

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VII EXAMINATION – SUMMER 2026****Subject Code:3170303****Date:01-06-2026****Subject Name: Medical Imaging Techniques****Time: 02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define the advantages of using tungsten as a target material in X-ray tube.	03
	(b) Draw and explain the electrical circuit of X ray generator.	04
	(c) Analyze the fundamental interactions between x-rays and matter.	07
Q.2	(a) Describe characteristic x-rays.	03
	(b) Enlist the comparisons between fluoroscopy and radiography	04
	(c) What is beam restrictor? Explain the construction of collimator type beam restrictor.	07
	OR	
	(c) Draw and explain in detail the SPECT.	07
Q.3	(a) Define image reconstruction algorithm in CT-Scan machine.	03
	(b) What is CT Number? Indicate the CT number for water, air, soft tissues, and bones.	04
	(c) Explain the construction and working of image intensifier tube.	07
	OR	
Q.3	(a) Define the artifacts in MRI.	03
	(b) How do we evaluate the slice selection in MRI imaging?	04
	(c) What is T1 relaxation time? What are the differences between T2 and T2* relaxation time?	07
Q.4	(a) Define the Positron Emission Tomography.	03
	(b) Describe the interaction of nuclear particles with matter.	04
	(c) Write a note on CT scanner generations with schematic diagram.	07
	OR	
Q.4	(a) Describe the principle of gamma camera.	03
	(b) What is NMR? Analyze the basic components in NMR imaging.	04
	(c) With schematic diagram, explain M-mode scan of ultrasonic imaging system.	07
Q.5	(a) What are the characteristics of ultrasound wave?	03
	(b) Define the biological effects of ultrasound imaging techniques.	04
	(c) Explain the B-mode scan of ultrasonic imaging system.	07
	OR	
Q.5	(a) Describe the propagation of ultrasound wave with necessary schematic.	03
	(b) Define the piezoelectric effect with example.	04
	(c) Explain spatial encoding for MRI study.	07
