

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

MEDICAL IMAGING TECHNIQUES

[Time : 3 hours]

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define linear attenuation co-efficient in CT imaging.
2. Name the types of scanners used in ultrasound imaging.
3. List the drawbacks of MRI scanner.
4. Define half-life period of a radio isotope.
5. Identify the property of X-ray used in scintillation detectors. (5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer *any five* of the following questions. Each question carries 6 marks.

1. Describe the principle of operation of CT machine.
2. Write notes on echoencephalography.
3. Explain the properties of ultrasound.
4. Define T_1 relaxation with respect to MRI imaging. Also mention the peculiarities of T_1 weighted image.
5. Describe the construction and working of superconducting magnet.
6. Explain different types of radioactive emission.
7. Differentiate between PET and SPECT scanners.

(5×6 = 30)

PART --- C
(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT --- I

- III (a) Describe the working of an X-ray machine with suitable block diagram.
(b) Draw the structure of X-ray tube and explain its working.

OR

- IV (a) Explain the working of a C-ARM or fluoroscopy unit block diagram.
(b) Write notes on intra-aortic balloon pump.

UNIT --- II

- V (a) Define the Doppler Effect. Explain the applications of Doppler Effect in medical field.
(b) With the help of a block diagram, explain the working of pulse-echo scanner.

OR

- VI (a) With the help of suitable diagram, describe the structure and function of ultrasound probe.
(b) Explain the working of a sector scanner.

UNIT --- III

- VII (a) List at least eight applications of MRI in medical field.
(b) Explain how an image slice is selected in MRI machine.

OR

- VIII (a) Explain the principle of operation of MRI machine.(No instrumentation)
(b) Explain about the RF coils used in MRI machine.

UNIT --- IV

- IX (a) Explain the working of a gamma camera with the help of a block diagram.
(b) Explain the working of ionization chamber.

OR

- X (a) Compare a CT scanner and a PET scanner based on its working and applications.
(b) Explain the principle of operation and working of a SPECT scanner with suitable diagrams.