as the wave passes. What type of wave would this be characterized as?

A) polarized wave
B) longitudinal wave
C) transverse wave
D) gravitational wave
E) soliton wave

Answer key: DEC

What length is necessary for an organ pipe to produce a 22Hz tone if the pipe is open at one end and closed at the other?

A) 2m B) 4m C) 6m D) 8m E) 10m

At a point 15m from a source of spherical sound waves, you measure a sound intensity of 750mW/m^2.
How much further do you need to walk, directly away from the source, until the sound intensity has changed by –4.4dB.

A) 5m B) 10m C) 15m D) 20m

Microwaves travel with the speed of light, c=300 000 000m/s. At a frequency of 10 GHz these wave cause water molecules in your burrito to vibrate. What is their wavelength?
1GHz = 1000 000 000 cycles/sec.

A) 0.3mm B) 3cm C) 30cm D) 300m E) 3km

Answer key: BBB

A standing wave is formed on a string for which 3.5 wave lengths fit into the total length of the string. The string is 2.7m long. The wave has a period of 0.10s. If the string has a mass density of 220 g/m , what is the tension in the string?

A) 1N B) 10N C) 20N D) 30N E) 100N

"Vibrato" in a violin is produced by sliding the finger back and forth along a vibrating string. The G–string on a particular violin measures 30cm between bridge and its far end and is clamped rigidly at both points. It's fundamental frequency is 197Hz. How far from the ("nut") end should a violinist place a finger so that the G–string plays the note A (440Hz)? Note: As discussed in class, the bridge end of the violin is the end that's near your cheek when playing the violin. The nut end of the violin is the end far away from your cheek when playing the violin.

A) 15cm B) 17cm C) 11cm D) 13cm E) 19cm

A small flute 10.75cm long, and open at one end. closed at the other is played near a taut guitar string with fundamental frequency of 600Hz. What's the lowest frequency that leads to standing waves on both instruments? (Speed of air = 344m/s)

A) 600
B) there is no such frequency
C) 1800
D) 2400
E) 1200

Answer key: BBD

Sound intensity in normal conversation is about 1microWatt/square−meter. What is the displacement amplitude of air in a 2.5kHz sound wave of this intensity?

A) 4mm
B) 4micrometer
C) 4nanometer
D) 4picometer
E) 4cm

Two wave pulses are described by $y(x,t) = 2/((x-t)^2+1)$ and $y(x,t) = -2/((x-2+t)^2 + 1)$, where x,y are in cm and t is in seconds. At what time will the two pulses exactly cancel ?

A) 1.0s B) 5.0s C) 7.5s D) never E) 2.5s

At a point 15m from a source of spherical sound waves, you measure a sound intensity of 750mW/m^2.
How much further do you need to walk, directly away from the source, until the sound intensity has changed by −4.4dB.

A) 5m B) 10m C) 15m D) 20m

Answer key: CAB

A simple harmonic wave of amplitude 5.0cm, wavelength 70cm, and frequency 14Hz is propagating along a wire with linear density 40g/m. What's the wave energy per unit length of the wire?

A) 0.4 J/m B) 1.0 J/m C) 4.0 J/m D) 10 J/m E) 40 J/m

Assume density of the gas and amplitude of a sound wave therein stays the same but the pressure in the gas quadruples. What happens to the intensity of the sound?

A) The intensity decreases by half.
B) The intensity stays the same.
C) The intensity doubles.
D) The intensity quadruples.
E) The intensity decreases to a quarter of what it was.

Consider a sound waves of the same wavelength in air and water. Which has the lower frequency?

A) Wave in air has lower frequency.
B) Wave in water has lower frequency.
C) They have the same frequency given that they have the same wave length.

Answer key: BAA

A horn emits sound at a frequency of 160Hz. What frequency is heard by an observer moving away from the source at 26m/s ?

A) 140Hz B) 150Hz C) 160Hz D) 170Hz E) 180Hz

The siren of an ambulance wails at 1662 Hz when the ambulance is stationary. What frequency will you hear after the ambulance has passed you while traveling at 33.60m/s? The speed of sound under the prevailing conditions is 342 m/s.

A) 1745Hz B) 1843Hz C) 1579Hz D) 1514Hz

The mach angle of a shock wave associated with the sonic boom of a low flying plane is 70 degrees. What is the speed of the airplane? (Speed of sound in air = 330m/s)

A) 1000 km/h
B) 3000 km/h
C) 5000 km/h
D) 7000 km/h
E) 500 km/h

Answer key: BDA