(REVISED COURSE)

(3 Hours) |Total Marks : 100

NB : (1) Question No.1 is compulsory.
  (2) Attempt any **four** questions out of remaining **six** questions.
  (3) Assume suitable data.
  (4) Assumption should be clearly stated.
  (5) Use legible handwriting. Use blue/black ink.

1. a) A sample has a T_1 of 1.5 seconds. If the net magnetization is set equal to   (5)
   zero, how long will it take for the net magnetization to recover to 98% of
   its equilibrium value ?

   b) What is the CT number of bone whose attenuation coefficient is 0.38 cm^{-1} (5)
   and attenuation coefficient of water is 0.195? (Magnification Constant 1000)

   c) Explain the third and fourth generation scanners used in CT imaging.   (10)

2. a) List various image reconstruction techniques used in Computed Tomography   (10)
   and explain the Fourier reconstruction technique.

   b) Explain the construction and working of Scintillation detectors.   (10)

3. a) Explain the following MRI parameters :—   (12)
        i) Free induction Decay
        ii) T_1 and T_2 relaxation time
        iii) Pulse sequences.

   b) What are the biological effects of MRI?   (8)

4. a) Explain briefly the various parts of the MRI system.   (12)

   b) Compare the CT and MRI based on their advantages, disadvantages,   (8)
   applications.

5. a) Discuss the construction and detectors used in MDCT. Explain how   (10)
   MDCT is superior over other generations of CT.

   b) Obtain the projections of the following image and reconstruct the image   (10)
   using ray by ray reconstruction technique.

9	7
1	5

Con. 6183–GT-9033-10.   2

6. a) Explain any two parameters with respect to Magnetic Resonance   **(10)**
      Spectroscopy :—
         (i) Chemical Shift
         (ii) PRESS sequence
         (iii) STEAM sequence.

   b) State the clinical applications of MR spectroscopy.   **(10)**

7. Write short notes on (any two) :—   **(20)**
      a) Artifacts in CT imaging
      b) PET-CT imaging
      c) Electrical Impedance Tomography
      d) CT-Angiography.

—————S—————