



## BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – B.Sc.(MRIT)-2021

Course Name – Physics of Advanced Imaging Technology

Course Code - BMRIT502

( Semester V )

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Which of the following best describes an artifact's use?
  - a) Chemical shift artifact
  - b) Gibbs artifact
  - c) Zipper artifact
  - d) Magic angle artifact
- (ii) Name the artifacts caused due to radiofrequency waves entering the MR room
  - a) Gibbs artifact
  - b) Zipper artifact
  - c) Chemical artifact
  - d) Cross-talk artifact
- (iii) In normal case, fat is Visualize as dark in ?
  - a) MR image
  - b) CT image
  - c) In both 1 & 2
  - d) None of these
- (iv) In case of abnormal tissue, blood is visualize as bright in ?
  - a) T1 weighted image
  - b) T2 weighted image
  - c) Both 1 & 2
  - d) None of these
- (v) Select which magnets require the use of cryogens
  - a) Bar
  - b) Resistive
  - c) Superconducting
  - d) Permanent
- (vi) Select which flip angle is commonly used in MRI?
  - a) 30degree
  - b) 45degree
  - c) 35degree
  - d) 90degree
- (vii) Cite if we reduced FOV, image resolution will..... And voxel size will reduce ?
  - a) Increase
  - b) Decrease
  - c) Will not very
  - d) Become unpredictable
- (viii) Cite the spatial resolution in CT is

- a) 1 lp mm-1  
c) 4 lp mm-1
- (ix) Select the contrast resolution in CT is  
a) Better than conventional films  
c) Same as conventional films
- (x) Zooming of the CT image shows  
a) Decrease the effect of noise  
c) No effect on noise
- (xi) Identify CT scan uses tube  
a) Rotating anode tube  
c) Gassy tube
- (xii) Identify star artifact in CT scan is due to  
a) Patient movement  
c) Beam hardening
- (xiii) Identify cupping artifact in CT scan is due to  
a) Patient movement  
c) Beam hardening
- (xiv) Complete the sentence: Slip rings allows to  
a) Rotate gantry  
c) Reduce patient dose
- (xv) Describe Slip ring brushes are made up of  
a) Tungsten  
c) Nickle
- b) 2 lp mm-1  
d) 10 lp mm-1
- b) Less than conventional films  
d) None of these
- b) Increase the effect of noise  
d) All of these
- b) Stationary anode tube  
d) None of these
- b) Aliasing  
d) Metals in the body
- b) Aliasing  
d) Metals in the body
- b) Rotate Patient couch  
d) None of these
- b) Cobalt  
d) Silver graphite

### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain Larmor equation? (3)
  3. Write the components of MRI in detail? (3)
  4. Can you explain the concept of multi-slice CT and its advantages? (3)
  5. What is Magnetic Resonance Spectroscopy (MRS) and how can it tell us about the makeup of tissues? (3)
  6. The velocity of ultrasound propagation depends on which factors? (3)
- OR**
- Explain how x-rays are captured in PSP? (3)

### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Describe the sequence of inversion recovery pulses. Explain the differences between the STIR and FLAIR pulse sequences and how they are used in medicine. (5)
8. Describe the features of the US beam. (5)
9. Write in detail on Modes and Array of USG? (5)
10. What is Doppler Effect? Express in details about the different types of Doppler mode with its application (5)
11. Draw the diagram of ultrasound transducer showing all the parts. Express in details about the different types of transducer with its application. (5)

12. Write in detail on MRI pulse sequence.

(5)

OR

Explain Turbo spin echo sequence.

(5)

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