

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020****Subject Code:2170303****Date:19/01/2021****Subject Name:Medical Imaging techniques****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

MARKS

- | | | | |
|------------|-----|--|-----------|
| Q.1 | (a) | Explain aperture diaphragm type beam restrictor. Calculate penumbra width when focal spot is 2cm wide, distance between source and object is 10cm, and distance between object and detector is 2m. | 03 |
| | (b) | Describe Line Focus Principle and Heel Effect and brief. | 04 |
| | (c) | Wit Neat diagram, discuss 'Xeroradiography'. | 07 |
| Q.2 | (a) | Explain Coherent and Compton scattering. | 03 |
| | (b) | Compare 3 rd and 4 th generation of CT scan machine. | 04 |
| | (c) | What is CT number? Explain its importance in CT image reconstruction. | 07 |
| Q.3 | (a) | Explain longitudinal acoustic propagation. | 03 |
| | (b) | What is matching in ultrasonic transducers? Explain mechanical matching. | 04 |
| | (c) | Explain A-mode imaging. | 07 |
| Q.4 | (a) | Explain reflection and refraction in ultrasound transmission. | 03 |
| | (b) | Discuss Beam profile of single element ultrasonic transducers. | 04 |
| | (c) | Explain B-mode imaging. | 07 |
| Q.5 | (a) | Enlist different Array structures in ultrasonic transducers. What are the advantages of array structure? | 03 |
| | (b) | Draw the block diagram of magnetic resonance system and enlist its components. | 04 |
| | (c) | Explain slice selection method in magnetic resonance system. | 07 |
| Q.6 | (a) | Explain cavitation as biological effect of ultrasound. | 03 |
| | (b) | What is primary magnetic field? Explain its effect on hydrogen atoms in human body in detail. | 04 |
| | (c) | Discuss in detail image reconstruction methods used in NMR imaging. | 07 |
| Q.7 | (a) | Explain fundamentals of medical thermography. | 03 |
| | (b) | Discuss interaction of nuclear particles and matter. | 04 |
| | (c) | Discuss SPECT in detail. | 07 |

- Q.8** (a) Enlist nuclear radiation detectors. Draw schematic diagram of scintillation detector. **03**
- (b) Discuss thermographic equipment in detail. **04**
- (c) Explain PET scanner in detail. **07**

www.FirstRanker.com