

MULTIPLE CHOICE

SOUND WAVES - PRACTICE SET - ANSWER KEY

PROPOSED FOR REVIEW - questions are the author's verbatim Q&A; distractors are auto-selected from other answers in the same bank and must be checked by a subject-matter reviewer (a distractor could coincidentally be correct). Not authoritative assessment content.

1. What does audible mean?

- A. Below 20 Hz only
- B. Able to be heard**
- C. Above 20 kHz only
- D. Unable to be heard

2. What is the propagation speed of sound in soft tissue?

- A. 1.54 m/s
- B. 1.54 MHz
- C. 1.54 mm/us or 1,540 m/s**
- D. 154 m/s

3. What type of sound speed is expected in materials that are not stiff and very dense?

- A. Fast sound speed
- B. Unchanged sound speed
- C. Zero sound speed
- D. Slow sound speed**

4. How are density and sound speed related when stiffness is unchanged?

- A. Directly related
- B. Inversely related**
- C. Unrelated
- D. Always equal

5. How are elasticity and compressibility related to stiffness?

- A. They are the same as stiffness
- B. They are opposite to stiffness**
- C. They are unrelated to stiffness
- D. They are units of stiffness

6. What is the typical frequency range for clinical diagnostic ultrasound?

- A. 2 MHz to 15 MHz**
- B. 0.1 MHz to 0.5 MHz
- C. 1540 MHz to 1540 MHz
- D. 20 Hz to 20 kHz

7. What is a typical pressure amplitude range in clinical diagnostic ultrasound?

- A. 20 Hz to 20 kHz
- B. 1 to 3 MPa**
- C. 2 to 15 seconds
- D. 1 to 3 Pa

8. What is the frequency range of audible sound?

- A. 20 Hz to 20 kHz**
- B. Greater than 20 kHz
- C. 2 MHz to 15 MHz
- D. Less than 20 Hz

9. What is intensity related to mathematically?

- A. Wavelength squared
- B. Period divided by power
- C. Frequency squared
- D. Amplitude squared**

10. Which sound wave parameter is determined only by the medium?

- A. Propagation speed**
- B. Power
- C. Period
- D. Frequency

11. Is intensity adjustable?

- A. No
- B. Yes**

12. What is intensity proportional to?

- A. Power and amplitude squared**
- B. Period and frequency
- C. Propagation speed only
- D. Wavelength only

13. What determines propagation speed?

- A. Medium only**
- B. Both source and medium
- C. Receiver gain only
- D. Sound source only

14. What is the mathematical relationship between power and amplitude?

- A. Power is proportional to amplitude squared**
- B. Power is proportional to amplitude cubed
- C. Power is inversely proportional to amplitude
- D. Power is unrelated to amplitude

15. Which three parameters describe the size or strength of a sound wave?

- A. Density, pressure, and distance
- B. Reflection, refraction, and scattering
- C. Period, frequency, and wavelength
- D. Amplitude, intensity, and power**

16. What frequency range is below human hearing?

- A. Greater than 20 kHz
- B. Less than 20 Hz**
- C. 20 Hz to 20 kHz
- D. 2 MHz to 15 MHz

17. What is power related to mathematically?

- A. Amplitude squared**
- B. Amplitude divided by frequency
- C. Period squared
- D. Wavelength squared

18. What determines the period of a sound wave?

- A. Both source and medium
- B. Receiver only
- C. Medium only
- D. Sound source only**

19. If amplitude is increased by a factor of 2, how does power change?

- A. Power increases by a factor of 4**
- B. Power stays the same
- C. Power decreases by a factor of 4
- D. Power increases by a factor of 2

20. What determines the initial intensity of a sound wave?

- A. Display depth only
- B. Sound source**
- C. Medium only
- D. Receiver gain only

21. What equation is used to find wavelength in soft tissue when frequency is in MHz?

- A. Wavelength (mm) = $1.54 \times \text{frequency (MHz)}$
- B. Wavelength (mm) = $\text{frequency (MHz)} / 1.54$
- C. Wavelength (mm) = $1.54 / \text{frequency (MHz)}$**
- D. Wavelength (mm) = $\text{frequency (MHz)} + 1.54$

22. What is the time from the start of one cycle to the start of the next cycle called?

- A. Frequency
- B. Period**
- C. Wavelength
- D. Pulse duration

23. In which type of material does sound generally travel fastest?

- A. Vacuum
- B. Solids**
- C. Gases
- D. Liquids

24. What happens to sound speed as a material becomes more dense, if stiffness is unchanged?

- A. Sound speed increases
- B. Sound speed stays the same
- C. Sound speed becomes zero
- D. Sound speed decreases**

25. Is amplitude adjustable?

- A. Yes**
- B. No