

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019

Subject Code: 2170303

Date: 23/11/2019

Subject Name: Medical Imaging techniques

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Explain coherent scattering mechanism of x-ray interaction with matter.	03
	(b) Explain line focus principle.	04
	(c) Explain characteristics of X- Ray Image.	07
Q.2	(a) Enlist the factors affecting X-ray Emission Spectrum and explain effect of any one.	03
	(b) Draw and explain fifth generation of CT scan.	04
	(c) Explain System components of Computed Tomography.	07
	OR	
	(c) Explain computed tomography image reconstruction algorithm.	07
Q.3	(a) Explain following terms related to ultrasound wave.	03
	• Axial and Lateral Resolution	
	• Huygens principle	
	(b) Explain the fundamentals of acoustical propagation.	04
	(c) Explain motion mode and Constant depth mode of ultrasound imaging technique with medical applications.	07
	OR	
Q.3	(a) Explain visualization and mapping of the ultrasonic field.	03
	(b) Discuss biological Effects of ultrasound.	04
	(c) Explain Amplitude mode and Brightness mode of ultrasound imaging technique with medical applications.	07
Q.4	(a) Enlist basic components of NMR (Nuclear Magnetic resonance).	03
	(b) Compare Magnetic resonance imaging technique with CT scan imaging technique.	04
	(c) Discuss biological effect of NMR imaging system.	07
	OR	
Q.4	(a) Explain following terms related to MRI.	03
	• Resonance	
	• Precession	
	• Magnetic Dipole Moment	
	(b) Explain any nuclear radiation detectors.	04
	(c) Draw and explain basic instrumentation of Gamma camera.	07
Q.5	(a) What is radioactivity decay? What is half-life of the radionuclide?	03
	(b) Give brief note on radionuclide generators.	04
	(c) Explain working of single photon emission computed tomography.	07
	OR	
Q.5	(a) Explain biological effect of radionuclide imaging.	03
	(b) Discuss fundamentals of medical thermography.	04
	(c) Explain working of positron emission tomography.	07
