

[Time: Three Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. **Question no 1 is compulsory.**
 2. **Attempt any three questions from remaining five questions.**
 3. **Figures to right indicate full marks.**

Q.1 State with reasons whether following statements are true or false. 20

- A) CT number for water is zero.
- B) In spiral CT, pitch factor less than one provides overlapping slices
- C) T_1 relaxation is longer than T_2 relaxation in MRI.
- D) During relaxation process in MRI, current induced in receiver coil is minimum when protons are in parallel with main magnetic field.
- E) CT provides better soft tissue details than MRI.

Q.2 A) Explain second and third generation of CT. 08

B) Explain different types of magnet used in MRI. 06

C) A sample has a T_2 of 0.5 sec. If the net magnetization is set equal to zero, how long will it take for the net magnetization to decay its 40 % of equilibrium value? 06

Q.3 A) How slice selection take place in MRI? Explain phase and frequency encoding in detail. 15

B) Write short note on Spin-echo pulse sequence. 05

Q.4 A) Write clinical applications of MRS. 15

B) Obtain the projections of following image using ray-by-ray reconstruction 05

4	5
1	8

Q.5 A) Explain different types of metabolites in MRS. 10

B) Draw and explain block diagram of MDCT. Why it is superior over conventional CT? 10

Q.6 Write short note on (any four) 20

A) Clinical applications of CT

B) CT Angiography

C) Gas-filled CT detector

D) Biological effects of MRI

E) CT artifacts
