

ARRT Practice Test

1. Which term represents the degree of echo amplification or brightness of an ultrasound image?

- a. Zoom
- b. Gain
- c. Scatter
- d. Absorption

2. What type of image does the linear array offer in real-time imaging?

- a. Trapezoidal image
- b. Pie-shaped image
- c. Large-field image
- d. Rectangular image

3. Pulsed Doppler is used for what diagnostic purpose?

- a. To determine blood flow through arteries and veins
- b. To view large organs
- c. To determine solid masses
- d. There is no diagnostic purpose for pulsed Doppler.

4. The wave characteristic of frequency is measured by what unit of measurement?

- a. Gain
- b. Color
- c. Length
- d. Hertz

5. The comet tail image indicates which of the following to the ultrasound technician?

- a. The edge of the organ
- b. Artifact
- c. The sign of an abscess
- d. The right depth of the transducer

6. You are performing an ultrasound exam of the abdomen and pelvis of a patient with an unexplained fever. You understand the purpose of the exam is to look for which of the following?

- a. Abscess, inflammation, or mass
- b. Enlarged lymph nodes
- c. Both a and b
- d. Neither a nor b

7. What is an appropriate way to store color images of an ultrasound scan?

- a. Images can be scanned and stored in the memory of the equipment in gray scale, color, or real-time imaging.
- b. Images must be printed immediately because storage and memory are unreliable.
- c. Images can be stored as numbers or images.
- d. Images can only be stored in gray scale in the memory of the equipment.

8. Which term defines the first beam transmitting from the transducer?

- a. The reflected beam
- b. The incident beam
- c. The transmitted beam
- d. The harmonic beam

9. The purpose of a diagnostic ultrasound transducer is best described in which of the following descriptions?

- a. It is easy on the technician's hand and can be easily gripped.
- b. It is shaped with a round end for the best imaging.
- c. It is used to convert electrical energy into sound energy and sound energy to electrical energy.
- d. The transducer really has no definite purpose; the computer equipment actually does the scan.

10. What is the most significant side effect of sound waves on the patient who is undergoing an ultrasound?

- a. There is only a minimal possibility of adverse effects from the heat produced by the sound wave.
- b. There is no possibility of adverse effect from an ultrasound exam.
- c. Neonates have the only chance of any adverse side effects from an ultrasound.
- d. There are serious side effects from having an ultrasound, and the technician must explain those to the patient before every exam.

11. Which statement best defines the ALARA principle?

- a. The principle states that the lowest reasonable energy should be used to produce the clearest image.
- b. The principle states that the highest reasonable energy should be used to produce the clearest image.
- c. The principle states the level of energy is not included in when deciding what technique to use to get a clear image.
- d. The principle states that the lowest reasonable energy should be used with minimal exposure for obtaining the clearest image.

12. What is the lowest intensity value of ultrasound imaging?

- a. SATA
- b. SPPA
- c. SATP
- d. SPTP

Answer Key and Explanations

1. B: Gain is the term that identifies the degree of echo amplification or brightness of an image. Gain can be adjusted up or down to get the clearest image possible. Zoom allows magnification of an area, scatter refers to an unclear image of random sound waves, and absorption refers to the loss of the sound wave from the organ or area being scanned.

2. D: A linear array offers a rectangular image of an area. The vector format offers a trapezoidal image, a sector format offers a pie-shaped image, and the curved array provides a large-field image.

3. A: Pulsed Doppler is used to study the flow of blood through arteries and veins. It can also determine the pressure in those vessels. It is not used for solid organ diagnosis unrelated to blood flow or solid masses, unless the solid mass is obstructing the blood flow in a vessel. It is a valuable diagnostic tool in sonography.

4. D: Hertz is a unit of measurement used to measure a wave characteristic. Gain, color, and length are other characteristics or ways a sound wave is imaged.

5. B: The comet tail is an artifact, and the technician would know to redirect the transducer or change position or pressure to get a clear image.

6. C: In the presence of high fever with no source, an abdominal or pelvic ultrasound may be ordered to look for abscesses, enlarged lymph nodes, and inflammation, which can be a source of fever. The scan may also reveal tumors or masses that can be causing the body to react with fever.

7. A: Images can be stored, depending on the equipment, as gray scale images, colored images, or real-time imaging and video. Images can be displayed as numbers or images. The equipment type and capacity direct how a scan is archived.

8. B: The incident beam is the very first sound beam sent from the transducer. A transmitted beam is the beam that continues to travel. The reflected beam is the beam that returns to the transducer and helps to form the images.

9. C: The transducer is what contains the conductive material that converts electrical energy to sound energy and sound energy to electrical energy when received back to the transducer.

10. A: There is minimal adverse effect from an ultrasound exam, and that occurs from the heat generated by conducted energy. Neonates, more so than others, need to be protected from the possibility of heat injury, but heat injury should be considered when doing any exam.

11. D: The as low as reasonably achievable (ALARA) principle stresses the use of the lowest reasonable energy when obtaining the clearest image and minimal exposure to the patient. The principle also stresses that the FDA regulates the ultrasound instruments used because of the bioeffects of ultrasound and the effects on patient safety. Choices a, b, and c are not correct.

12. A: SATA is the spatial average-temporal average of a sound beam and is the lowest level of intensity. SPPA refers to spatial peak-pulse average and is measured during the time of the pulse. SATP refers to spatial average-temporal peak and is the average intensity of a beam at the highest point. SPTP is spatial peak-temporal peak and is the peak intensity of the beam in both space and time, being the highest intensity measurement for a sound beam.