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**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 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. Identify the role of image intensifier in C-arm.
2. Define piezoelectric effect.
3. Define Lamour frequency.
4. List the types of radioactive emission.
5. List any two types of functional imaging techniques.

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Illustrate the working of a Xenon detector using suitable diagram.
2. Explain the properties of X-rays.
3. Define acoustic impedance. Mention its importance in image formation.
4. Explain the types of scanning used in ultrasound machine in detail.
5. What is FID signal ? Explain how it is generated.
6. What are gradient coils ? Explain its function in MRI machine.
7. Explain the types of radioactive decay that produces radiation.

(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) Explain the principle and operation of a CT machine with the help of a block diagram. 10
- (b) Differentiate between angioplasty and angiography. 5

OR

- IV (a) Identify the need for a rotating anode X-ray tube. Draw the internal diagram and explain the functioning of rotating anode X-ray tube. 10
- (b) Explain how an image is formed in an X-ray film. 5

UNIT — II

- V (a) Explain the modes of operation of ultrasound scanning. 8
- (b) Explain echocardiography. 7

OR

- VI (a) Explain the working of pulsed Doppler scanner with suitable block diagram. 8
- (b) List the applications (at least seven) of ultrasound scanning in medical field. 7

UNIT — III

- VII (a) Explain the working of MRI machine with help of a block diagram. 10
- (b) Define longitudinal relaxation time with suitable diagrams. 5

OR

- VIII (a) Explain the types of magnetic used in MRI machine. 8
- (b) Explain Transverse relaxation with suitable diagrams and equations. 7

UNIT — IV

IX Write notes on :

- (i) Concept of nuclear imaging
- (ii) Radioactive decay
- (iii) Properties of Gamma ray

(5×3= 15)

OR

- X (a) Describe the process of gamma ray generation in PET scanners. List three radiopharmaceuticals used in nuclear imaging. 6
- (b) Explain the principle of operation of a PET machine. Describe the instrumentation of PET machine. 9