

MULTIPLE CHOICE

PHYSICS - MIXED EXAM

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. True or False? Pulse repetition frequency is related only to depth of view among routine imaging controls.

- A. False
- B. True

2. What artifact has the same appearance as incorrect TGC settings?

- A. Focal enhancement
- B. Comet tail
- C. Slice thickness artifact
- D. Mirror image artifact

3. What logarithmic unit is commonly used to express changes in amplitude?

- A. Decibels (dB)
- B. Pascals (Pa)
- C. Watts (W)
- D. Hertz (Hz)

4. Which instruments have the highest potential for transmitting infection?

- A. Instruments that penetrate the skin or mucous membranes
- B. Noncritical instruments that contact intact skin only
- C. External probes that never contact patients
- D. Display monitors used for viewing images

5. Which two characteristics create a long spatial pulse length?

- A. Many cycles in the pulse and short periods
- B. Few cycles in the pulse and high frequencies
- C. Few cycles in the pulse and short wavelengths
- D. Many cycles in the pulse and long wavelengths

6. During inspiration, does venous return to the heart increase or decrease?

- A. Remain unchanged
- B. Increase
- C. Decrease
- D. Stop

7. What does the term nonlinear behavior mean?

- A. Irregular, uneven, or disproportionate
- B. Proportional, symmetrical, or even
- C. Archived, stored, or displayed
- D. Binary, digital, or discrete

8. What are the forms of energy associated with blood?

- A. Viscous, frictional, and inertial energy
- B. Plug, parabolic, and turbulent energy
- C. Thermal, acoustic, and optical energy
- D. Pressure, kinetic, and gravitational energy

9. Can the sonographer adjust amplification?

- A. No

B. Yes

10. With oblique incidence, what is the total percentage of sound reflected plus sound transmitted?

- A. 100%
- B. 0%
- C. 50%
- D. 200%

11. What happens to sound speed when a material becomes stiffer?

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

12. What is the shape of a vein if the transmural pressure is low?

- A. Dumbbell shaped
- B. Round
- C. Straight-walled and rigid
- D. Oval and fully distended

13. How many kilometers are in 2,000 meters?

- A. 200 km
- B. 20 km
- C. 2 km
- D. 0.2 km

14. What is the third function of the receiver?

- A. Compensation
- B. Demodulation
- C. Reject
- D. Compression

15. Is the real world known as analog or digital?

- A. Analog
- B. Digital
- C. Binary
- D. Pixel-based

16. What uses pins that are parallel to the sound beam?

- A. Axial resolution
- B. Registration accuracy
- C. Lateral resolution
- D. Slice thickness

17. What does directly related mean?

- A. When both variables are multiplied to equal 1
- B. When one variable changes and the other stays constant
- C. When one variable increases, the other decreases
- D. When one variable increases, the other increases

18. When are contrast harmonics created?

- A. During digital storage
- B. During reflection
- C. During PACS archiving
- D. During transmission only

19. What are other terms for focal length?

- A. Far field or Fraunhofer zone
- B. Focal depth or near zone length
- C. Focal point or focus
- D. Beam diameter or aperture

20. What mnemonic lists common alternate names for axial resolution?

- A. LARRD: longitudinal, axial, range, radial, depth
- B. CARD: contrast, axial, radial, depth
- C. LARD: lateral, axial, range, Doppler
- D. LATA: longitudinal, angle, temporal, axial

21. Which region is noise more likely to affect?

- A. Only the focal zone
- B. Low-level hypoechoic regions
- C. Bright echogenic areas
- D. Only regions deep to bone

22. How is frequency related to propagation speed in a given medium?

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

23. What does the term phased array mean?

- A. Single active element
- B. Multi-focus or adjustable
- C. Mechanical only
- D. Fixed single focus

24. Cubic meters are units of what quantity?

- A. Area
- B. Frequency
- C. Volume
- D. Length

25. What units are used to measure volume?

- A. Linear units
- B. Frequency units
- C. Square units
- D. Cubic units

26. What does the metric prefix hecto mean?

- A. Thousand
- B. Ten
- C. Hundredth
- D. Hundred

27. What are multiple ultrasound pulses called?

- A. Wall filter or scale
- B. Gain or compression
- C. Pulse length or period
- D. Packet or ensemble

28. In scientific notation, what value range is represented by a positive exponent?

- A. Less than 1
- B. Exactly 0
- C. Greater than or equal to 10
- D. Between 1 and 10

29. What is the second function of the receiver?

- A. Demodulation
- B. Compensation
- C. Amplification
- D. Compression

30. How is reflector depth calculated from go-return time in soft tissue?

- A. Go-return time divided by 1.54 mm/microsecond, then multiplied by 2
- B. 1.54 mm/microsecond multiplied by go-return time, multiplied by 2
- C. 1.54 mm/microsecond multiplied by go-return time, divided by 2
- D. 1.54 mm/microsecond divided by go-return time

31. Is higher or lower spatial resolution associated with a higher pixel density?

- A. Higher spatial resolution
- B. Unchanged spatial resolution
- C. No spatial resolution
- D. Lower spatial resolution

32. How many hertz are in 6 MHz?

- A. 6,000,000 Hz
- B. 600,000 Hz
- C. 6,000 Hz
- D. 60,000 Hz

33. Which transducer frequency creates lower Doppler shifts?

- A. Higher pulse repetition frequency
- B. Lower frequency transducer
- C. Higher frequency transducer
- D. Lower wall filter setting

34. What happens to PRP when the depth of view is deep?

- A. PRP equals frequency
- B. PRP is zero
- C. PRP is short
- D. PRP is long

35. What are the two different forms of magnification?

- A. Pre and post compensation
- B. Read and write magnification
- C. Analog and digital magnification
- D. Axial and lateral magnification

36. During inspiration, does venous flow in the legs increase or decrease?

- A. Reverse direction
- B. Increase
- C. Decrease
- D. Remain unchanged

37. True or False? The resistive index (RI) helps in the diagnosis of arterial stenosis.

- A. False
- B. True

38. During which process is a reflected sound pulse converted into electricity?

- A. Transmission
- B. Refraction
- C. Reception
- D. Display storage

39. What happens to temporal resolution with shallow imaging?

- A. It becomes unrelated to frame rate
- B. It decreases because PRP becomes longer
- C. It degrades
- D. It improves

40. What pulse characteristic determines axial resolution?

- A. Pulse repetition frequency
- B. Receiver gain
- C. Beam steering angle
- D. Pulse length

41. What is the total pulse travel distance for a reflector depth of 3 cm?

- A. 6 cm
- B. 3 cm
- C. 1.5 cm
- D. 9 cm

42. What are the units for flow?

- A. Any volume divided by time, such as liters/min
- B. Any frequency divided by time, such as Hz/s
- C. Any pressure divided by area, such as mmHg/cm²
- D. Any distance divided by time, such as cm/s

43. What mnemonic is used for lateral resolution?

- A. ALARA
- B. LATA
- C. PRF
- D. SPL

44. What units are used to measure area?

- A. Square units
- B. Linear units
- C. Cubic units
- D. Frequency units

45. What type of numbers are associated with computer devices?

- A. Real-world numbers
- B. Analog numbers
- C. Digital numbers
- D. Continuous numbers

46. What term means echo-free?

- A. Isoechoic
- B. Hypoechoic
- C. Anechoic
- D. Hyperechoic

47. True or False? When density decreases and stiffness is unchanged, sound speed decreases.

- A. False
- B. True

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

- A. W/cm²
- B. dB/cm
- C. Hertz
- D. Units of length, such as cm

49. True or False? There are no bioeffects associated with ultrasound having characteristics typical of those in diagnostic ultrasound.

- A. False
- B. True

50. What does phased array mean?

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