

Instructions (shown before students start the test)

Welcome to the Sounds of Music test for the January Region 7 workshop

Introduction (shown after students start the test)

1. (1.00 pts) You pluck a string, and the fundamental frequency is 250 Hz. Find the frequency of the 3rd harmonic?

- A) 350 Hz
- B) 500 Hz
- C) 750 Hz
- D) 1000 Hz

2. (1.00 pts) If a 510 Hz tone is traveling through air at a speed of 340 m/s, what is the wavelength of the tone?

- A) 0.5 m
- B) 1.0 m
- C) 0.67 m
- D) 0.76 m

3. (1.00 pts) If you are 2 meters away from a speaker, and move so that you are now 8 meters away from the speaker, the intensity of the sound has been

- A) Same
- B) Cut to $\frac{1}{2}$
- C) Cut to $\frac{1}{4}$
- D) Cut to $\frac{1}{8}$
- E) Cut to $\frac{1}{16}$

4. (1.00 pts) What range of frequencies is a young human able to hear?

- A) 20 Hz – 20,000 Hz
- B) 50 Hz – 50,000 Hz
- C) 100 Hz – 100,000 Hz
- D) 200 Hz – 200,000 Hz

5. (1.00 pts) Why does tightening a guitar string raise the pitch?

- A) It makes the string thinner
- B) It makes the fundamental wavelength shorter.
- C) It makes the wave travel faster along the string.
- D) It makes the string vibrate slower.

6. (1.00 pts) If you double the frequency of a tone, what interval has it just risen?

- A) A third
- B) A fifth
- C) A sixth
- D) An octave

7. (1.00 pts) Which major key has 2 sharps?

- A) A-major
- B) D-major
- C) E-major
- D) F-major

8. (1.00 pts) How does a trumpet player play a higher note even though he hasn't changed which valves he is depressing?

- A) He shakes the trumpet
- B) He blows harder
- C) He "tongues" his notes
- D) He makes his lips tighter

9. (1.00 pts) You can make a stemmed glass of water sound a tone by running your finger across its lip because

- A) Your finger is moving at the natural frequency of the glass.
- B) Your finger is creating a complex excitation, and the glass picks out its resonant frequency.
- C) Your finger is moving frictionlessly across the lip of the glass.
- D) Your finger warms up the lip of the glass, causing the sound.

10. (1.00 pts)

A stretched string is vibrated in such a way that a standing wave with two nodes appears. The distance between the nodes is 0.5m. What is the wavelength of the standing wave?

- A) 0.5m
- B) 0.75m
- C) 1m
- D) 1.25m

11. (1.00 pts) How many accidentals are in the key signature of a F# major scale?

- A) 4
- B) 5
- C) 6
- D) 7

12. (1.00 pts) What is the relative major to E minor?

- A) A Major
- B) B Major

- C) E Major
- D) G Major

13. (1.00 pts) How do you produce a higher pitch on your melodic percussion instrument?

- A) Use thicker material
- B) Hit harder
- C) Make the bar or tube shorter
- D) Play softer

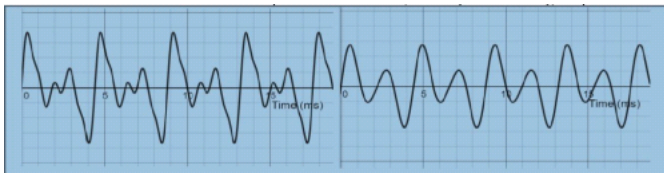
14. (1.00 pts) Two race cars drive away from each other at the same speed. One car sounds a horn. What fraction of the emitted frequency does the other car hear?

- A) $4/3$
- B) 1
- C) $2/3$
- D) $5/3$

15. (1.00 pts) Knowing the Fourier amplitudes of a tone, what can one know about the sound?

- A) Know the pitch but not volume
- B) Know the pitch and timbre
- C) Know the frequency but not the pitch
- D) Know the loudness and the speed of sound
- E) Know the timbre but not the pitch

16. (1.00 pts) Shown below are two sound samples. The unlabeled y-axis represents change in pressure.



From the information above, which of the following would differ the most between these two sounds?

- A) Size of the instrument producing them
- B) Frequency
- C) Wavelength
- D) Timbre

17. (1.00 pts)

Decibel meter A is placed 5 meters from a large bell, and decibel meter B is placed 25 meters from the same bell. The bell rings, and decibel meter A records a peak volume of 9 dB. Assuming the sound spreads evenly in all directions and is not substantially reflected or absorbed before reaching decibel meter B, which of the following would be the peak reading on decibel meter B?

- A) 19 dB
- B) 81 dB
- C) 88 dB
- D) 90 dB

18. (1.00 pts) You build your own 4-stringed guitar and tune the lowest string to B \flat 2. Which of the following tunings will maximize the sympathetic resonance on the instrument?

- A) B \flat 2, E \flat 3, F3, B \flat 3
- B) B \flat 2, C3, D3, E3
- C) B \flat 2, D \flat 3, E \flat 3, G3
- D) B \flat 2, A \flat 3, B \flat 3, D4

19. (1.00 pts) Which of the following will lower the pitch of a violin string? (Select all that apply)

(Mark **ALL** correct answers)

- A) Reducing the thickness of the string
- B) Doubling tension in the string
- C) Replacing an aluminum string with steel, but keeping the same thickness
- D) Doubling the length of the string and also doubling the tension