

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0222]

**FEBRUARY 2022
(OCTOBER 2021 EXAM SESSION)**

Sub. Code: 2501

**M.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY
FIRST YEAR**

(Candidates admitted from 2019-2020 onwards – Paper I)

(Candidates admitted from 2020-2021 onwards – Paper II)

PAPER I & II – RADIOLOGICAL PHYSICS

Q.P. Code : 282501

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Describe the Physics and principle of mammography.
2. What are the factors affecting radiographic quality? How to improve the Radiographic quality?

II. Write Short Notes on:

(10x6 = 60)

1. Scatter radiation- formation and control
2. Write about interlocking and X-ray tube overload protection
3. Half value thickness
4. Describe the principle of Magnetic Resonance angiography
5. Annihilation coincidence detection.
6. Explain about the relationship between the absorbed dose and equivalent dose.
7. Write notes on Doppler Physics
8. Heat dissipation methods in X-ray tube
9. Radiation units.
10. Discuss the interaction between ultrasound and matter.

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[AHS 0522]

MAY 2022

Sub. Code: 2501

**M.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY
FIRST YEAR**

(Candidates admitted from 2019-2020 onwards – Paper I)

(Candidates admitted from 2020-2021 onwards – Paper II)

PAPER I & II – RADIOLOGICAL PHYSICS

Q.P. Code : 282501

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Describe the physical principle of MDCT.
2. Discuss in detail the Digital Radiography. Also explain the advantages of digital radiography over conventional radiography.

II. Write Short Notes on:

(10x6 = 60)

1. PACS in radiology department.
2. X-ray films and characteristics.
3. Rotating anode in X ray tube.
4. Personal dosimeters.
5. Write note on ultrasound physics.
6. Describe the Hounsfield number.
7. Write note on Compton effect.
8. Filters.
9. CR vs DR.
10. What are the requirements of X-ray production.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1022]

OCTOBER 2022

Sub. Code: 2501

**M.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY
FIRST YEAR**

**(Candidates admitted from 2019-2020 onwards – Paper - I)
(Candidates admitted from 2020-2021 Batch onwards – Paper - II)
PAPER I & II - RADIOLOGICAL PHYSICS**

Q.P. Code : 282501

Time: Three hours

Maximum : 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. Principles and Clinical application of dual energy CT. Discuss various dose reduction techniques in CT.
2. Describe the construction of an X – ray tube with the help of a labelled diagram. Discuss the mechanism of production of X – rays.

II. Write notes on:

(10 x 6 = 60)

1. Define radiographic contrast. Describe factors that affect radiographic contrast.
2. CT Enteric contrast agents.
3. Photoelectric effect and its role in production of radiographic images.
4. Clinical applications and techniques of fat suppression MRI.
5. Filters.
6. X – ray Film.
7. Rare earth screens.
8. CT perfusion in acute stroke.
9. Tomosynthesis in mammography.
10. Ultrasound artifacts.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0523]

MAY 2023

Sub. Code: 2501

**M.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY
FIRST YEAR**

**(Candidates admitted from 2020-2021 Batch onwards)
PAPER II - RADIOLOGICAL PHYSICS**

Q.P. Code: 282501

Time: Three hours

Maximum : 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. Enumerate the types of digital radiography. Describe each one briefly. Advantages and limitations of digital radiography compared with conventional film screen radiography.
2. a) Principles of radiation protection.
b) Describe various radiation units.
c) Discuss the methods used to decrease radiation exposure in fluoroscopy.

II. Write notes on:

(10 x 6 = 60)

1. Define and classify radiographic grids. Describe their various uses in radiography.
2. Describe AERB guidelines on X-ray room installation.
3. Short notes on HEEL effect.
4. Classify iodinated contrast media.
5. Motion artifacts in MRI. Methods to prevent them.
6. Cone beam CT.
7. Image intensifier.
8. Rotating anode in X-ray tube.
9. Diffusion weighted imaging.
10. Pressure injector.

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[AHS 1023]

OCTOBER 2023

Sub. Code: 2501

**M.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY
FIRST YEAR (From 2020-2021 onwards)
PAPER II - RADIOLOGICAL PHYSICS**

Q.P. Code: 282501

Time: Three hours

Maximum: 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. Production of X-rays with diagrammatic representation.
2. Describe the Physics and principle of mammography.

II. Write notes on:

(10 x 6 = 60)

1. Types of MRI magnets.
2. TLD Badge.
3. Types of ultrasound transducers.
4. Digital subtraction angiography [DSA].
5. Flat panel detector.
6. Radiation units.
7. Compton Effect.
8. Focal spot and sizes in X-ray tube.
9. Principle of Automatic Exposure Control (AEC).
10. Half value thickness.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1024]

OCTOBER 2024

Sub. Code: 2501

**M.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY
FIRST YEAR (From 2020-2021 onwards)
PAPER II - RADIOLOGICAL PHYSICS**

Q.P. Code: 282501

Time: Three hours

Maximum: 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. Computer Radiography Vs Digital radiography. Explain the pros and cons.
2. Principle of radiation detections and measurement. Discuss about scintillation detectors and TLD badge.

II. Write notes on:

(10 x 6 = 60)

1. Types of MRI magnets.
2. Picture Archiving and Communication System (PACS).
3. Radiation units.
4. Quality assurance of mobile X-ray units.
5. Design of gamma camera unit.
6. X-ray quality and quantity.
7. Rotating anode.
8. Discuss stochastic effects of Radiation.
9. Full wave – self rectification-X-ray generator.
10. Leakage and scattered radiation.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0525]

MAY 2025

Sub. Code: 2501

**M.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY
FIRST YEAR (From 2020-2021 onwards)
PAPER II - RADIOLOGICAL PHYSICS**

Q.P. Code: 282501

Time: Three hours

Maximum: 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. Write in detail about the principle and production of Ultrasound. Give their advantages and disadvantages.
2. Describe the various types of interactions of ionizing radiation with matter.

II. Write notes on:

(10 x 6 = 60)

1. X-ray production and their properties.
2. Anode angulation, line focus principle and space charge effect.
3. Law of exponential attenuation, half value layer and linear attenuation coefficient.
4. Principle of automatic exposure control (AEC) and practical operation.
5. Types of generators and 3 phase, 6 and 12 pulse circuits.
6. Fuse, switch and earthing.
7. Relationship between absorbed dose and equivalent dose.
8. Thermoluminescent and pocket dosimeter.
9. Working principle of Computed Tomography.
10. Factors influencing the quality and quantity of X-rays.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1025]

OCTOBER 2025

Sub. Code: 2501

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FIRST YEAR (From 2020-2021 onwards)
PAPER II - RADIOLOGICAL PHYSICS**

Q.P. Code: 282501

Time: Three hours

Maximum: 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. What are the factors affecting radiographic quality? How to improve the radiographic quality?
2. Digital Radiography - its principle, physics and equipment.

II. Write notes on:

(10 x 6 = 60)

1. Half Value Thickness (HVT).
2. Explain the parts of Ultrasound Transducer.
3. Types of Interaction of ionizing radiation with matter and explain about photoelectric effect.
4. Linear attenuation coefficient.
5. Diffusion weighted imaging in MRI.
6. Characteristics X-rays.
7. Pocket dosimeter.
8. Describe Filament circuit in X-ray Production.
9. Write note on Flat Panel Detectors and its advantages.
10. Anode heel effect.
