

GANPAT UNIVERSITY

B.Tech. Semester: VIII Biomedical & Instrumentation Engineering

Regular Examination May-June -2013

Subject Name with Code: - BME 801: Advanced Biomedical Imaging Techniques

TIME: - 3 Hours

Total Marks-70

INSTRUCTIONS:-

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

Section-I

- Que.-1 (a)** Explain Slice select gradient. Also discuss How to change slice thickness. 06
- (b)** Explain the application of RF pulse in term of proton energy level in MRI. 06

OR

- Que.-1 (a)** Explain Phase encoding method for Image construction in MRI. 06
- (b)** Explain the phenomena that will make the spins get out of phase after the 90° RF pulse is turned off. 06

- Que.-2 (a)** Explain Inversion recovery pulse sequence with clinical application. 06
- (b)** Explain T1 and T2 characteristics of body tissues. 05

OR

- Que.-2 (a)** Draw the partial saturation and saturation recovery Pulse sequences. 06
- (b)** Write a short note on coils used in MRI. 05

- Que.-3 (a)** Suppose that at 1 Tesla , the approximate T1 and T2 values of H2O and Fat are follows: 06

For CSF T1=2000ms, T2= 300ms and

For Gray matter T1=500 ms, T2=100ms

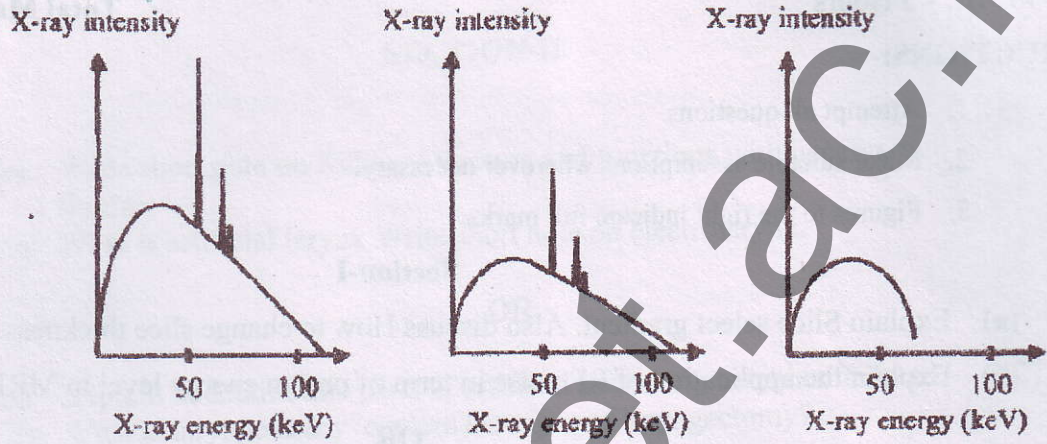
Calculate signal intensity ratio for CSF and gray matter for the pulse sequence

TR=500ms, TE= 25ms. Draw it graphically Assume similar spin densities for these tissues.

- (b)** What is Magnetic Susceptibility? Give brief introduction about type of substances with different magnetic susceptibility are commonly dealt with in MRI. 06

Section-II

Que.-4 (a) Figures shows the intensity of x-rays produced from the source as a function of their energy. With respect to the reference graph shown on the left, one plot corresponds to a decrease in the tube current and the other to a decrease in the accelerating voltage (kVp). Which plot corresponds to a decrease in which parameter and How? 06



(b) Explain working of Iterative reconstruction method and filtered back projection techniques. 06

OR

Que.-4 (a) Explain components of X-ray tube. 06

(b) Compare all generations of CT scan. 06

Que.-5 (a) Explain working of Spiral CT scan and how it is differ than Conventional CT? 06

(b) Explain clinical application of Nuclear medicine. 05

OR

Que.-5 (a) Explain working of PET scanner. 06

(b) Explain Data acquisition system of Nuclear medical Imaging with necessary schematic. 05

Que.-6 (a) Write a short note on infrared imaging techniques. 06

(b) Explain following terms: 06

- 1] Bronchoscope
- 2] cystoscope
- 3] Lithotripsy

END OF PAPER