MULTIPLE CHOICE

SOUND & MEDIA - PRACTICE SET

1. How is attenuation measured?

A. Meters per second (m/s)
B. Decibels (dB)
C. Watts/cm^2
D. Hertz (Hz)

2. What is an acute angle?

A. An angle exactly 90 degrees
B. Any angle other than 90 degrees
C. An angle less than 90 degrees
D. An angle greater than 90 degrees

3. Which two conditions are required for refraction to occur?

A. Normal incidence and identical propagation speeds
B. Normal incidence and different acoustic impedances only
C. Oblique incidence and identical propagation speeds
D. Oblique incidence and different propagation speeds in the two media

4. True or False? When a sound beam hits an oblique boundary, you can always tell whether the sound will reflect or transmit from the angle alone.

A. False
B. True

5. When two media have the same acoustic impedance, how much incident intensity is transmitted?

A. Only 1% of the incident intensity
B. All of the incident intensity
C. Exactly half of the incident intensity
D. None of the incident intensity

6. What determines the amount of attenuation that occurs as ultrasound travels?

A. Path length and sound frequency
B. Pulse repetition frequency and frame rate
C. Gray-scale map and annotation
D. Receiver gain and display brightness

7. Which sound beams scatter more, higher-frequency or lower-frequency beams?

A. All frequencies scatter equally
B. Higher-frequency beams
C. Only zero-frequency beams
D. Lower-frequency beams

8. What happens to attenuation at higher sound frequencies?

A. Attenuation is greater
B. Attenuation is unchanged
C. Attenuation becomes negative
D. Attenuation is lower

9. What is crucial for ultrasound to image objects deep within the body?

A. Complete absorption
B. Refraction only
C. Total reflection
D. Transmission

10. True or False? If sound speed is the same in two media, no refraction occurs.

A. False
B. True

11. What determines half-value layer thickness?

A. Display dynamic range only
B. Pulse repetition frequency only
C. Medium and frequency
D. Transducer diameter only

12. What half-value layer is expected in a medium with high attenuation?

A. Thick half-value layer
B. Thin half-value layer
C. No half-value layer
D. Unchanged half-value layer

13. What are the units of intensity?

A. W/cm^2
B. Rayls
C. dB/cm
D. Hertz

14. If sound travels to a depth of 8 cm in a medium with an attenuation coefficient of 2 dB/cm, what is the total attenuation?

A. 4 dB
B. 16 dB
C. 8 dB
D. 32 dB

15. True or False? Specular reflections that strike a smooth boundary at an angle return directly to the transducer.

A. False
B. True

16. How are distance traveled and attenuation related?

A. Directly related
B. Reciprocal
C. Unrelated
D. Inversely related

17. What term describes a medium's acoustic resistance to sound propagation?

A. Attenuation
B. Impedance
C. Refraction
D. Frequency

18. In intensity or power ratios, what change does +10 dB represent?

A. Ten times larger
B. Two times larger
C. One-tenth as large
D. One-half as large

19. In soft tissue, how are attenuation coefficient and frequency related?

A. Unrelated
B. Exponentially decreasing
C. Inversely related
D. Directly related

20. What units are used for half-value layer thickness?

A. Units of length, such as cm
B. Hertz
C. W/cm^2
D. dB/cm

21. What term describes a sound beam striking a boundary at exactly 90 degrees?

A. Diffuse reflection
B. Normal incidence
C. Oblique incidence
D. Refraction

22. What does attenuate mean?

A. To transmit without loss
B. To strengthen
C. To weaken
D. To change into an image

23. True or False? At most soft-tissue interfaces, 99% or more of the sound intensity is transmitted.

A. True
B. False

24. What are the units and typical range of sine values used for ultrasound refraction angles?

A. Measured in rayls, from 0 to 1
B. Measured in hertz, from 1 to 10
C. Unitless, from 0 to 1
D. Measured in degrees, from 0 to 90

25. What type of scattering occurs when an object's dimensions are much smaller than the wavelength of sound?

A. Specular reflection
B. Refraction
C. Mirror-image artifact
D. Rayleigh scattering