

## Principles of Magnetic Resonance Imaging

1. MRI provides visualization of which of the following?
  - a. Soft-tissue contrast
  - b. Visualizing blood flow
  - c. Tissue perfusion
  - d. All the above
2. The “magnetic needles” in our body commonly used for MRI are \_\_\_\_\_ nuclei.
  - a. Oxygen
  - b. Hydrogen
  - c. Carbon
  - d. Nitrogen
3. Hydrogen nuclei have an intrinsic property known as \_\_\_\_\_.
  - a. Tilt
  - b. Waves
  - c. Spin
  - d. Frequency
4. What is the process that causes the net magnetization to constantly approach equilibrium called?
  - a. Relaxation
  - b. Rotation
  - c. Centering
  - d. Rotation
5. True or false. Different tissues such as fat and water will end relaxation at different time points.
  - a. True
  - b. False
6. Recovery of longitudinal magnetization is achieved by a process called \_\_\_\_\_.
  - a. Magnetization vector
  - b. Equilibrium
  - c. Spin-lattice relaxation
  - d. Net magnetization
7. Which of the following is a contrast or weighting choice for MRI imaging?
  - a. T1 weighting
  - b. T2 weighting
  - c. Proton density
  - d. All the above
8. The parameters that control the particular weighting of a spin echo sequence are the echo time (TE) and the \_\_\_\_\_.
  - a. Spin time
  - b. Parameters
  - c. RF pulses
  - d. Repetition time (TR)
9. Repetition time (TR) is the period of time between successive \_\_\_\_\_.
  - a. Net magnetization
  - b. RF pulses
  - c. Spin times
  - d. Signal decay

10. Which of the following is a concept based on the gradient coil system?
- Slice selection
  - Spatial encoding
  - Equilibrium
  - A & B
11. k-space is often referred to as \_\_\_\_\_ space.
- Open
  - Closed
  - Fourier
  - A & B
12. True or false. The purpose of an MRI examination is to fill the k-space with data so that an image can be reconstructed.
- True
  - False
13. What describes the sequence of RF pulses that are applied in repetition to successfully acquire the whole k-space of an object?
- Pulse sequences
  - Frequency direction
  - Phase direction
  - Phase encoding
14. Which of the following **is not** a principle of spin echo?
- A 60-degree pulse flips the magnetization into the transverse plane
  - Dephasing due to random nuclei interactions and field inhomogeneities sets in
  - After a waiting period of  $TE/2$ , a 180-degree pulse inverts the magnetization
  - After a waiting period  $TE/2$ , all magnetic moments have refocused
15. The gradient echo pulse sequence utilizes partial flips with angles below \_\_\_\_\_.
- 45 degrees
  - 60 degrees
  - 90 degrees
  - 120 degrees