



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – B.Sc.(MRIT)-2022/B.Sc.(MRIT)-2023

**Course Name – Physic of Modern Radiographic and Imaging Equipment-Digital
Radiography,CT**

Course Code - BMRITC402

(Semester IV)

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) What type of beam is used by 2nd generation CT Scan?
 - a) Multiple X-ray beam
 - b) Narrow Fan Beam
 - c) Broad fan beam
 - d) Pencil beam of X-rays
- (ii) State that which type of beam is used by 3rd & 4th generation CT Scan? Select the correct option.
 - a) Multiple X-ray beam
 - b) Narrow Fan Beam
 - c) Pencil beam of X-rays
 - d) Broad fan beam
- (iii) Select the correct option: What is a Pitch?
 - a) Couch movement each 360 degree added by slice thickness
 - b) Couch movement each 360 degree Multiplied by slice thickness
 - c) Couch movement each 360 degree divided by slice thickness
 - d) None of these
- (iv) Identify the atomic number of Bismuth is
 - a) 83
 - b) 4
 - c) 74
 - d) 131
- (v) Identify the beam geometry used in first generation CT.
 - a) Pencil
 - b) Narrow Beam
 - c) Wide Fan Beam
 - d) All of these
- (vi) Choose the correct value of CT number in air ?
 - a) (+)1000
 - b) (-)1000
 - c) (+)100
 - d) (-)100
- (vii) 1st CT Scan was designed to practice?
 - a) Stomach
 - b) Angiography
 - c) Heart
 - d) Brain

- (viii) Identify Spatial resolution in CT is
- 1 lp mm⁻¹
 - 2 lp mm⁻¹
 - 4 lp mm⁻¹
 - 10 lp mm⁻¹
- (ix) In helical CT, pitch is defined as
- Table movement in 360 degrees / beam width
 - Patient dose in 360 degrees / beam width
 - Reconstructed slice thickness / beam width
 - Gantry angle with respect to the scan axis
- (x) Select the correct option: Decreasing kV in CT is advantageous because
- X-ray penetration improves
 - Tissue contrast improves
 - Scan times are reduced
 - Metal streak artifacts are improved
- (xi) Choose the major technical challenge in cardiac CT is
- Spatial resolution
 - Temporal resolution
 - Contrast resolution
 - Three-dimensional reconstruction
- (xii) Choose the correct option: Thallium doped cesium iodide is a ?
- photoscintillator
 - Photo-conductor
 - Photostimulable phosphor
 - Protective layer
- (xiii) Identify the benefit of the PACS include
- Security of the image storage
 - Elimination of the film stores
 - Better availability of the images
 - All of these
- (xiv) Describe how automated exposure compensation uses the topogram (or scout) image to determine
- Tube current (mA)
 - Pitch
 - Reconstruction filter
 - Bowtie filter
- (xv) Identify the 'filter' in filtered backprojection refers to
- Bowtie filter between the beam and patient
 - Conversion between attenuation and Hounsfield units
 - Conversion between fan-beam and parallel geometry
 - Fix for the blurring inherent to backprojection

Group-B

(Short Answer Type Questions)

3 x 5=15

- Describe the display of CT images? (3)
- Illustrate the mode of CT Scan. (3)
- Write a short note on CT Number. (3)
- What is window width? (3)
- Write the advantages of PACS (3)

OR

Explain how x-rays are captured in PSP? (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

- Explain CBCT and its clinical application. (5)
- Summarize the data acquisition in CT Scan. (5)
- Explain CT Artifact (5)
- Explain the factor affecting image quality in CT. (5)
- Explain CT image reconstruction. (5)
- Evaluate an Image Acquisition of DR System? (5)

OR

Evaluate an Image Acquisition of CR System? (5)