

Roll No.

Total Pages : 3

MD/M-20

413

MODERN MEDICAL IMAGING SYSTEMS

Paper-EP 1003

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *five* questions in all. Select *one* question from each unit. Question No. 1 is compulsory. Use of scientific (non-programmable) calculator is allowed.

Compulsory Question

1. Answer in brief :

- (a) What is the basic difference between X-rays and gamma rays? 2
- (b) What are the main features of ultrasonic waves ? 2
- (c) How are different units of radioactivity related to each other? 2
- (d) What is the basic concept of Fourier transformation? 2

UNIT-I

- 2.** (a) Discuss the production mechanism of X-rays. 5
- (b) What is the meaning of patient dose in context of diagnostic techniques? 3

3. (a) What is the importance of using Fluorescent screens in X-ray imaging? 5
- (b) Calculate the wavelength of X-rays (in μm) having an energy of 3 eV. 3

UNIT-II

4. (a) Discuss the mechanism of absorption of ultrasonic energy in the human body. 4
- (b) What are the biological effects of ultrasonic waves? 4
5. (a) Describe the mechanism of generation and detection of ultrasonic waves. 5
- (b) Describe in brief about the Pulse-Echo technique. 3

UNIT-III

6. (a) What do you understand by the term Nuclear Magnetic Imaging systems? 5
- (b) Discuss in brief about the specific application of PET scanning. 3
7. (a) What are the different types and properties of particles emitted in radioactive decay? 5
- (b) At a given instance, a radioactive source is having an activity of $5.7 \mu\text{Ci}$. What would be its activity (in Bq) after it has exhausted three half lives? 3

UNIT-IV

8. (a) Discuss the idea of Spin-Echo imaging technique. 4
(b) What are the advantages of using NMR imaging? 4
9. (a) Describe the concept of Saturation as well as inversion recovery. 5
(b) What are the biological effects of NMR imaging? 3
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