B.E. Biomed. Sem VII (R). Medical Image

Con. 3565–11.

(REVISED COURSE)

RK–3576

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions out of the remaining six questions.
(3) Draw neat diagrams.

1. (a) Explain the following MRI parameters :–
   (i) Spin Echo technique
   (ii) T_1 and T_2 relaxation times.
   (b) What are the various CT scanner generations ? Describe the 3rd and 4th generations in detail with diagram.

2. (a) Discuss the construction and detectors used in MDCT. Explain how MDCT is superior over other generations of CT.
   (b) Find the projections of the image given below and reconstruct the image using iterative ray by ray construction technique.

5	8
2	3

3. (a) Explain the construction and working of scintillation detectors.
   (b) Explain the principle of Electrical Impedance Tomography and also state its clinical applications.

4. (a) Explain slice selection technique in MRI.
   (b) Compare MRI and CT. Can MRI replace CT.

5. (a) Explain any two parameters with respect to Magnetic Resonance Spectroscopy :–
   (i) Chemical Shift Imaging
   (ii) PRESS Sequence
   (iii) STEAM Sequence.
   (b) What are the biological effects of MRI.

6. (a) Explain Hounsfield numbers in relation to CT imaging.
   (b) A sample has a T_1 of 1·5 seconds. If the net magnetization is set equal to zero, how long will it take for the net magnetization to recover to 98% of its equilibrium value ?
   (c) Discuss the safety considerations while performing MRI scan.

7. Write short notes on (any four) :–
   (a) PET–CT
   (b) Superconducting Magnets in MRI
   (c) T_E and T_R Intervals
   (d) Clinical Applications of CT
   (e) Gradient Coils.

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