Assignment: Chapter 3 questions

There are chapter questions embedded throughout each chapter. To receive credit, you must answer each of the chapter questions below. The answers to these questions serve as the starting point for your class notes and are a way for you to self-check your understanding of the material. That is, reading the chapter and answering the chapter questions is the first step in preparing for the quizzes and the class material.

Answer each of the **32 questions below**, then save and submit your work.

1. Define vibration and equilibrium. What is a synonym for vibration?

2. Explain a cycle of vibration, accounting for displacement and restorative forces, and equilibrium.

3. What is a mechanical wave? A pulse wave?

4. Describe the mechanics of a longitudinal pressure wave, including the phenomena of compressions and rarefactions.

5. What are two different ways by which energy can be transferred in a wave? How is energy transferred in a sound wave?

6. Define frequency and period and explain the relationship between the two measures.

7. Calculate the period of a 220-Hz sound wave to the nearest tenth.

8. Calculate the frequency of a sound wave with a period of 6.5 ms. (Hint: 6.5 ms = .0065 s)

9. Define intensity. How are pressure and amplitude of vibration related to intensity?

10. What is meant by the inverse square relationship?

11. How do we measure intensity? Why is a logarithmic scale used? (Hint: How much energy is in an extremely loud sound compared to one that is just barely perceptible to us?)

12. Define wavelength.

13. What factors can influence the speed of a sound wave? What properties of sound waves do not affect the speed?

14. How does pitch relate to f_o?

15. How does loudness relate to intensity?

16. What is the semitone scale? What is the difference, in semitones, between 392 Hz and 440 Hz?

17. Define complex wave.

18. What is the f_o of a complex wave composed of the following three frequencies: 100 Hz, 350 Hz, and 500 Hz?

19. What defines a complex wave as periodic? Nearly periodic?

20. Define the appearance of a periodic waveform. (Hint: Compare the appearance of one cycle to another.)

21. What is a power spectrum?

22. Line and continuous spectra represent what types of sounds, respectively?

23. Define constructive and destructive interference.

24. Describe the two types of behaviors that can occur when a sound wave meets a boundary within the vocal tract.

25. Explain the concept of natural resonant frequency. Use a child's swing as an example. Can you think of another example in everyday life of something that is set into vibration?

26. How is the natural resonant frequency of an object affected by its stiffness, mass, and length?

27. What is a standing wave?

28. Describe the rules governing standing waves.

29. What are nodes and antinodes?

30. Explain the difference between free and forced vibration.

31. Under what conditions would you expect the vibration of one object to result in a strong (large amplitude) vibration of a second object? Under what conditions would you expect a weak (small amplitude) vibration to result?

32. What is the difference between a mechanical and an acoustic resonator? Which type of resonator is the vocal tract?