

MULTIPLE CHOICE

SOUND BEAMS - PRACTICE SET

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. When the beam is two near zone lengths from the transducer, what size is the beam?

- A. The same size as the focal zone
- B. Same size as the active element
- C. Twice the size of the active element
- D. One-half the size of the active element

2. What does phased array mean?

- A. Fixed single focusing
- B. No focusing
- C. Adjustable or multiple focusing
- D. Mechanical steering only

3. For a continuous wave, what is the diameter of a sound beam at the end of the near zone?

- A. Same width as the active element
- B. One-half the wavelength in tissue
- C. Twice the width of the active element
- D. One-half the width of the active element

4. How are frequency and focal depth related?

- A. Inversely related
- B. Directly related
- C. Unrelated
- D. Equal to each other

5. How wide is the beam at the beginning of the far zone?

- A. The same width as the transducer
- B. One-half as wide as the transducer
- C. Twice as wide as the transducer
- D. One wavelength wide

6. Why is axial resolution improved with higher frequencies?

- A. Because higher frequencies have shorter pulses
- B. Because higher frequencies increase pulse repetition period
- C. Because higher frequencies eliminate attenuation
- D. Because higher frequencies have wider beams

7. Does lateral resolution change with depth?

- A. No
- B. Yes, because the beam diameter varies with depth

8. Where is lateral resolution the best?

- A. The far zone only
- B. Beyond two near-zone lengths
- C. The focus
- D. The transducer face only

9. True or False? Small sound sources create beams that are Y-shaped.

- A. False

B. True

10. What crystal diameter creates beams with a deeper focus?

- A. Diameter does not affect focus
- B. Smaller diameter
- C. Larger diameter
- D. Same diameter regardless of focus

11. What are other terms for far zone?

- A. Focal zone or focal point
- B. Near field or Fresnel zone
- C. Focal depth or near zone length
- D. Far field or Fraunhofer zone

12. Which sound frequency will result in a deeper focus?

- A. Frequency has no effect
- B. Lower frequency
- C. The same frequency regardless of crystal size
- D. Higher frequency

13. What is another term for focus?

- A. Focal length
- B. Focal point
- C. Focal zone
- D. Far field

14. How is external focusing achieved?

- A. With a lens
- B. With receiver gain
- C. With a curved active element
- D. With electronic delays

15. What term describes the ability to distinctly identify two objects that are very close together and side by side?

- A. Axial resolution
- B. Lateral resolution
- C. Temporal resolution
- D. Contrast resolution

16. What is an adjustable focus system called?

- A. Fixed focus transducer
- B. Mechanical transducer
- C. Phased array
- D. Continuous wave probe

17. What sound frequency creates beams with a deeper focus?

- A. Lower frequency
- B. Higher frequency
- C. Same frequency at all depths
- D. Frequency does not affect focus

18. What crystal diameter produces a beam that narrows, or diverges less, in the far field?

- A. Larger diameter
- B. Smaller diameter
- C. Diameter has no effect
- D. Same diameter as the near zone

19. How does focusing improve lateral resolution?

- A. By increasing slice thickness
- B. By reducing the number of scan lines
- C. By lengthening the spatial pulse
- D. By concentrating sound into a narrower beam

20. What does each small particle in a Huygens source create?

- A. A V-shaped Huygens wavelet
- B. A single Doppler shift
- C. A rectangular scan line
- D. A straight specular echo

21. What are the five terms that describe the regions and shape of a sound beam?

- A. Reflection, refraction, scattering, absorption, and attenuation
- B. Near zone, focal zone, focus, far zone, and focal length
- C. Amplitude, intensity, power, pressure, and energy
- D. Frequency, period, wavelength, speed, and impedance

22. True or False? More divergence is associated with a smaller diameter and lower frequency.

- A. True
- B. False

23. What change in transducer diameter results in a deeper focus?

- A. Reducing the active aperture to zero
- B. Keeping transducer diameter unchanged
- C. Decreasing transducer diameter
- D. Increasing transducer diameter

24. What are the effects of focusing?

- A. A shorter pulse length and better axial resolution
- B. No change in beam diameter or focal depth
- C. A smaller focal zone, a narrower beam in the focal zone, and a shallower focus
- D. A larger focal zone, a wider beam in the focal zone, and a deeper focus

25. What are V-shaped waves known as?

- A. Specular reflections
- B. Standing waves
- C. Axial pulses
- D. Huygens wavelets, spherical waves, or diffraction patterns