

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY**FIRST YEAR****PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY***Q.P. Code : 841402***Time : Three Hours****Maximum : 100 marks****Answer ALL questions in the same order.****I. Elaborate on:**

	Pages (Max.)	Time (Max.)	Marks (Max.)
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- | | | | |
|--|---|---------|----|
| 1. What is the principle electromagnetic induction and explain its application in X- ray production? | 7 | 20 min. | 10 |
| 2. Describe in detail about the factors affecting the quality and quantity of X-rays. | 7 | 20 min. | 10 |
| 3. What is the principle of radiation detection and explain about personnel monitoring. | 7 | 20 min. | 10 |

II. Write notes on:

- | | | | |
|---|---|--------|---|
| 1. Atoms and molecules. | 4 | 9 min. | 5 |
| 2. Filtration. | 4 | 9 min. | 5 |
| 3. Mutual induction. | 4 | 9 min. | 5 |
| 4. Anode assembly. | 4 | 9 min. | 5 |
| 5. Compton effect. | 4 | 9 min. | 5 |
| 6. Radiation zone monitor. | 4 | 9 min. | 5 |
| 7. Write about the phenomenon of thermionic emission. | 4 | 9 min. | 5 |
| 8. Half-value layer. | 4 | 9 min. | 5 |
| 9. X-ray tube cooling. | 4 | 9 min. | 5 |
| 10. Binding energy. | 4 | 9 min. | 5 |

III. Short answers on:

- | | | | |
|---|---|--------|---|
| 1. Define current. | 1 | 3 min. | 2 |
| 2. What is nucleus? | 1 | 3 min. | 2 |
| 3. What is the commonly used target angle in diagnostic X-ray unit? | 1 | 3 min. | 2 |
| 4. Voltmeter and Ammeter. | 1 | 3 min. | 2 |
| 5. Pocket dosimeter. | 1 | 3 min. | 2 |
| 6. Why tungsten is used as target material in X-ray tube? | 1 | 3 min. | 2 |
| 7. What is kVp and mA stand for in imaging technology? | 1 | 3 min. | 2 |
| 8. What is heat units? | 1 | 3 min. | 2 |
| 9. Give charge and mass of neutron. | 1 | 3 min. | 2 |
| 10. Expand TLD. | 1 | 3 min. | 2 |

[LC 0212]

FEBRUARY 2013

Sub. Code: 1402

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code : 841402

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain in detail about various components of X-ray tube.
2. Describe the different types of radioactivity.
3. Describe about Bohr's atomic model structure

II. Write notes on:

(10 x 5 = 50)

1. Excitation.
2. Photo electric effect.
3. Explain inverse square law.
4. Pair production.
5. Element and compound.
6. X-ray circuit.
7. Factors influencing X-ray beam quality and quantity.
8. Tube Voltage.
9. Self induction.
10. Principle of line focus.

III. Short Answers on:

(10 x 2 = 20)

1. Mass number.
2. Define work.
3. What is conduction.
4. What is electric potential.
5. Melting point of X-ray target material and atomic number.
6. What is ohm.
7. Define power and give its unit.
8. What is the charge and mass of an electron?
9. Filament current.
10. What is radiation.

[LD 0212]

AUGUST 2013

Sub. Code: 1402

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code : 841402

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe the construction and working of modern x-ray tube.
2. Explain in detail about the photoelectric effect of radiation.
3. Write in detail about construction and working of ionization chamber.

II. Write notes on:

(10 x 5 = 50)

1. Write briefly about properties of X-ray.
2. Sub atomic particles.
3. Excitation.
4. Tube current.
5. Electromagnetic radiation.
6. X-ray efficiency.
7. Explain the phenomenon of magnetism.
8. Radiation survey meter.
9. Radioactive decay.
10. Principle of line focus.

III. Short Answers on:

(10 x 2 = 20)

1. Define Ohm's law.
2. Einstein's formula.
3. What is the SI unit of radioactivity.
4. Voltmeter and Ammeter.
5. What is nucleon.
6. Define work.
7. Name the target material commonly used in X-ray tube.
8. Atomic number and mass number.
9. Define energy.
10. What is element.

[LE 0212]

FEBRUARY 2014

Sub. Code: 1402

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code : 841402

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Draw neat diagram of X-ray tube and explain about each parts of X-ray tube.
2. Describe the different types of radiation detection.
3. Explain about different methods of atomic structures.

II. Write notes on:

(10 x 5 = 50)

1. Atoms and molecules.
2. Photo electric effect.
3. Explain inverse square law.
4. Magnetism.
5. Thermionic emission.
6. X-ray circuit.
7. Factors influencing X-ray beam quality and quantity.
8. Half value layer.
9. Self induction.
10. Tube voltage.

III. Short Answers on:

(10 x 2 = 20)

1. Mass number.
2. Define work.
3. What is convection.
4. Define electric potential.
5. Melting point of X-ray target material and atomic number.
6. What is current.
7. Define power and give its unit.
8. What is the charge and mass of an neutron.
9. Filament current.
10. What is radiation?

[LF 0212]

AUGUST 2014

Sub. Code: 1402

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code : 841402

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe the principle ionization chamber and radiation measurement.
2. Explain the photoelectric effect radiation with matter.
3. Write in detail about construction and working modern of X-ray machine

II. Write notes on:

(10 x 5 = 50)

1. Properties of X-ray.
2. Define atom.
3. Excitation.
4. Filament current.
5. Electromagnetic spectrum.
6. Define focal spot.
7. Explain the phenomenon of thermionic emission.
8. Radiation survey meter.
9. Artificial radioactivity.
10. Mutual induction.

III. Short Answers on:

(10 x 2 = 20)

1. Define Ohm's law.
2. Einstein's formula.
3. What is the SI unit of radioactivity.
4. Radioactive decay.
5. What is nucleon.
6. Define work.
7. Name the target material commonly used in X-ray tube.
8. Atomic number.
9. Define energy.
10. What is molecules.

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code : 841402

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. What is the principle electro magnetic induction and explain its application in X- ray production?
2. Differentiate between quality and quantity of X-rays and factors influencing them.
3. Explain about personnel monitoring devices.

II. Write notes on:

(10 x 5 = 50)

1. Atoms and molecules.
2. Total filtration.
3. Self induction.
4. Cathode assembly.
5. Pair production.
6. Radiation zone monitor.
7. Write about the phenomenon of thermionic emission.
8. Half-value layer.
9. X-ray tube cooling method.
10. Binding energy.

III. Short Answers on:

(10 x 2 = 20)

1. Define current.
2. What is nucleus?
3. Heel effect.
4. Capacitor.
5. Film badge dosimeter.
6. Why tungsten is used as target material in X-ray tube?
7. What is kVp and mA stand for in imaging technology?
8. What is convection?
9. Give charge of proton.
10. What is TLD?

[LH 0815]

AUGUST 2015

Sub. Code: 1402

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code : 841402

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain the KV Control Circuit.
2. Explain the AC Generator.
3. Explain the Atomic Structures.

II. Write notes on:

(10 x 5 = 50)

1. Electro Magnetic Waves.
2. X-Ray Production.
3. State Fleming's Rt.Hand Rule.
4. Einstein's Formula $E = mc^2$
5. Atomic Elements.
6. State Electro Magnetic Law.
7. Force, Work, Power.
8. TLD Badge.
9. X-Ray Intensity affecting factors.
10. State Ohm's Law.

III. Short Answers on:

(10 x 2 = 20)

1. SI unit of Resistance, Capacitance.
2. Newton.
3. Ionisation.
4. Composite Filters.
5. Radioactive Isotopes.
6. Intensity.
7. Joule's Law.
8. Why Tungsten used in X-ray tube?
9. Magnetic Flux.
10. KVpeak.

[LI 0216]

FEBRUARY 2016

Sub. Code: 1402

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code : 841402

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Compare the Properties of Alphas, Beta, Gamma, X-ray.
2. State Fleming's Lt. and Rt. Hand Rule.
3. Electromagnetic Loss.

II. Write notes on:

(10 x 5 = 50)

1. Electromagnetic Spectrum.
2. SI unit of Temp, Radiation Absorption, Heat, Pressure.
3. Elimination of Heat in X-ray tube.
4. Rectification circuit.
5. TLD Badge.
6. Usage of Filters in X-ray.
7. Usage of Survey Meter.
8. Find the Intensity of radiation at 3mt, if it is 20R at 1mt.
9. Ionisation and Excitation.
10. Ohm's Law.

III. Short Answers on:

(10 x 2 = 20)

1. Unit for Magnetic Flux.
2. Atomic Elements.
3. Joule's Law.
4. TLD.
5. Electro Magnetic Induction.
6. Reason for Tungsten in Cathode X-ray tube.
7. Curie.
8. Solid State Rectifiers.
9. HVL.
10. 2 Radioactive Isotopes.

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code: 841402

Time : Three hours

Maximum: 100 Marks

Answer **ALL** questions.

I. Elaborate on:

(3 x 10 = 30)

1. Discuss in detail on principles of radiation safety. Write a note on personnel monitoring devices.
2. Explain with diagram about high tension X-ray circuit.
3. Write in detail the principle and construction of modern X-ray tube.

II. Write notes on:

(10 x 5 = 50)

1. Compton scattering.
2. Electromagnetic induction.
3. Full wave rectifier circuit.
4. Continuous radiation.
5. What are the various radioisotopes used in medicine?
6. Heat loss in transformer.
7. Methods to cool anode.
8. Explain the method to determine Half value layer.
9. Write a note on artificial radioactivity.
10. Film badge.

III. Short answers on:

(10 x 2 = 20)

1. Focal spot.
2. Ohms law.
3. Dosimeter.
4. Tube current.
5. Focusing cup.
6. Filtration.
7. Rectifier.
8. Einstein's formula.
9. Define radioactivity.
10. Excitation.

[LK 0217]

FEBRUARY 2017

Sub. Code: 1402

**DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR
PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code: 841402

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Discuss in detail the working and construction of stationary anode x-ray tube.
2. Discuss about the factors influencing quality and quantity of x-ray beam.
3. Discuss in detail the interaction of x-rays with matter.

II. Write notes on:

(10 x 5 = 50)

1. Properties of x-rays.
2. Tube rating chart.
3. Auto transformer.
4. Characteristic radiation.
5. Mutual induction.
6. Personnel monitoring device.
7. Heat dissipation in X-ray tube.
8. Radiation zone monitor.
9. Atomic structure of Tungsten.
10. Quality of x-rays.

III. Short answers on:

(10 x 2 = 20)

1. Focal spot.
2. Transformer.
3. Mass number.
4. Define work.
5. Thermionic emission.
6. Electron.
7. Binding energy.
8. Space charge effect.
9. TLD.
10. Ionisation chamber.

[LL 0817]

AUGUST 2017

Sub. Code: 1402

**DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR
PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code: 841402

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Discuss in detail the working and construction of rotating anode x-ray tube.
2. Describe the construction and working of an ionization chamber.
3. Discuss in detail on the interactions of X-rays with matter.

II. Write notes on:

(10 x 5 = 50)

1. Electromagnetic radiation spectrum.
2. Principles of radiation safety.
3. Quality and quantity of X-rays.
4. Anode Heel effect.
5. Line focus principle.
6. Pocket dosimeter.
7. TLD badge.
8. Crookes tube.
9. Radiation survey meter.
10. Method of anode cooling.

III. Short answers on:

(10 x 2 = 20)

1. Radioactivity.
2. Inverse square law.
3. Half value layer.
4. Filament.
5. Phosphorescence.
6. Ionisation.
7. Define Power.
8. Atomic number.
9. Scintillation detector.
10. Define voltage.

[LM 0218]

FEBRUARY 2018

Sub. Code: 1402

**DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR
PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code: 841402

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Explain Bremsstrahlung production and Characteristic of X-ray spectrum.
2. Discuss the Interaction of Radiation with Matter.
3. Explain the TLD Personal Monitoring device and brings out its silent features over the Film Badge.

II. Write notes on:

(10 x 5 = 50)

1. Auto Transformer.
2. Capacitor and Capacitance.
3. Ionization and Excitation.
4. Mutual Induction.
5. Radiation Survey Meter.
6. Fleming's Left hand Rule.
7. MA circuit.
8. Theory of Transformer.
9. The atomic structure and Molecules.
10. Properties and production of X-rays.

III. Short answers on:

(10 x 2 = 20)

1. What is Characteristic X-rays?
2. Radioactivity Decay.
3. Define Power and Energy.
4. Define HVL.
5. Tube Current.
6. Isotope.
7. Magnetic Induction.
8. Focussing cup.
9. Voltmeter and Ammeter.
10. Atomic Number.

[LN 0818]

AUGUST 2018

Sub. Code: 1402

**DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR
PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code: 841402

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail about construction and working modern of X-ray machine.
2. Explain the photoelectric effect radiation with matter.
3. Write in detail about construction and working of ionization chamber.

II. Write notes on:

(10 x 5 = 50)

1. Explain inverse square law.
2. Atoms and molecules.
3. Photo electric effect.
4. Tube current.
5. Electromagnetic radiation.
6. X-ray efficiency.
7. Explain the phenomenon of magnetism.
8. Radiation survey meter.
9. Radioactive decay.
10. Auto Transformer.

III. Short answers on:

(10 x 2 = 20)

1. Define Ohm's Law.
2. Mass number.
3. Define work.
4. What is conduction?
5. Why Tungsten used as a X-ray target material?
6. Define power and give its unit.
7. Electromagnetic spectrum.
8. Define focal spot.
9. Filament current.
10. What is TLD?

[LO 0219]

FEBRUARY 2019

Sub. Code: 1402

**DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR
PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code: 841402

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Describe in details with diagram about the Rotating Anode X-Ray Tube.
2. Explain in detail the factors Influencing the Quality and Quantity of X-rays.
3. With a clean Diagram, describe Rectification, Half – Wave and Full – Wave Rectification Circuit.

II. Write notes on:

(10 x 5 = 50)

1. Filament Circuit.
2. Focusing Cup.
3. X-Ray tube Housing.
4. Components of Generator.
5. Triode.
6. Space Charge Effect.
7. Properties of X-rays.
8. Automatic Exposure Control.
9. Short notes of Ionization chamber.
10. Grids.

III. Short answers on:

(10 x 2 = 20)

1. Inverse Square Law.
2. Ammeter.
3. Ionization.
4. Anode Heel Effect.
5. What is Focal spot?
6. Transformer Efficiency.
7. Thermionic Emission.
8. Anode angle.
9. Advantage of 3 – phase Generator.
10. Fluorescence.

DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY**FIRST YEAR****PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY***Q.P. Code: 841402***Time : Three Hours****Maximum : 100 Marks****Answer All questions.****I. Elaborate on:****(3 x 10 = 30)**

1. Explain with neat diagram, the construction and working of rotating anode X-Ray tube. What are its advantages over a stationary anode?
2. Draw a control circuit diagram and explain how mA can be controlled?
3. Describe in detail photoelectric effect. What are the application of photoelectric Effect in radiography.

II. Write notes on:**(10 x 5 = 50)**

1. Film badge.
2. Self rectifier circuit.
3. Radiation survey metre.
4. Principle of Line focus.
5. Properties of α , β , γ ray.
6. Film cassette.
7. Laws of electro magnetic induction.
8. Filtration.
9. Continuous X-rays.
10. Derivation of the equation for radioactive decay.

III. Short answers on:**(10 x 2 = 20)**

1. Define energy.
2. Atomic number.
3. Space charge effect.
4. Voltmeter and ammeter.
5. Why tungsten used as a X-ray target material?
6. Ionization.
7. Thermionic emission.
8. Proton.
9. Radiation.
10. Fleming's left hand rule.

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

[AHS 0122]

JANUARY 2022

Sub. Code: 1402

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSION)

**DIPLOMA IN RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR (Regulation from 2010-2011)
PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY
Q.P. Code: 841402**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on: (3 x 10 = 30)

1. Describe with neat diagram, the construction and working of stationary anode X-ray tube.
2. Define rectifier and explain full wave rectifier with diagrams.
3. Write in detail about the factors affecting the quality and quantity of X-rays.

II. Write notes on: (10 x 5 = 50)

1. Properties of X-ray.
2. Types of radioactivity.
3. Write about atomic structure.
4. Explain about electromagnetic spectrum.
5. Write briefly about ionization and excitation.
6. TLD Badge.
7. Define and explain the Ohm's Law.
8. HVL and HVT.
9. Intensifying Screen.
10. Photoelectric effect.

III. Short answers on: (10 x 2 = 20)

1. Define work.
2. Mass Number.
3. Electron.
4. Mutual induction.
5. Conduction.
6. Define magnetic flux and unit.
7. Inverse square law.
8. Resistance and Unit.
9. Define current.
10. What is molecules?
