

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY /
RADIO DIAGNOSIS TECHNOLOGY**

FIRST YEAR

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

Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. The properties of α , β and γ rays.
2. The production of X-rays with a diagram.
3. Any one x-ray circuit with a neat sketch

II. Write notes on:

(8 x 5 = 40)

1. What are ferromagnetic materials? What are magnetic lines forces?
Mention unit of magnetic strength.
2. Radioactive materials.
3. Derivation of the equation for radioactive decay.
4. Factors that affect the quality and intensity of X-rays.
5. Heel effect of an X ray tube.
6. Note on characteristic spectrum. Which is the component in the X-ray tube that changes characteristic spectrum?
7. Photoelectric effect and its relevance in diagnostic radiology?
8. Note on radiation detection and measurements.

III. Short Answers on:

(10 x 3 = 30)

1. What is the law of conservation of energy?
2. Define work. What is the unit of work?
3. Mention briefly the atomic structure and atomic particles.
4. Define electric current. What is its unit?
5. Write Newton's laws of forces (any two). Give an example for the third law.
6. What is main advantage of rotating anode over the stationary anode?
7. What is natural radioactivity?
8. Define half-life of a radioactive substance. Write the equation to calculate the halflife.
9. What are radioisotopes and how are they prepared?
10. What are equipments used for radiation survey?

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. The interactions of X and γ radiation with matter.
2. The properties of X-rays and use of X-rays in medicine.
3. Electromagnetic spectrum with a schematic diagram indicating the wavelengths.

II. Write notes on:

(8 x 5 = 40)

1. Properties of ferromagnetic materials.
2. Radioactive materials.
3. Derivation of the equation for radioactive decay.
4. Factors that affect the quality and intensity of X-rays.
5. Heel effect of an X ray tube.
6. Continuous and characteristic spectrums.
7. Photoelectric effect and its relevance in diagnostic radiology?
8. TLD and Pocket dosimeter. What is the main difference between them?

III. Short Answers on:

(10 x 3 = 30)

1. What are the fundamental units?
2. Define work. What is the unit of work?
3. Write Einstein's formula and explain briefly.
4. Define electric current. What is its unit?
5. Define the inverse square law of X-rays.
6. What is main advantage of rotating anode over the stationary anode?
7. Define half-life of a radioactive substance. Write the equation to calculate the half-life.
8. What is electromagnetic induction? Mention any applications of it.
9. What is ionization?
10. What are equipments used for radiation survey?

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions in the same order.

I. Elaborate on:

**Pages Time Marks
(Max.) (Max.) (Max.)**

- | | | | |
|---|---|---------|----|
| 1. Write in detail the working principle of a Personnel Monitoring Devices. | 7 | 20 min. | 10 |
| 2. Write in detail the construction and working principle of a Stationary Anode X-Ray tube. | 7 | 20 min. | 10 |
| 3. Explain the principle of various Radiation Detectors. | 7 | 20 min. | 10 |

II. Write Notes on:

- | | | | |
|--|---|---------|---|
| 1. With diagram explain the Grid Controlled X-ray tube. | 4 | 10 min. | 5 |
| 2. Write any five properties of X-Rays. | 4 | 10 min. | 5 |
| 3. Discuss the working principle of Pocket Dosimeter. | 4 | 10 min. | 5 |
| 4. Write briefly about Characteristic Radiation. | 4 | 10 min. | 5 |
| 5. Discuss about Photoelectric effect. | 4 | 10 min. | 5 |
| 6. Define heel effect and its application in Diagnostic Radiology. | 4 | 10 min. | 5 |
| 7. Discuss the principle of Ionization Chamber. | 4 | 10 min. | 5 |
| 8. Write briefly about the Properties of alpha rays. | 4 | 10 min. | 5 |

III. Short answers on:

- | | | | |
|---|---|--------|---|
| 1. Define Half Value layer. | 2 | 4 min. | 3 |
| 2. Define Ionization. | 2 | 4 min. | 3 |
| 3. Write a note Coherent scattering. | 2 | 4 min. | 3 |
| 4. Define Inherent Filtration. | 2 | 4 min. | 3 |
| 5. Factors affecting the Intensity of X-rays. | 2 | 4 min. | 3 |
| 6. Define Half Life. | 2 | 4 min. | 3 |
| 7. Write short note on Step Down transformer. | 2 | 4 min. | 3 |
| 8. Define Atomic and Mass Number. | 2 | 4 min. | 3 |
| 9. Define Grid Ratio. | 2 | 4 min. | 3 |
| 10. Define Space charge effect. | 2 | 4 min. | 3 |

[LC 0212]

FEBRUARY 2013

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY /
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FIRST YEAR

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

Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe the function of modern X-ray tube with neat diagram.
2. Explain the different methods of radiation detection.
3. Write in detail about photo electric effect relevant to diagnostic radiology.

II. Write notes on:

(8 x 5 = 40)

1. Write briefly about ionization and excitation.
2. Types of radioactivity with example.
3. Explain about electromagnetic spectrum.
4. Principle of line focus.
5. Give a brief an account of heel effect.
6. Define and explain the ohm's law.
7. Explain the phenomenon of thermionic emission.
8. Properties of X-ray.

III. Short Answers on:

(10 x 3 = 30)

1. What is power and energy and give its unit ?
2. Half-life.
3. Isotope.
4. Voltmeter and Ammeter.
5. Radioactive decay.
6. Tube current.
7. X-ray target material.
8. Function of focusing cup.
9. Nucleon.
10. What is atom?

[LD 0212]

AUGUST 2013

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY /
RADIO DIAGNOSIS TECHNOLOGY**

FIRST YEAR

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

Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail the Process of X-Ray Generation.
2. Discuss in detail the Interaction of X-Rays with Matter.
3. Explain the principle of various Radiation Detectors.

II. Write notes on:

(8 x 5 = 40)

1. With diagram explain the Atomic Structure.
2. Write any five properties of Electromagnetic Radiation.
3. Discuss the working principle of Thermo luminescence Dosimeter.
4. Write briefly about the construction of the anode section of an Rotating Anode X-Ray tube.
5. Discuss about Line focus principle.
6. With diagram explain the Grid Controlled X-ray tube.
7. With diagram explain the Filament Circuit.
8. Write briefly about Heel effect.

III. Short Answers on:

(10 x 3 = 30)

1. Define Grid Ratio.
2. Define Half life.
3. Write a note Thermionic Emission.
4. Write any three uses of Radiation Survey Meter.
5. Factors affecting the Intensity of X-rays.
6. Define Self Induction.
7. Define Excitation.
8. Define Atomic and Mass Number.
9. Write the uses of Pocket Dosimeter.
10. Define Space charge effect.

[LE 0212]

FEBRUARY 2014

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY /
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FIRST YEAR

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe the principle of radiation measurement and explain about the thermo luminescent dosimeter.
2. Explain about photo electric effect in diagnostic radiology.
3. Write in detail about the factors affecting the quality and quantity of X-rays.

II. Write notes on:

(8 x 5 = 40)

1. Write about atomic structure.
2. Types of Radioactivity.
3. Explain about electromagnetic spectrum.
4. Properties of X-ray.
5. Conduction and convection.
6. Define Half value layer.
7. Principle of line focus.
8. Pocket dosimeter.

III. Short Answers on:

(10 x 3 = 30)

1. What is characteristic radiation?
2. Define power and work.
3. Radioactive decay
4. Sub atomic particles and their charge.
5. Tube current.
6. Isotope.
7. Mass defect.
8. Thermal capacity.
9. Focal spot.
10. Atomic number.

[LF 0212]

AUGUST 2014

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY /
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FIRST YEAR**

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail about procedures of radiation survey.
2. Explain the phenomena of radioactivity with example.
3. Describe the principle of ionization chamber and X-ray measurement.

II. Write notes on:

(8 x 5 = 40)

1. Write briefly about ionization and excitation.
2. Types of radioactivity with example.
3. Explain about electromagnetic waves.
4. Intensity of radiation.
5. Give a brief an account of heel effect.
6. Define and explain the ohm's law.
7. Explain the phenomenon of thermionic emission.
8. Attenuation and absorption.

III. Short Answers on:

(10 x 3 = 30)

1. Define power and energy.
2. Half-life.
3. Isotope.
4. Voltmeter and Ammeter.
5. Magnetic induction.
6. Tube voltage.
7. Electromagnet.
8. What is focusing cup.
9. Charge neutron and proton.
10. What is an electron.

[LG 0215]

FEBRUARY 2015

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY /
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FIRST YEAR

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe in detail about mutual and self induction and its application in radiology.
2. Describe in detail about working principle of Coolidge X-ray tube.
3. Explain the TLD personnel monitoring device and bring out its salient features over film badge.

II. Write notes on:

(8 x 5 = 40)

1. Write briefly about effect of an electric current.
2. Explain about magnetic fields.
3. Radiation survey meter.
4. Radioactive decay constant.
5. Give a brief an account of properties of X- rays.
6. Capacitor and capacitance.
7. Explain about nucleon.
8. Fleming's left hand rule.

III. Short Answers on:

(10 x 3 = 30)

1. Define coulomb.
2. Define HVL.
3. Properties of target material.
4. Mass defect.
5. Voltmeter and Ammeter.
6. Lenz's law.
7. Transformer efficiency.
8. Inverse square law.
9. Write a relationship between HVL and linear attenuation.
10. Atom and molecules.

[LH 0815]

AUGUST 2015

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY /
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FIRST YEAR

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain Bremsstrahlung and Characteristic X-ray spectrum.
2. Describe the construction and working of an modern X-ray tube with neat diagram.
3. Discuss the interaction of radiation with matter.

II. Write notes on:

(8 x 5 = 40)

1. Properties of X rays (any five Points).
2. Auto transformer.
3. Ionization and Excitations.
4. mA circuit.
5. Full wave rectifier.
6. Laws of electromagnetic induction.
7. Theory of transformer.
8. Nuclear reactor.

III. Short Answers on:

(10 x 3 = 30)

1. Define Isobar.
2. State ohm's law.
3. Define SI unit of power.
4. Define Artificial radioactivity.
5. Define SI unit of electric current.
6. Define Mass Number.
7. Define Isotope.
8. Define Half value layer.
9. Define one Becquerel.
10. Define Sivert.

[LI 0216]

FEBRUARY 2016

Sub Code: 1802

B.Sc. RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Explain with the help of neat diagram the working of modern X-ray tube.
2. Discuss the Bremsstrahlung and characteristics X- ray spectrum.
3. Explain the interaction of X and gamma radiation with matter.

II. Write notes on:

(8 x 5 = 40)

1. Alpha and beta decay.
2. mA circuit (or) filament circuit.
3. Half wave rectifier.
4. Ionization and excitation.
5. Write the various laws that govern the electromagnetic induction.
6. Various types of transformer losses.
7. Heel effect.
8. Auto transformer.

III. Short answers on:

(10 x 3 = 30)

1. Define Atomic Number.
2. Define One Curie.
3. Define One watt.
4. Define SI unit of electric current.
5. Define Self Induction.
6. Why the intensifying screen is used in radiography cassettes?
7. Define film gamma.
8. Define Half Value Layer.
9. Define One Gray.
10. What are the chemical used in developer solutions?

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Discuss in detail about beam limiting devices.
2. Electromagnetic spectrum. Discuss about the various properties of xrays.
3. Explain in detail natural and artificial radioactivity. Discuss the various radioisotopes used in medicine.

II. Write notes on:

(8 x 5 = 40)

1. Reasons for grid cut-off.
2. Intensifying screen.
3. Heat loss in transformer.
4. Film cassette.
5. HVT and TVT.
6. Stationary anode x-ray tube.
7. Full wave rectifier.
8. Interaction of xrays with matter.

III. Short answers on:

(10 x 3 = 30)

1. Voltage and current.
2. Alternating current.
3. Coulombs law.
4. Ohms law.
5. Diodes.
6. Nuclear Fission reaction.
7. Tomography.
8. Capacitance.
9. Valve.
10. Self induction.

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Explain in detail the different interactions of x-rays with matter.
2. Write a note on the rotating anode xray tube.
3. Explain about the electromagnetic spectrum. Discuss about various radioisotopes used in medicine.

II. Write notes on:

(8 x 5 = 40)

1. Effect of scattered radiation.
2. Potter bucky.
3. Write a note on 3 phase 6 rectifier circuit.
4. Film screen contact test.
5. Filters used in Radiology.
6. Quality and quantity of xrays.
7. Nuclear fusion.
8. Intensifying screen.

III. Short answers on:

(10 x 3 = 30)

1. Linear attenuation coefficient.
2. Mutual induction.
3. Thermionic effect.
4. Fluorescence.
5. Optical density.
6. Differential absorption.
7. LET.
8. Inverse square law.
9. Eddy current loss.
10. Rare earth screens.

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. With neat diagram explain about the high tension generator circuit for xray production.
2. Discuss about various types of grids. Discuss about the types of grid cut-off.
3. Discuss about capacitor discharge and battery operated xray machine.

II. Write notes on:

(8 x 5 = 40)

1. Automatic exposure control.
2. Radiographic film.
3. Interaction of gamma rays with matter.
4. Half wave rectifier.
5. Photoelectric effect.
6. Collimator.
7. Nuclear Fission.
8. Discuss in detail the function of Semiconductors.

III. Short answers on:

(10 x 3 = 30)

1. Radioisotope.
2. Electromagnetic spectrum.
3. Galvanometer.
4. Faraday's law.
5. HVL.
6. Cathode ray oscilloscope.
7. Joules law.
8. Transformer.
9. Capacitor.
10. Hysteresis loss.

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR**

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail the construction and working principle of stationary anode X ray tube.
2. Explain in detail the interaction of X rays with matter.
3. Explain the theory of transformers and its losses.

II. Write notes on:

(8 x 5 = 40)

1. Describe the decay of alpha, beta and gamma rays.
2. Explain the various factors affecting the quality and quantity of X rays.
3. What is grid? Explain its types.
4. Write the construction of intensifying screens.
5. Describe the kV control circuit.
6. Explain in brief the construction of nuclear reactor.
7. What is rectifier? Explain full wave rectification circuit.
8. Explain the properties of X rays.

III. Short answers on:

(10 x 3 = 30)

1. Define Mass number.
2. Define Isotopes.
3. Define Ohms law.
4. What is heel effect?
5. What is electron capture?
6. Define Half value thickness (HVT).
7. Why tungsten is used as target material in X ray tube?
8. Define Lenz's law.
9. Define work. What is the unit of work?
10. Define Half life.

B.Sc. RADIOLOGY IMAGING TECHNOLOGY**FIRST YEAR****PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
PHYSICS OF DIAGNOSTIC RADIOLOGY***Q.P. Code: 801802***Time : Three Hours****Maximum : 100 Marks****Answer All questions.****I. Elaborate on:****(3 x 10 = 30)**

1. Explain the working principle of modern X ray tube with neat diagram.
2. Explain the principle of nuclear reactor with neat diagram.
3. What is grid? Explain the different types of grid.

II. Write notes on:**(8 x 5 = 40)**

1. Explain the beta decay with examples.
2. How the filters affect the X ray emission?
3. Describe the function of p-n junction diode.
4. Describe full wave rectification circuit.
5. Explain photo electric effect and its significance in diagnostic radiology?
6. Explain the significance of intensifying screens.
7. Describe the theory of transformer with diagram.
8. A Circuit has a potential of 200 V and resistance of 5 Ω . Calculate the current passing through the circuit.

III. Short answers on:**(10 x 3 = 30)**

1. Define space charge effect.
2. What is the target material used in X ray tube and why?
3. Define atomic number and mass number.
4. Define internal conversion.
5. Define tenth value layer (TVT).
6. Define linear attenuation coefficient.
7. Explain the importance of collimation.
8. Define fluorescence and phosphorescence.
9. Define specific activity.
10. What is half life?

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR**

**PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Explain with the help of neat diagram the construction and working of stationary anode X-ray tube.
2. Write in detail about Compton effect and its significance in diagnostic radiology.
3. Describe with circuit diagram, the working of kV control circuit.

II. Write notes on:

(8 x 5 = 40)

1. Atomic structure.
2. Construction and working of transformer.
3. Natural radioactivity.
4. Half wave rectifier circuit and its function.
5. Construction and working of grid.
6. Construction of cassette.
7. Pair production.
8. Anode heel effect.

III. Short answers on:

(10 x 3 = 30)

1. Isotope.
2. Units of temperature.
3. Ohm's law.
4. Electric power and its unit.
5. Half life.
6. Mass attenuation coefficient.
7. Line focus principle.
8. Grid factor.
9. Rare earth screens.
10. Fluorescence.

B.Sc. RADIOLOGY IMAGING TECHNOLOGY**FIRST YEAR****PAPER II – GENERAL PHYSICS, RADIATION PHYSICS AND
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1. Explain the production of X rays with neat diagram.
2. Write in detail the various modes (α , β and γ) of radioactive decay.
3. Explain the various factors that affect the quantity and quality of X rays.

II. Write notes on: Answer any 8 out of 10 questions**(8 x 5 = 40)**

1. What is photoelectric effect? Its relevance in diagnostic radiology.
2. Explain the effect of scattered radiation on radiograph image quality and how to reduce it?
3. Describe about the self-induction and mutual induction.
4. Draw the rotating anode X ray circuit and explain its parts.
5. Explain the mA control circuit.
6. Describe the principle of auto transformer.
7. Describe the constituents of intensifying screens.
8. Write any five properties of X rays.
9. Write about the artificial production of radionuclides.
10. What is pair production? Explain the annihilation process.

III. Short answers on:**(10 x 3 = 30)**

1. Define atomic number.
2. Define isobar.
3. What is line focus principle?
4. What is thermionic emission?
5. Define faraday's law.
6. What is focusing cup?
7. Define electric current and its unit.
8. Define power and its unit.
9. What is advantage of rotating anode over stationary anode?
10. What is focal spot?

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR**

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Q.P. Code: 801802

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Explain with the help of neat diagram the construction and working of modern X-ray tube.
2. Write in detail about photo electric effect and its significance in diagnostic radiology.
3. Describe in detail, various types of grids used in diagnostic radiology.

II. Write notes on:

(8 x 5 = 40)

1. Electromagnetic radiation.
2. Laws of electromagnetic induction.
3. Artificial radioactivity.
4. Full wave rectifier circuit and its function.
5. Beam limiting devices.
6. Construction and function of intensifying screen.
7. Explain alpha decay and beta decay.
8. X-ray filtration.

III. Short answers on:

(10 x 3 = 30)

1. Einstein's formula.
2. Nucleus.
3. Step up transformer.
4. Electric current and its unit.
5. Units of radioactivity.
6. Half value layer.
7. X-ray tube housing.
8. Grid ratio.
9. Quantum mottle.
10. Types of cassette.

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

[AHS 0321]

MARCH 2021

Sub. Code: 1802

(AUGUST 2020 EXAM SESSION)

B.Sc. RADIOLOGY IMAGING TECHNOLOGY

FIRST YEAR (Regulations 2010-2011 & 2014-2015)

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

Q.P. Code : 801802

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain with diagram, the theory of X-ray production.
2. Write in detail the uses of radioactive isotopes in medicine.
3. What is scattered radiation? What are the effects of scattered radiation?
How do you reduce the effects of scattered radiation?

II. Write notes on:

(8 x 5 = 40)

1. Ionisation and excitation.
2. Transformer losses.
3. Properties of alpha, beta and gamma rays.
4. Theory of semiconductor diode.
5. mA circuit and its working.
6. Photo electric effect.
7. X-ray cassette.
8. Factors affecting quality of x-rays.

III. Short answers on:

(10 x 3 = 30)

1. Electromagnetic spectrum.
2. Atomic number.
3. Electric power and its unit.
4. Alternating current.
5. Nuclear fission.
6. Exponential equation of radioactive decay.
7. Linear attenuation coefficient.
8. Autotransformer.
9. Self rectifier circuit.
10. Intensification factor.

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

[AHS 0422]

APRIL 2022

Sub. Code: 1802

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSIONS)

B.Sc. RADIOLOGY AND IMAGING TECHNOLOGY

FIRST YEAR (Regulation 2010-2011 & 2014-2015)

PAPER II - GENERAL PHYSICS, RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY

Q.P. Code: 801802

Time: Three Hours

Maximum : 100 Marks

Answer All questions

- I. Elaborate on :** (3X10=30)
1. Explain the principles of X-rays while interacted with matter.
 2. Discuss the principle of radiation measurement. Add a note on dosimeter & its applications.
 3. Describe the physics of natural and artificial of radiation. Add a note on their applications in Radiodiagnosis.
- II. Write Notes on :** (8X5=40)
1. Intensifying screens.
 2. Cassette construction.
 3. Cathode ray oscillation.
 4. Principle & importance of X-rays.
 5. Reactance & resonance.
 6. Nuclear fission.
 7. Electromagnetic waves.
 8. Types of interactions.
- III. Short Answers on :** (10X3=30)
1. Define alpha decay.
 2. TVT.
 3. Importance of Bucky diaphragm.
 4. List 2 Artificial sources of radiation production.
 5. Types of high voltage circuit.
 6. Physics of grid.
 7. List the types of nuclear reactions.
 8. Define neutron.
 9. Name any two sources of isotopes production.
 10. What is an atom?

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

[AHS 1122]

NOVEMBER 2022

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR (Regulations 2010-2011 & 2014-2015)
PAPER II - GENERAL PHYSICS, RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY**

Q.P. Code: 801802

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on : **(3X10=30)**

1. Explain in detail about Interaction of radiation with matter.
2. Discuss the various types of cassette.
3. Types of radioactivity.

II. Write Notes on : **(8X5=40)**

1. Farady's law of electromagnetic induction.
2. Einstein's formula.
3. Grids and their types.
4. Total attenuation variation.
5. Characteristics of X-ray spectrum.
6. Line focus principle.
7. Electro Magnetic induction.
8. kV circuit.

III. Short Answers on : **(10X3=30)**

1. Half life.
2. Isotope.
3. Define Mass number.
4. Intensification factor.
5. Rectifier.
6. Tube current.
7. Focal spot.
8. Grid.
9. Nucleon.
10. Explain ionization and excitation.

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

[AHS 0423]

APRIL 2023

Sub. Code: 1802

B.Sc. RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR (Regulations 2010-2011 & 2014-2015 onwards)
PAPER II – GENERAL PHYSICS, RADIATION PHYSICS & PHYSICS OF
DIAGNOSTIC RADIOLOGY
Q. P. Code: 801802

Time: Three hours

Maximum : 100 Marks

Answer ALL Questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain Photon interaction with matter.
2. Describe about importance of Grid in Radiography.
3. Write in detail about the types of Radioactivity.

II. Write notes on:

(8 x 5 = 40)

1. Discuss the principle of Transformer.
2. Distinguish between Nuclear fission and Nuclear fusion.
3. Factors affecting quality of X-rays.
4. Hysteresis loss.
5. Intensifying screen.
6. Continuous and characteristic spectrum.
7. Write briefly about the Properties of Alpha ray.
8. Explain attenuation and its types.

III. Short answers on:

(10 x 3 = 30)

1. Define Power and Energy.
2. Focal spot.
3. Line focus principle.
4. Galvanometer.
5. Thermionic Emission.
6. Radioisotope.
7. Define Inherent Filtration.
8. Define electric current. What is its unit?
9. Define half-life of a radioactive substance.
10. Define Atomic and Mass Number.

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

[AHS 0424]

APRIL 2024

Sub. Code: 1802

**B.Sc. RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR (Regulations 2010-2011 & 2014-2015 onwards)
PAPER II - GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY**

Q.P. Code: 801802

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on:

(3 X 10 = 30)

1. Describe the working of Rotating Anode X-ray tube with neat diagram.
2. Interaction of Radiation with matter.
3. Describe in detail about the types of X-ray cassette.

II. Write Notes on:

(8 X 5 = 40)

1. Capacitor and Capacitance.
2. Radioactive decay constant.
3. Properties of X-rays.
4. Auto transformer.
5. Full wave rectifier.
6. Photo electric effect.
7. Automatic exposure control.
8. Quality and Quantity of X-rays.

III. Short Answers on :

(10 X 3 = 30)

1. Eddy current loss.
2. Rare earth screens.
3. Galvanometer.
4. Faraday's law.
5. HVT and TVT.
6. Define Artificial Radioactivity.
7. Isotope.
8. Define Space charge effect.
9. X-ray target material.
10. Define Grid Ratio.

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

[AHS 1125]

NOVEMBER 2025

Sub. Code: 1802

B.Sc. RADIOLOGY IMAGING TECHNOLOGY
FIRST YEAR (Regulations 2010-2011 & 2014-2015 onwards)
PAPER II - GENERAL PHYSICS, RADIATION PHYSICS &
PHYSICS OF DIAGNOSTIC RADIOLOGY
Q.P. Code: 801802

Time: Three Hours

Answer All questions

Maximum : 100 Marks

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

1. Describe the Bremsstrahlung and characteristics X-ray Spectrum.
2. Explain the interaction of X-rays with matter.
3. Describe in detail about Mutual and Self Induction and its application in Radiology.

II. Write Notes on : **(8 x 5 = 40)**

1. Types of Anodes with neat diagram.
2. Explain the Electromagnetic Spectrum.
3. Autotransformer.
4. Explain Half wave rectifier.
5. Explain the types of Radioactive decays.
6. Differentiate between Ionization and Excitation.
7. Explain in detail about the structure of Atom.
8. Theory of Transformer with diagram.

III. Short Answers on : **(10 x 3 = 30)**

1. Define Fluorescence.
2. State Coulomb's Law.
3. Use of intensifying screens.
4. Beta decay.
5. Compton scattering.
6. Use of Generators in X-ray circuits.
7. Define Nuclear Fission.
8. Define Exposure.
9. Automatic Exposure Control.
10. Grid factor.
