

**Final Exam
2012 Junior Radiology Course
July 6, 2012**

MULTIPLE CHOICE & TRUE OR FALSE QUESTIONS

37. In the evaluation of pulmonary thromboembolism, Technetium-99 labeled Macro-aggregated albumin particles are used in nuclear lung scanning to assess perfusion by occluding capillaries.

- A) True
- B) False

38. Mammography is the most sensitive examination for detection of early breast cancers.

- A) True
- B) False

39. A fracture with multiple fragments is called comminuted.

- A) True
- B) False

40. CT scanners are a form of ionizing-radiation and generate X-rays.

- A) True
- B) False

41. Radiographs of the chest obtained with portable x-ray machines are more likely to suffer motion effects than radiographs obtained with stationary x-ray equipment.

- A) True
- B) False

42. Shorter exposure times decrease the risk of motion artifacts on radiographs.

- A) True
- B) False

43. In patients with suspected metastatic osseous lesions, radiographs of the chest always reliably demonstrate lesions in the ribs.

- A) True
- B) False

44. Many osteolytic metastatic lesions are not visible on plain films until 50% of the bone is resorbed; however, they can be detected with nuclear medicine total body bone scan.

- A) True
- B) False

45. Scatter radiation is the most common type of ionizing radiation encountered by healthcare workers.

- A) True
- B) False

46. Scatter radiation can be decreased by wearing a lead apron and increasing the distance from the x-ray source.

- A) True
- B) False

47. Pneumothorax is easily diagnosed on an AP supine radiograph portable radiograph.
- A) True
 - B) False
48. Bone Densitometry (DEXA Scan) is used to evaluate for osteoporosis.
- A) True
 - B) False
49. Lead aprons have a more beneficial impact when used around diagnostic x-rays than when used around most radiopharmaceuticals used for nuclear medicine imaging.
- A) True
 - B) False
50. Concerning PET imaging, F-18 FDG mechanism of action and cellular uptake is:
- A. Glucose receptor followed by glucose phosphorylation inside a cell
 - B. NaCl pathway of diffusion
 - C. K⁺ analog and osmosis
51. Concerning PET imaging, important factors to consider before the examination are:
- A. Serum glucose level
 - B. Insulin administration and levels especially in diabetic patients
 - C. Strenuous physical activity
 - D. Fasting 4-6 hours before the examination
 - E. All of the above
52. PET/CT fusion imaging is an invaluable tool for which of the following cancers:
- A. Lymphoma
 - B. Breast cancer
 - C. Lung cancer
 - D) Esophageal cancer
 - E. All of the above
53. Accurate statements regarding MRI include:
- A) MRI has superior soft tissue differentiation for musculoskeletal imaging
 - B) Patients with indwelling pacemakers may safely undergo MRI scanning
 - C) Imaging is multiplanar (in axial, sagittal and coronal planes)
 - D) All of the above
 - E) A and C only
54. The most common non-skin malignancy in American women is:
- A) lymphoma
 - B) breast cancer
 - C) lung cancer
 - D) ovarian cancer
 - E) colon cancer
55. Pulmonary embolism can be DEFINITELY diagnosed (not just a probability given) by:
- A) Pulmonary arteriogram
 - B) Spiral contrast CT scan
 - C) Ventilation and perfusion nuclear scanning
 - D) A and B

56. Which of the following imaging sequences would expose a patient to the least ionizing radiation?
- A) Pelvic ultrasound, MRI of the pelvis
 - B) Gallbladder ultrasound, abdominal CT, HIDA scan
 - C) Ultrasound of the breast, Mammogram
 - D) EPA chest radiograph, ultrasound of the heart
 - E) AP, lateral, and oblique radiographs of the thumb
57. Radioisotopes used for nuclear medicine imaging include:
- A) Technetium – 99
 - B) Indium – 111
 - C) Iodine – 123
 - D) Gallium – 67
 - E) All of the above
58. Uses for ultrasound include:
- A) Interrogation of veins of upper and lower extremities for deep veins thrombosis
 - B) Evaluate for gallstones
 - C) Possible ectopic pregnancy
 - D) A, B and C
59. Imaging modalities that do not involve radiation include:
- A) CT scan
 - B) MRI and Ultrasound
 - C) Nuclear medicine
 - D) Plain Radiographs
60. Concerning angiographic treatment of abdominal pelvic bleeding:
- A) Temporary agents are never used, all embolizations are permanent
 - B) Embolization is often called for in the setting of pelvic fracture with associated active arterial bleeding
 - C) Embolization is now preferred over surgery for treating arterial bleeding in the pelvis
 - D) B and C only
61. Which statements regarding pulmonary emboli are true?
- A) Pulmonary emboli arise from thrombosis in the deep veins
 - B) Pulmonary Angiographic findings may include arterial branches with a truncated appearance or filling defect
 - C) V/Q scans predict probability of their likelihood
 - D) All of the above
62. Which statement regarding MRI of the brain is false?
- A) Cortical bone is not well evaluated with MRI
 - B) MRI is superior to CT for evaluation of hyperacute intracranial bleed
 - C) CT and MRI of the brain are complementary imaging modalities
 - D) MRI is not easily performed on a trauma patient
63. Common use of stents, placed by interventional techniques, includes treatment of which of the following?
- A) Atherosclerotic (vascular) stenoses
 - B) Acute obstruction of the ileum
 - C) Malignant biliary stricture
 - D) All of the above

64. Cerebral aneurysms and arteriovenous malformations:
- A) May be diagnosed by CT and MR
 - B) Can be associated with massive intracranial hemorrhage
 - C) May warrant Digital Subtraction Angiography by a Neuroradiologist for characterization and treatment planning
 - D) All of the above
65. In magnetic resonance imaging, which of the following is/are true?
- A) Magnetic resonance angiography is contraindicated in patient's with aneurysm clips and intra-orbital fragments
 - B) MRI is an invaluable tool in diagnosing occult fractures and bone marrow edema
 - C) CT is faster than MRI
 - D) All of the above
66. Which of the following statement(s) is (are) accurate?
- A) Fractures can occur in isolation without subluxation or dislocation
 - B) Partial dislocations are termed subluxations
 - C) Dislocations never occur in isolation (i.e. without a fracture)
 - D) A and B
 - E) All of the above
67. Concerning Nuclear Medicine Hepatobiliary (HIDA) scan of the gallbladder which of the following is incorrect:
- A) Most common clinical indication is evaluation of cholecystitis
 - B) Plain radiographs of the abdomen are required for comparison
 - C) A normal examination identifies filling of the gallbladder
 - D) Morphine can be administered during the examination for augmentation of gallbladder filling
68. Use of intravascular contrast media for MRI examinations can be associated with an entity termed Nephrogenic Systemic Fibrosis (NSF):
- A) True
 - B) False
69. Use of intravascular contrast media for CT and MRI examinations can be associated with renal dysfunction. Which of the following laboratory values are important to consider prior to the administration of contrast media:
- A) BUN, Creatinine, GFR(glomerular filtration rate)
 - B) Sodium, chloride, potassium
 - C) Serum glucose and insulin levels
70. Guidewires and catheters are the foreign bodies interventionalists are most frequently asked to retrieve.
- A) True
 - B. False
71. Which of the following is NOT an indication for nephrostomy:
- A) Prelithotripsy
 - B) Check patency of the intrarenal collecting system
 - C) Lessen risk of sepsis in a patient with urinary tract obstruction
 - D) Nothing else better to do

72. Which of the following liver tumors are susceptible to treatment by chemoembolization:
- A) Hepatoma
 - B) Carcinoid metastasis
 - C) Both
 - D) None of the above are susceptible
73. Which of the following access sites do interventionalists use the MOST for central venous access:
- A) Internal jugular vein
 - B) Thrombosed subclavian vein
 - C) Azygous continuation of the Inferior vena cava
 - D) None of the above
74. Which of the following is NOT appropriate conduct when losing a guidewire in a patient:
- A) Tell your attending staff
 - B) Tell your upper level resident
 - C) Alert the interventionalist on call
 - D) Don't tell anybody and cover it up.
75. In analog or digital radiography, which of the following is the least effective means of reducing X-ray scattering that results in "fogging" of the image, i.e. reducing the amount of contrast among various tissues in the image?
- A) Collimating the X-ray beam to the area of interest.
 - B) Using a grid within the cassette containing the film or other photosensitive material.
 - C) Doubling the mAs.
76. Breast cancer screening annually is effective in reducing breast cancer mortality.
- A) True
 - B) False
77. For plain film or computed Radiography, X-rays emitted by a Tungsten target that strike the patient can then undergo any of the following fates except for which one below:
- A) Absorption
 - B) Conversion into Radiofrequency energy photons
 - C) Pass directly through the patient to expose film in a radiography cassette
 - D) Scattered off in some direction other than towards the radiography cassette
78. False negative bone scan occurs with which of the following:
- A) Multiple Myeloma
 - B) Prostate cancer
 - C) Thyroid carcinoma
 - D) A & C
79. Which of the following imaging modalities does not use Ionizing radiation?
- A) Magnetic Resonance Imaging
 - B) X-rays
 - C) CT
 - D) Nuclear medicine
80. Concerning CT and Hounsfield Units(HU), which of the following is incorrect:
- A) Gas: -1000
 - B) Bone: +1000
 - C) Water: 0
 - D) Bone: -3000

81. Concerning bone tumors, the BEST INITIAL test for the characterization of matrix and periosteal reaction is
- A) Plain film (Radiograph)
 - B) Ultrasound
 - C) Computed tomography
 - D) Magnetic resonance imaging
 - E) PET scan
82. Disadvantages of MRI include:
- A) Poor visualization of cortical bone and soft tissue calcifications
 - B) Limited spatial resolution
 - C) Some medical devices are prohibitive
 - D) All of the above
83. In general, the differential diagnosis for cardiac silhouette enlargement is chamber dilation and pericardial effusion.
- A. True
 - B. False
84. Multidetector CT with 3D volume rendered images is used in cardiac imaging for evaluation of postoperative CABG patients to evaluate stent patency?
- A) True
 - B) False
85. Dr Casey's guiding principle in musculoskeletal radiology is anatomy?
- A) True
 - B) False
86. Concerning the immature skeleton, the growth plates (physes) are:
- A) Closed
 - B) Open
 - C) Do not exist
87. Salter-Harris Classification is used to describe which of the following:
- A) Long bone fractures
 - B) Lumbar spine fractures
 - C) Fractures involving the physis in an immature skeleton
88. An open fracture versus a closed fracture is clinically significant because of the increased risk of osteomyelitis?
- A) True
 - B) False
89. ER patient with traumatic elbow injury and an elbow joint effusion requires dedicated imaging for which of the following:
- A) Ulna fracture
 - B) Occult radial head or neck fracture
 - C) Fracture of the olecranon
 - D) Complete triceps tendon rupture
90. The classic radiographic findings in a skeletal survey for multiple myeloma are:
- A) Sclerotic lesions in the axial skeleton
 - B) Predominant lytic ("swiss cheese") appearing lesions throughout the axial and appendicular skeleton
 - C) Normal radiographs

91. The following are acute abdominal emergencies:
- A) Appendicitis
 - B) Pancreatitis
 - C) Pneumoperitoneum
 - D) All of the above
92. Contraindication to MRI include:
- A) Pacemakers
 - B) Intra-orbital metal fragments
 - C) Cerebral aneurysm clips
 - D) All of the above
93. A **gamma camera** is a device used to image gamma radiation emitting radioisotopes, a technique known as scintigraphy.
- A) True
 - B) False
94. Concerning Cardiac Nuclear Imaging, which of the following are evaluated:
- A. Heart wall motion
 - B. Myocardial Perfusion & Viability
 - C. A & B
95. Which of the following is correct concerning Nuclear medicine MUGA scans (Gated equilibrium radionuclide angiograms):
- A) Performed with Tc-99m red blood cells
 - B) Common indications include assessment of LVEF & regional wall motion
 - C) A & B
96. For a lytic lesion to be visualized by radiography localized demineralization of 30-50% must occur.
- A) True
 - B) False
97. Bone scans usually demonstrate metastatic lesions much earlier than radiography?
- A) True
 - B) False
98. The three principle methods by which individual radiation exposure can be reduced are:
- A) Time, distance and shielding
 - B) Survey, screening, evaluation
 - C) Maximize signal to noise, use of metallic artifact reduction techniques, decrease patient motion
99. With reference to the general literature, a radiologist should strive to be most like:
- A) Miss Havisham
 - B) Scout Finch
 - C) Sherlock Holmes
 - D) Holden Caulfield
 - E) c & d

100. You are an Intern in Internal Medicine. Your upper level resident and her attending decide that inpatient B. Good needs the following imaging studies obtained before Friday night, as certain imaging studies (all of which are known not to be considered medical emergencies) are not done on the weekends at your hospital owing to staffing considerations. It's Wednesday, late afternoon, and you are charged with deciding (and then ordering) which tests can be done, in a particular order, on Thursday and/or Friday. The imaging studies they want are: an air-contrast Barium Enema (a fluoroscopically-guided study of the colon;) an MRI of the brain without IV contrast; a CT of the abdomen and pelvis without IV contrast (also without any oral or rectal contrast) looking for urinary tract calculi; and AP and lateral X-rays of the lumbar spine.

Which of the following combinations is feasible from the point of view that all of the aforementioned studies would be expected to be free of any of kind of imaging artifact? ("None of the above" is not considered an acceptable answer.)

A) Thursday: L-spine X-rays, then air contrast Ba Enema; then on Friday, MRI of the brain and CT of the abdomen and pelvis, all without IV contrast.

B) Thursday: L-spine X-rays, MRI brain without IV contrast; then on Friday, air contrast Barium enema followed by CT abdomen and pelvis without IV contrast.

C) Thursday: CT abdomen & pelvis without IV contrast followed by air contrast Barium enema; then on Friday, MRI brain without IV contrast followed by L-spine X-rays.

D) Thursday: MRI of the brain, CT of the abdomen and pelvis, all without IV contrast; then on Friday, L-spine X-rays followed by air contrast Barium enema.