

## WORKSHEET 1

### Properties of Sound

#### FILL IN THE BLANKS:

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1. In his 1962 article "The Concept of Unity in Electronic Music", Karlheinz Stockhausen discusses his views on the interrelation of the following four basic sound-properties of a musical tone: 1) \_\_\_\_\_, 2) \_\_\_\_\_, 3) \_\_\_\_\_, and 4) \_\_\_\_\_.
2. Our perception of the loudness of a musical sound is primarily related to which of those four basic sound-properties? \_\_\_\_\_
3. A *waveform* is a graph of the variation of a sound's \_\_\_\_\_ vs. \_\_\_\_\_.
4. An *oscilloscope* is a mechanical device that continuously displays the \_\_\_\_\_ of a sound.
5. The waveform of a "well-tuned" (by US standards) violin A-string is essentially repeated \_\_\_\_\_ times per second.
6. Because it is a product of *simple harmonic motion*, a sine wave is devoid of \_\_\_\_\_.
7. What word would you use to describe the *timbre* of a sine wave? \_\_\_\_\_.
8. What unit is commonly used to measure *frequency*, or cycles per second? \_\_\_\_\_.
9. When two simultaneously sounding sine waves have nearly but not the same frequency, we perceive \_\_\_\_\_.
10. Our perception of *beats* is related to the periodic fluctuation of which of the four basic sound-properties listed in question one? \_\_\_\_\_
11. The *beat theorem* states that if two sine waves whose frequencies are close but not the same, we will perceive a number of beats that is the \_\_\_\_\_ of the two frequencies.
12. How many beats per second will you hear if the following sine wave pairs are sounded simultaneously? a) 440 Hz. & 443 Hz. \_\_\_\_\_; b) 440 Hz. & 437 Hz. \_\_\_\_\_; c) 440 Hz. & 447 Hz. \_\_\_\_\_; d) 440 Hz. & 429 Hz. \_\_\_\_\_; e) 440 Hz. & 880 Hz. \_\_\_\_\_.
13. What traditional tonal harmonic sonority is formed by the fourth, fifth and sixth partials of the harmonic series? A \_\_\_\_\_ triad.

#### CIRCLE YES OR NO:

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14. Go to a piano. Silently depress the E4 key. While silently holding down the E4 key, play C2 loudly. Does the E4 string vibrate sympathetically? Yes/No
15. Go to a piano. Silently depress the F4 key. While silently holding down the F4 key, play C2 loudly. Does the F4 string vibrate sympathetically? Yes/No
16. Go to a piano. Silently depress the G#4 key. While silently holding down the G#4 key, play C# loudly. Does the G#4 string vibrate sympathetically? Yes/No
17. Go to a piano. Silently depress the C#4 key. While silently holding down the C#4 key, play A1 loudly. Does the C#4 string vibrate sympathetically? Yes/No