

# Sounds of Music

Written Test

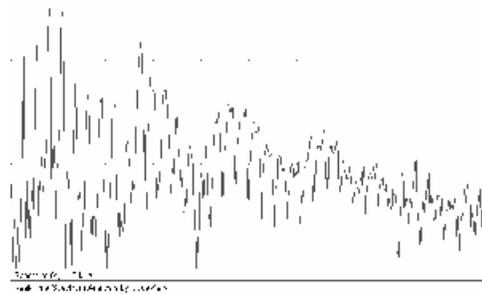
Madison Regional Science Olympiad Feb. 1, 2003

## Team:

You will have 15 minutes to complete this test. You may not use notes of any kind, books or a calculator. The point values for each question are indicated in parenthesis behind that question. Remember that this test is a third of your score for this event.

1. What is the approximate range of healthy human hearing? (2) \_\_\_\_\_

2. What does the graph below show? \_\_\_\_\_ (2)



What information can you gather about a sound source from this type of graph? (5)

3. What is measured in decibels? (3)  
What is measured in phons? (3)

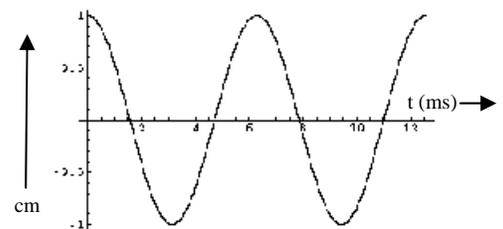
4. A wave has an initial amplitude of 600cm and after 6 seconds the wave has an amplitude of 75 cm. What is the damping time of this wave? (4) \_\_\_\_\_

5. The wave shape represented by the graph at right is called a/an \_\_\_\_\_ oscillation. (1)

The corresponding tone is called a \_\_\_\_\_ tone (1).

6. For the oscillation shown in the graph at right, the period is \_\_\_\_\_. (1)

The frequency is \_\_\_\_\_ Hz (1), the amplitude is \_\_\_\_\_ units. (1)



7. The tones one can play on a bugle are limited to the so-called “natural scale.” If the lowest bugle frequency is 100 Hz, what will be the next four higher frequencies the bugle can produce? (4)

175, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ Hz.

8. What, mathematically speaking, is the difference between consonance and dissonance? (2)

## Sounds of Music questions – 2003 Minnesota State Tournament

1. When your instrument is producing its fundamental vibration, how does the wavelength of the sound compare to the length of the string/air column? (2)
2. Where in your instrument is there a displacement node? (2)
3. In your instrument, how could the speed of the disturbance be increased? (3)
4. Is the wave on the string/in the air column transverse or longitudinal? (2)
5. What unit is sound intensity measured in? (2)
6. You are trying to make sure your instruments have exactly the same frequency for C<sub>5</sub>; you strike them simultaneously. How can you tell if you're in tune or not? (3)
7. Can a healthy human ear hear a frequency of 18500Hz? (2)
8. Define the term – standing wave. (3)
9. What is the approximate ratio of the frequencies G<sub>6</sub>/C<sub>6</sub>? (2)
10. What is the physical condition of the air ant an antinode in an air column instrument? (3)
11. How doe your instrument produce a sound wave? (3)

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