

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Winter 2022-23 Examination

Semester: 7
Subject Code: 203111401
Subject Name: Medical Imaging Technology

Date: 03/10/2022
Time: 10:30 am to 01:00 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (All are compulsory, Each Question carry one mark) (15)

1. The order of imaging methods (from worst to best) with respect to visibility of detail (resolution) is:
(a) Gamma camera, fluoroscopy, CT (b) Ultrasound, fluoroscopy, radiography
(c) Gamma camera, fluoroscopy, MRI (d) Radiography, fluoroscopy, MRI
2. The presence of noise in a medical image will generally
(a) Produce artifacts (b) Produce blurring
(c) Reduce visibility of low contrast objects (d) Produce image distortion
3. MRI can detect diseases at ----- stages.
(a) Advanced (b) late
(c) Early (d) None
4. If medium 1 and 2 have impedance of z_1 and z_2 respectively, then percent reflected beam depends upon _____.
(a) $z_1 + z_2$ (b) $z_1 - z_2$
(c) z_1 / z_2 (d) $z_1 * z_2$
5. What property of sound waves acts like the principle of ultrasound?
(a) Reflection and Refraction (b) Reflection only
(c) Refraction only (d) Propagation
6. The gradient of magnetic field is produced by _____ coils.
7. What is Heel Effect?
8. In which generation of CT scanner have complete ring of detectors surrounds the patient?
9. Drinking radioactive Barium solution helps look at the _____.
10. Define CT Number. Calculate the CT Number of Water.
11. On computed tomography, bone is displayed as _____.
12. What is cryogen? Which cryogen is used for MRI Scanner?
13. How to Calculate electromechanical coupling coefficient?
14. Define the Term: Zeeman effect
15. Enlist the types of Coils that are available for MRI Scanner.

Q.2 Answer the following questions. (Attempt any three) (15)

- (A) Give the difference between X-Ray, CT & MRI imaging techniques.
- (B) Explain different phenomenon occurs during interactions between x-rays & matter.
- (C) Define the term: Thermography. Explain the Brief note on medical Thermography.
- (D) Draw & explain the construction of image intensifier.

- Q.3 (A)** State different types of Magnets used in MRI and explain it in detail. (07)
(B) Write a short note on Digital Subtraction Angiography. (08)

OR

- (B)** What are the Components used in CT Scanner? Explain the Subsystem of Gantry in detail. (08)
Q.4 (A) Explain construction of single element ultrasonic transducer with the concept of mechanical matching. (07)

OR

- (A)** Explain PET Scanner in brief with suitable Schematic Diagram. (07)
Q.4 (B) Enlist different Modes of Ultrasounds & explain A mode of Ultrasound with necessary Block Diagram. (08)