

Chapter 02: Specialized Imaging Test Bank

MULTIPLE CHOICE

1. The loud tapping noise associated with MRI comes from _____.
 - a. energizing the main magnet
 - b. radiofrequency coils
 - c. liquid helium pumps
 - d. motors driving the couch
 - e. energizing the gradient magnets

ANS: E

2. Which of the following does not exhibit high signal intensity on T1-weighted MRI images?
 - a. Subacute hemorrhage
 - b. Proteinaceous material
 - c. Gadolinium
 - d. Muscle

ANS: D

3. Which of the following MRI techniques would be most helpful in evaluating avascular necrosis?
 - a. T1
 - b. T2
 - c. Gradient echo
 - d. Fat suppression

ANS: D

4. Which of the following is not a contraindication to MRI?
 - a. Cardiac pacemakers
 - b. Cochlear implants
 - c. Harrington rods
 - d. Brain aneurysm clips

ANS: C

5. The acronym SPECT is defined as _____.
 - a. single positron emission computed tomography
 - b. single-photon emission computed tomography
 - c. axial PET
 - d. fast PET

ANS: B

6. Which of the following is the substance of choice in routine radionuclide bone imaging?
 - a. Strontium
 - b. Molybdenum

- c. Technetium
- d. Barium
- e. Iodine

ANS: C

7. Which of the following examinations most likely delivers the highest radiation dose?
- a. X-ray
 - b. CT
 - c. Radionuclide imaging
 - d. PET scanning

ANS: B

8. In radionuclide imaging of bone, a “hot spot” relates to _____.
- a. osteoblastic activity
 - b. bone destruction
 - c. osteoclastic activity
 - d. ischemia
 - e. necrosis

ANS: A

9. Which of the following imaging modalities measures attenuation values of x-rays with the “Hounsfield unit”?
- a. Radionuclide scintigraphy
 - b. Bone scan
 - c. CT
 - d. X-ray

ANS: C

10. An injection into the subarachnoid space is a key procedure of _____.
- a. myelogram
 - b. MRI
 - c. CT
 - d. discography
 - e. radionuclide bone scan

ANS: A

11. Which examination would be least likely to display a disc lesion?
- a. Plain film radiography
 - b. MRI
 - c. Myelography
 - d. CT

ANS: A

12. Which of the following represents the most appropriate examination to quantify bone mineral content?
- a. X-ray
 - b. MRI

- c. DEXA
- d. PET

ANS: C

13. In positron emission tomography (PET), the annihilation episode between an electron and a positron generates which of the following?
- a. Two x-ray photons
 - b. Two gamma photons
 - c. Four x-ray photons
 - d. Four gamma photons

ANS: B

14. What type of magnet is used to construct “open MRI” units?
- a. Superconducting
 - b. Permanent
 - c. Resistive
 - d. Compressive

ANS: B

15. Using DEXA, which T-score correlates to osteoporosis?
- a. +2
 - b. 0
 - c. -1
 - d. -2
 - e. -3

ANS: E

16. In MRI technology, according to the Larmor equation, the frequency of precession of the hydrogen magnetic dipoles has a direct linear relationship with which factor?
- a. Size of the patient
 - b. Strength of the external magnetic field
 - c. Area of examination
 - d. Hydration of the patient
 - e. Location of examination (e.g., lumbar spine vs. wrist)

ANS: B

17. Which of the following diagnostic imaging modalities does not use ionizing radiation in the process of obtaining an image?
- a. CT
 - b. Nuclear scintigraphy
 - c. Bone scan
 - d. MRI

ANS: D

18. Which of the following types of magnets used in MRI units is able to induce the strongest magnetic field and highest signal-to-noise ratio?
- a. Superconducting

- b. Permanent
- c. Resistive electromagnetic
- d. Rare earth

ANS: A

19. Concentration of which element in the patient is most important in generating magnetic resonance images?
- a. Helium
 - b. Hydrogen
 - c. Oxygen
 - d. Fluoride

ANS: B

20. Which of the following tissues images dark, or "low signal intensity," on both T1- and T2-weighted pulse sequencing?
- a. Water
 - b. Fat
 - c. Muscle
 - d. Cortical bone

ANS: D

21. What is the average Hounsfield unit measure for tissue density of bone?
- a. +40
 - b. +400
 - c. +1000
 - d. +2000

ANS: B

22. Chest radiographic examination of a 57-year-old male patient with a 27-pack-year history of smoking reveals a 1.5 cm nodule, without clear evidence of intrinsic calcification, within the right lung parenchyma. Which diagnostic imaging modality would provide the most accurate characterization in follow-up?
- a. MRI
 - b. CT
 - c. Apical lordotic radiograph
 - d. Nuclear scintigraphy

ANS: B

23. For which of the following diagnoses would evaluation with radionuclide scintigraphy be inappropriate?
- a. Stress fracture
 - b. Reflex sympathetic dystrophy
 - c. Metastatic bone disease
 - d. Osteoporosis

ANS: D

24. Contrast injection into the center of an intervertebral disc is a component of which specialized imaging modality?
- Myelography
 - Discography
 - PET
 - CT

ANS: B

25. Which in the following is NOT an advantage of digital x-ray imaging over conventional radiographic film-based images?
- Potential increase in patient x-ray dose
 - Ability to share images across computer platforms
 - Wider exposure latitude than radiographic film
 - Correction of underexposure or overexposure within limits

ANS: A

26. Which diagnostic imaging modality is most appropriate in assessment of a patient with acute onset low back pain, with pain radiating to the right lower extremity to the great toe?
- Digital radiography
 - Myelography
 - CT
 - MRI

ANS: D

27. Which diagnostic imaging modality is the most appropriate immediate follow-up in a patient with recent head trauma and clinical concern for subdural hemorrhage?
- Digital radiography
 - CT
 - MRI
 - PET

ANS: B

28. Which of the following diagnostic imaging modalities has the ability to evaluate cellular and tissue metabolic activity without the use of ionizing radiation?
- PET
 - Bone scan
 - Contrast-enhanced MRI
 - DEXA

ANS: A

29. What is the increased risk of fracture in a patient with a T-score of -2 as compared to a normal 40-year-old individual?
- 2 times
 - 4 times
 - 6 times
 - 8 times

ANS: B

30. Which diagnostic imaging modality would be most appropriate in further assessment of a patient with metatarsal pain, history of recent participation in marathon training, and normal radiographic examination of the foot?
- Diagnostic ultrasonography
 - Radionuclide scintigraphy
 - CT
 - DEXA

ANS: B

31. Flow phase, blood pool scan, and static bone scan are all phases of which diagnostic imaging modality?
- CT
 - PET
 - Radionuclide scintigraphy
 - Discography

ANS: C

32. Which diagnostic imaging modality is the procedure of choice in evaluation for cervical spine fracture?
- Conventional radiography with flexion and extension views
 - Conventional radiography with flexion, extension, right and left oblique, and open-mouth views
 - CT
 - Single positron emission CT

ANS: C

33. A 56-year-old male patient presents with new onset low back pain radiating to the right lower extremity past the knee, and a surgical history of laminectomy at L4-L5. Which contrast agent is likely to be injected with MRI to help differentiate between recurrent disc herniation and scar formation?
- Gadolinium
 - Technetium
 - Iodine
 - Pantopaque

ANS: A

34. Which of the following is consistent with the appearance of a disc herniation on myelography?
- Widening of the intervertebral disc
 - Attenuation of the nerve root
 - Angular indentation on the lateral thecal sac
 - Filling of the nerve root sleeve with contrast

ANS: C

35. A 63-year-old female patient slips on ice carrying groceries into her home, falls onto her right outstretched hand, and has immediate onset of right wrist pain and swelling. Which diagnostic imaging modality is the procedure of choice in initial follow-up?
- CT
 - MRI
 - DEXA
 - X-ray

ANS: D

36. A 62-year-old male patient presents with immediate onset of dyspnea. Which diagnostic imaging modality would be most helpful in excluding pulmonary embolism?
- MRI
 - Ventilation-perfusion scan
 - DEXA
 - Inspiration and expiration radiographs

ANS: B

37. The average length of an MRI examination can vary from _____ minutes.
- 1-5
 - 10-20
 - 30-90
 - 90-120

ANS: C

38. Which of the following is the most common concern for patients undergoing MRI examination?
- Noise of the MRI unit
 - Length of the examination
 - Radiation dose
 - Claustrophobia

ANS: D

39. Use of gadolinium as a contrast agent in MRI examinations is associated with complications in patients who have poor _____ function.
- pulmonary
 - renal
 - cardiovascular
 - neurological

ANS: B

40. Which of the following diagnoses is an indication for direct MRI arthrography?
- Hip labral tear
 - Intervertebral disc herniation
 - Anterior cruciate ligament tear
 - Bone contusion

ANS: A