

[LH 0415]

OCTOBER 2015

Sub. Code: 3601

DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY
(Regulation for candidates admitted from 2014-2015 session onwards)
PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY

Q.P. Code : 363601

Time : Three hours

Maximum : 100 marks

I. Elaborate on:

(2 x 20 = 40)

1. Explain X-ray production using Rotating anode X-ray tube with suitable diagram.
2. Describe the Physical Principles in Magnetic Resonance Imaging.

II. Write notes on:

(10 x 6 = 60)

1. Define Roentgen and Gray.
2. Define Faraday's Law and Lenz's Law in Electromagnetic induction.
3. Describe the law of Radioactive disintegration with decay equation.
4. Explain Heel effect with necessary diagram.
5. Define Half Value Layer & Discuss about Filtration.
6. Explain the function of Ionisation Chamber detector in Radiation detection.
7. Discuss about Automatic Brightness Control in Fluoroscopy.
8. List out the artifacts in Magnetic Resonance Imaging.
9. Explain A-mode Ultrasound with necessary diagram.
10. Discuss about Single Photon Emission Computed Tomography (SPECT).

[LJ 1016]

OCTOBER 2016

Sub. Code: 3601

**P.G. DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY EXAMS
PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY**

Q.P. Code : 363601

Time : Three hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Explain the various process of radioactive decay, including decay equation, half life and mean life.
2. Explain the various display modes of ultrasound and its clinical applications.

II. Write notes on:

(10 x 6 = 60)

1. Resistors used in parallel connection.
2. Auto transformer and its applications.
3. Bremsstrahlung X-rays.
4. Compton scattering.
5. Pocket dosimeter and its uses.
6. Artifacts in computed tomography.
7. Pulse sequences in MRI.
8. PET-CT imaging.
9. Digital subtraction angiography.
10. Stationary anode X-ray tube.

[LL 1017]

OCTOBER 2017

Sub. Code: 3601

**P.G. DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY EXAMS
PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY**

Q.P. Code : 363601

Time : Three hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Describe about the construction and image acquisition method of SPECT scan.
2. Describe about various principle of radiation detection.

II. Write notes on:

(10 x 6 = 60)

1. Write about electromagnetic spectrum.
2. Write note on Kirchoff's current law.
3. Explain about Fleming's right hand rule.
4. Define half-life and mean life. The half-life of I-131 is 8 day. Calculate the value of decay constant and its mean life.
5. What is contrast and spatial resolution?
6. Explain about photo electric effect.
7. Explain the process of thermo luminescence dosimeter.
8. Write about mammography.
9. Explain about ultrasound production.
10. Write about magnetic resonance.

[LM 0518]

MAY 2018

Sub. Code: 3601

**P.G. DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY EXAMS
PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY**

Q.P. Code : 363601

Time : Three hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Describe in detail about various generation of computed tomography.
2. a) Discuss in detail about interaction of photons with matter.
b) The X-ray exposure at 1m was 300 mR/h. The aluminium thickness of 10 mm placed between X-ray beam and detector. Now intensity reduced to 75 mR/h. Calculate the HVT of the beam.

II. Write notes on:

(10 x 6 = 60)

1. Explain about mass defect and binding energy.
2. Write note on space charge effect.
3. Explain the factors affecting X-ray spectrum.
4. Write about mutual induction.
5. Explain about radioactivity.
6. Distinguish between conductors and insulators.
7. Explain about Sommerfield atomic model.
8. Define Coulomb's law and magnetic flux.
9. Explain the principle of ionization chamber.
10. Write about T2 relaxation.

[LN 1018]

OCTOBER 2018

Sub. Code: 3601

**P.G. DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY EXAMS
PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY**

Q.P. Code : 363601

Time : Three hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Explain in detail about radiation detection, measurements and various detectors.
2. Discuss about pet principle, pet camera, its construction, positron emitting isotopes and its clinical use.

II. Write notes on:

(10 x 6 = 60)

1. Various modes in USG.
2. CT artifacts.
3. Truncation artifact, its cause and methods to avoid it.
4. USG gel and its components.
5. T1 and T2 relaxation principle in MRI.
6. Technetium generator with suitable illustration.
7. Doppler principles and in detail about pulsed doppler.
8. Types, uses of various Filters in X-ray.
9. Factors affecting the image quality of X-rays.
10. Hounsefield units.

[LO 0519]

MAY 2019

Sub. Code: 3601

**P.G. DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY EXAMS
PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY**

Q.P. Code : 363601

Time : Three hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Discuss the various types of X-ray Interactions with matter.
2. Various Imaging Sequences in Magnetic Resonance Imaging.

II. Write notes on:

(10 x 6 = 60)

1. Define Exposure and Absorbed Dose.
2. Define Coulombs law & Ohm's Law.
3. List out the properties of X-rays.
4. Explain the function of Auto transformer with suitable diagram.
5. Explain the function of capacitors in series.
6. Explain the function of Scintillation detector in Radiation detection.
7. Multislice Computed Tomography.
8. Explain Time of Repetition & Time of Echo in Magnetic Resonance Imaging.
9. Explain the types of Ultrasound Transducers.
10. MR Elastography.

[LP 1019]

OCTOBER 2019

Sub. Code: 3601

**P.G. DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY EXAMS
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Q.P. Code : 363601

Time : Three hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Explain High Frequency X-ray Generator with suitable diagram.
2. Describe the generations of Computed Tomography.

II. Write notes on:

(10 x 6 = 60)

1. Discuss Neils Bohr Atom Model.
2. Define Conductor, Insulator and Semiconductor.
3. List out the properties of Gamma radiation.
4. Explain Space Charge effect with necessary diagram.
5. Describe Pair production & Annihilation.
6. Explain the function of Geiger Muller Counter as Radiation Detector.
7. List out the advantages of Compression in Mammography Imaging.
8. Explain T1 relaxation & T2 relaxation in Magnetic Resonance Imaging.
9. Describe M-mode Ultrasound.
10. Define Physical Half Life & Biological Half Life in Radioactivity.

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

[AHS 0321]

MARCH 2021

Sub. Code: 3601

(OCTOBER 2020 EXAM SESSION)

POST GRADUATE DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY

(From 2014-2015 onwards)

PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF DIAGNOSTIC RADIOLOGY

Q.P. Code : 363601

Time : Three hours

Answer ALL Questions

Maximum : 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. What is DSA? Discuss its principle & advantages it offers over conventional angiography.
2. Discuss Principle & Clinical applications of Spiral CT. A note on CT generation.

II. Write Short Notes on:

(10x6 = 60)

1. Piezoelectric effect.
2. PACS & filmless radiology.
3. SPECT.
4. Modern X-ray tube.
5. Larmor frequency.
6. Advantages of digital radiology over conventional.
7. Technical principles of mammography equipment.
8. Beam hardening effect.
9. Factors affecting quality and intensity of x ray.
10. Transducers used for Cranial sonography.

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

[AHS 0921]

**SEPTEMBER 2021
(MAY 2021 EXAM SESSION)**

Sub. Code: 3601

**POST GRADUATE DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY
(From 2014-2015 onwards)**

**PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF DIAGNOSTIC RADIOLOGY
*Q.P. Code : 363601***

Time : Three hours

Answer ALL Questions

Maximum : 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. What are the radioactive isotopes used in diagnostic radiology? What are the radiation hazards and how do you prevent the same .
2. Describe physical principles involved in MRI. Discuss merits & demerits of MRI.

II. Write Short Notes on:

(10x6 = 60)

1. Discuss the various modes of radioactive decay.
2. Line focus principle
3. Heel effect
4. Draw the basic structure of a transducer. Merits and Demerits of various transducer available
5. Principle of doppler with colour flow imaging
6. Scattered radiation
7. Fission and Fusion
8. Gradient echo imaging
9. Factors affecting contrast of an image
10. MR Spectroscopy

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

[AHS 0522]

MAY 2022

Sub. Code: 3601

POST GRADUATE DIPLOMA IN RADIOLOGY & IMAGING TECHNOLOGY

(From 2014-2015 onwards)

PAPER I – FUNDAMENTALS OF RADIATION PHYSICS & PHYSICS OF DIAGNOSTIC RADIOLOGY

Q.P. Code : 363601

Time : Three hours

Answer ALL Questions

Maximum : 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. What is basic principle of ultrasound? Describe construction of Phase array & linear array scanner.
2. Detail about the properties of X-ray and production of x ray with a note on tube design.

II. Write Short Notes on:

(10x6 = 60)

1. Describe the interaction of electron with target.
2. Spiral v/s Conventional CT.
3. Focal point of X-ray tube.
4. Grids.
5. X-ray films.
6. HRCT.
7. Intensifying screens.
8. Film badge.
9. Xero radiography.
10. MRI coils.
