

Instructions: On the Answer Sheet, enter your 2-digit ID number (with a leading 0 if needed) in the boxes of the ID section. *Fill in the corresponding numbered circles.* Answer each of the numbered questions by filling in the corresponding circles in the numbered question section. Print your name in the space at the bottom of the answer sheet. Sign here stating that you have neither given nor received help.

your signature

1. Which of the following imaging modalities does not use ionizing radiation? (pick best answer)
 - A. Only MRI
 - B. Ultrasound and CT
 - C. Ultrasound and MRI
 - D. Only ultrasound
 - E. Only CT

2. The mid-sagittal plane
 - A. is parallel to the front of the body.
 - B. represents a projection through the side of the body.
 - C. is only used in CT but not MRI.
 - D. is parallel to the top of the head.
 - E. divides the body into two roughly symmetrical halves.

3. The sagittal plane
 - A. is used only in projection radiography.
 - B. is parallel to the front of the body.
 - C. represents a projection through the side of the body.
 - D. is parallel to the top of the head.
 - E. is perpendicular to the coronal plane.

4. Computerized Tomography (CT)
 - A. requires extremely strong magnetic fields.
 - B. requires the use of radioactive isotopes.
 - C. depends on multiple projections of X-rays from many angular orientations to compute a slice of voxels.
 - D. cannot be used to produce a 3D set of voxels.
 - E. is primarily used to image physiological function rather than anatomical structure.

5. Select the statement that best describes the field of Medical Imaging.
- A. Can be used for Diagnosis and Therapy.
 - B. Requires training in computational and life sciences.
 - C. Is a multidisciplinary area.
 - D. Integrates Bioengineering, Biology, and Medicine.
 - E. All of the other statements.
6. Which one of the following statements is true? The two medical imaging techniques, CT (Computed Tomography) and MRI (Magnetic Resonance Imaging), are complimentary because
- A. None of the other statements is true.
 - B. CT differentiates heavy from light atoms while MRI differentiates the local environments of hydrogen atoms.
 - C. MRI is a tomographic modality whereas CT is not.
 - D. MRI uses ionizing radiation whereas CT does not.
 - E. CT images bone differently from soft tissue whereas MRI does not.
7. Which of the following statements is true?
- A. Ultrasound is the only imaging modality that does not use ionizing radiation.
 - B. None of the other statements is true.
 - C. PET and MRI are examples of emission imaging.
 - D. MRI relies on nuclear resonance and CT on emission of radiation by tissue.
 - E. X-rays, CT, and PET are all examples of transmission imaging.
8. As of 2008, which of the following imaging modalities is not one of the major modalities utilized in medical care in the United States?
- A. Nuclear medicine
 - B. Magnetic resonance imaging
 - C. Ultrasound
 - D. Magneto Encephalography
 - E. Projection radiography
9. Which of the following imaging modalities uses very strong magnetic fields?
- A. CT
 - B. Ultrasound
 - C. X-ray
 - D. MRI
 - E. PET

10. A coronal slice

- A. divides the body into two roughly symmetrical halves.
- B. is parallel to the top of the head.
- C. is parallel to the front of the body.
- D. represents a projection through the side of the body.
- E. can be at any orientation relative to the patient.

11. The axial plane

- A. represents a tomographic slice orthogonal to the long axis of the body.
- B. is parallel to the side of the body.
- C. is used only in projection radiography.
- D. is parallel to the front of the body.
- E. is parallel to the coronal plane.

12. Which of the following imaging modalities uses radio frequency electromagnetic radiation?

- A. Ultrasound
- B. MRI
- C. X-ray
- D. CT
- E. PET

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1. Which of the following imaging modalities does not use ionizing radiation? (pick best answer)

- A. Ultrasound and MRI
- B. Only CT
- C. Only MRI
- D. Ultrasound and CT
- E. Only ultrasound

Explanation: CT uses X-Rays which are ionizing radiation, MRI uses magnetic fields and radio frequencies which are not ionizing (only frequencies at ultraviolet and above are ionizing). Ultrasound does not ionize tissue.

[*imaging0001.mcq*]

2. The mid-sagittal plane

- A. divides the body into two roughly symmetrical halves.
- B. is parallel to the top of the head.
- C. represents a projection through the side of the body.
- D. is parallel to the front of the body.
- E. is only used in CT but not MRI.

Explanation: The mid-sagittal plane divides the left and right halves of the body. It may be used in any 3D imaging modality.

[*imaging0002.mcq*]

3. The sagittal plane

- A. is perpendicular to the coronal plane.
- B. is parallel to the top of the head.
- C. represents a projection through the side of the body.
- D. is parallel to the front of the body.
- E. is used only in projection radiography.

Explanation: The sagittal plane is parallel to the side of the body and is perpendicular to the other two planes (coronal and axial). It may be used in any 3D tomographic imaging modality, but not in projection radiography).

[*imaging0003.mcq*]

4. Computerized Tomography (CT)

- A. depends on multiple projections of X-rays from many angular orientations to compute a slice of voxels.
- B. requires extremely strong magnetic fields.
- C. requires the use of radioactive isotopes.
- D. is primarily used to image physiological function rather than anatomical structure.
- E. cannot be used to produce a 3D set of voxels.

Explanation: CT is based on X-rays, not magnetic fields or radioactive elements. It images primarily anatomical structure and depends on multiple angles of projection to compute a slice using a technique called back-projection.
[*imaging0005.mcq*]

5. Select the statement that best describes the field of Medical Imaging.

- A. All of the other statements.
- B. Integrates Bioengineering, Biology, and Medicine.
- C. Can be used for Diagnosis and Therapy.
- D. Requires training in computational and life sciences.
- E. Is a multidisciplinary area.

Explanation: They are all true (isms).
[*imaging0021.mcq*]

6. Which one of the following statements is true? The two medical imaging techniques, CT (Computed Tomography) and MRI (Magnetic Resonance Imaging), are complementary because

- A. CT differentiates heavy from light atoms while MRI differentiates the local environments of hydrogen atoms.
- B. CT images bone differently from soft tissue whereas MRI does not.
- C. MRI uses ionizing radiation whereas CT does not.
- D. MRI is a tomographic modality whereas CT is not.
- E. None of the other statements is true.

Explanation: CT studies heavy atoms in bone while MRI studies hydrogen atoms in tissue.
[*imaging0022.mcq*]

7. Which of the following statements is true?

- A. None of the other statements is true.
- B. PET and MRI are examples of emission imaging.
- C. MRI relies on nuclear resonance and CT on emission of radiation by tissue.
- D. Ultrasound is the only imaging modality that does not use ionizing radiation.
- E. X-rays, CT, and PET are all examples of transmission imaging.

Explanation: None are true.
[*imaging0023.mcq*]

8. As of 2008, which of the following imaging modalities is not one of the major modalities utilized in medical care in the United States?

- A. Magneto Encephalography
- B. Projection radiography
- C. Magnetic resonance imaging
- D. Ultrasound
- E. Nuclear medicine

Explanation: Magneto Encephalography has yet to attain levels of use comparable to the other four imaging modalities shown here.

[*imaging0033.mcq*]

9. Which of the following imaging modalities uses very strong magnetic fields?

- A. MRI
- B. CT
- C. Ultrasound
- D. PET
- E. X-ray

Explanation: Only MRI uses very high field magnets.

[*imaging0058.mcq*]

10. A coronal slice

- A. is parallel to the front of the body.
- B. is parallel to the top of the head.
- C. represents a projection through the side of the body.
- D. divides the body into two roughly symmetrical halves.
- E. can be at any orientation relative to the patient.

Explanation: The coronal plane parallel to the front of the body, like the corona behind the Christ figure's head in many medieval paintings.

[*imaging0059.mcq*]

11. The axial plane

- A. represents a tomographic slice orthogonal to the long axis of the body.
- B. is parallel to the side of the body.
- C. is parallel to the front of the body.
- D. is parallel to the coronal plane.
- E. is used only in projection radiography.

Explanation: The axial plane crosses the long axis of the body and is perpendicular to the other two planes (coronal and sagittal). It may be used in any 3D tomographic imaging modality, but not in projection radiography).

[*imaging0083.mcq*]

12. Which of the following imaging modalities uses radio frequency electromagnetic radiation?

- A. MRI
- B. CT
- C. Ultrasound
- D. PET
- E. X-ray

Explanation: Only MRI uses RF electromagnetic radiation.
[*imaging0094.mcq*]