

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2017****Subject Code: 2170303****Date: 02/11/2017****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) Describe the characteristics of X-rays.	03
	(b) Explain the effect of pair production and photodisintegration.	04
	(c) Draw and explain the constructional details of rotating anode X-ray tube.	07
Q.2	(a) Define edge spread function.	03
	(b) Explain Compton scattering with necessary diagram.	04
	(c) Write a descriptive note on X-ray image intensifiers.	07
	OR	
	(c) Write a descriptive note on beam restrictors and grids.	07
Q.3	(a) Define Attenuation, Absorption and Scattering for ultrasound.	03
	(b) Draw diagram for showing attenuation of ultrasound in various biological materials.	04
	(c) Explain the back projection and filtered back project algorithms.	07
	OR	
Q.3	(a) Define the Doppler effect with necessary diagram.	03
	(b) List and explain the types of radioactive decay that produce radiation.	04
	(c) Enlist and explain different generations of CT scanner.	07
Q.4	(a) Draw and explain the spectral distribution of infrared emission from human skin.	03
	(b) Draw the block diagram of a basic pulse-echo system.	04
	(c) Describe the principle of time-motion (M-mode) display.	07
	OR	
Q.4	(a) Draw the spectral characteristics of various types of infrared detectors.	03
	(b) Draw the multilayer matching between transducer's piezoelectric element and body tissue.	04
	(c) Describe the instrumentation of 2-D echo cardiography.	07
Q.5	(a) Outline the fundamental principle of positron emission tomography.	03
	(b) Briefly describe the scintillation detector.	04
	(c) Explain the advantages and biological effect of NMR imaging system	07
	OR	
Q.5	(a) State the Bloch equation for NMR imaging system.	03
	(b) Draw the block diagram of gamma camera.	04
	(c) Briefly explain the image reconstruction techniques for MRI with necessary diagrams.	07
