

N.A



## BRAINWARE UNIVERSITY

Term End Examination 2023

Programme – B.Sc.(MRIT)-2021

Course Name – Physics of Newer Imaging Modalities

Course Code - BMRIT401

( 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) Relate MRI room shielding also called as ?

- |                   |                    |
|-------------------|--------------------|
| a) Faraday's Cage | b) Bird's Cage     |
| c) Newton's Cage  | d) Einstein's Cage |

(ii) Choose the correct options: The common Grid ratio in mammography

- |                 |               |
|-----------------|---------------|
| a) 12:1 to 14:1 | b) 4:1 to 5:1 |
| c) 8:1 to 12:1  | d) 6:1 to 9:1 |

(iii) Compare MRI to CT ("CAT scans"). Which is true?

- |   |   |
|---|---|
| a) Both methods use X-rays, but exposure is higher with CT.                           | b) CT reveals soft structures, while MRI is better at dense material, such as bone. |
| c) Both methods produce cross-sectional images at a specified plane through the body. | d) None of these  |

(iv) State Mammograms most often detect breast cancer in which age group?

- |        |                  |
|--------|------------------|
| a) 20s | b) 40s           |
| c) 30s | d) 50s and older |

(v) Nuclear Medicine develop

- |  |  |
|--|--|
| a) The field involving the clinical use of sealed radionuclides.     | b) The field involving the non-ionizing radiations                               |
| c) The field involving the clinical use of non-sealed radionuclides. | d) A branch in which the ionizing radiation is used to treat malignant diseases. |

(vi) State Wide Area Network (WAN) devices are connected by

- |                              |           |
|------------------------------|-----------|
| a) Cable                     | b) Router |
| c) Telecommunication Devices | d) Ring   |

(vii) If you needed to visualize a patient's History and Physical(H&P) report, you would find this in:

- |          |        |
|----------|--------|
| a) PACS  | b) RIS |
| c) DICOM | d) HIS |

- (viii) Choose the correct option: Focal spot size for mammography is
- a) 0.5-1mm  
b) 1-2mm  
c) 2-3mm  
d) 0.1-0.4mm
- (ix) Complete the sentence: the heel effect is caused by...
- a) different path lengths of photons in the anode — the correct answer  
b) misaligned collimation  
c) operating the x-ray tube with the beam horizontal  
d) placing wedge filters in the x-ray beam
- (x) Complete the sentence: Charge-coupled device can be used in digital fluoroscopy...
- a) as a collimation device  
b) as a mechanism to reduce scattered radiation  
c) as an alternate energy source during blackouts  
d) in lieu of a conventional video camera to look at the output of the image intensifier — the correct answer
- (xi) 1st CT Scan was designed to practice?
- a) Stomach  
b) Angiography  
c) Heart  
d) Brain
- (xii) Identify CT scan was invented by?
- a) Godfrey Hounsfield  
b) Wilhelm Cornard Roentgen  
c) Alan Cormack  
d) None of these
- (xiii) Identify Contrast resolution in Computed Tomography is ?
- a) Less than conventional film  
b) Better than conventional films  
c) Same as conventional films  
d) None of these
- (xiv) 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
- (xv) Identify the atomic number of Bismuth is.....
- a) 83  
b) 4  
c) 74  
d) 131

#### Group-B

(Short Answer Type Questions)

3 x 5=15

2. Define Piezoelectric effect? Types of Array? (3)
3. CT Scan was Discovered by whom and in which year? Explain the working principle of it? (3)
4. Describe the advantages and benefits of PACS for Institutions? (3)
5. Explain Ultrasound in detail? (3)
6. Express CT Generation and explain any one generation in detail? (3)

OR

Express the Gradient coil in detail?

(3)

#### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain Teleradiology? (5)
8. Evaluate an Image Acquisition of DR System? (5)
9. Write in detail on pulse height analyzer (PHA) (5)
10. Define Spin and precession and write in detail (5)
11. Explain the generations of Computed tomography? (5)
12. Explain Gamma camera in detail? (5)

OR

What is an annihilation? Express the working principle of Nuclear medicine?

(5)