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18EI821

Eighth Semester B.E. Degree Examination, July/August 2022 Medical Imaging Techniques

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the five ways of interaction between X-rays with atoms. (10 Marks)
- b. Explain the basic construction of an X-ray tube. What are the factors that affect the intensity of the X-ray beam? (10 Marks)

OR

- 2 a. Explain the following:
 - i) Fluoroscopy
 - ii) Angiography
 - iii) Mammography
 - iv) Computed Tomography. (10 Marks)
- b. Explain the biological effects of ionizing radiation. (10 Marks)

Module-2

- 3 a. Explain the construction, network model, equivalent circuit and frequency response of single element ultrasonic transducer. (10 Marks)
- b. Explain attenuation, absorption and scattering in ultrasonic wave propagation. (10 Marks)

OR

- 4 a. Draw the block diagram of A mode pulse-echo system and explain its working. What are its applications? (10 Marks)
- b. What is Doppler effect and Doppler frequency? Explain the working of CW ultrasonic flow meter. (10 Marks)

Module-3

- 5 a. Explain the terms:
 - i) Nuclear particles
 - ii) Nuclear activity and half life
 - iii) Units of measuring nuclear activity. (10 Marks)
- b. List the types of nuclear radiation detectors. Explain any one with a schematic diagram. (10 Marks)

OR

- 6 a. Explain the applications of radiation detector probes in clinical diagnosis. (10 Marks)
- b. Explain the principle and working of Positron Emission Tomography. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Explain:
i) Angular momentum
ii) Free induction decay. (10 Marks)
b. With a neat block diagram, explain the working of magnetic resonance imaging system. (10 Marks)

OR

- 8 a. Discuss slice selection, phase encoding and frequency encoding in NMR imaging. (10 Marks)
b. Explain the characteristics of magnetic resonance images. (10 Marks)

Module-5

- 9 a. Explain the physical factors that affect the amount of infrared radiation. (07 Marks)
b. Explain the components of infrared image scanner with a neat schematic block diagram. (13 Marks)

OR

- 10 a. Explain the working of pyroelectric vidicon camera with a neat schematic block diagram. (12 Marks)
b. Explain the salient features of image guided interventions indicating its advantages and applications. (08 Marks)

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