

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

[AHS 1122]

NOVEMBER 2022

Sub. Code: 1942

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019)
PAPER II – RADIATION PHYSICS & BASIC OF CLINICAL
RADIOGRAPHY/IMAGING**

Q. P. Code: 801942

Time: Three hours

Maximum : 100 Marks

Answer ALL Questions

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

1. Write in detail the principle, construction and working of a rotating anode X-ray tube.
2. Write an essay on X-ray film construction and film characteristics.
3. Explain the process of alpha, beta and gamma decay with suitable examples.

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

1. Write notes on electromagnetic spectrum.
2. Excitation and ionization.
3. Step up and step down transformer.
4. Explain Linear and mass attenuation coefficients, HVT and TVT.
5. Compton effect.
6. Distinguish between continuous spectrum and characteristic spectrum.
7. Factors affecting the fluoroscopic image.
8. Electron capture and internal conversion.

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

1. SI unit of Temperature.
2. Define Isotope and Isomer.
3. Heel effect.
4. Relationship between Wavelength, Frequency and Energy.
5. Fog and noise.
6. Tube voltage.
7. Coulomb's law.
8. Half-life.
9. Nucleon.
10. Image Intensifier.

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

[AHS 0423]

APRIL 2023

Sub. Code: 1942

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019 onwards)
PAPER II – RADIATION PHYSICS & BASIC OF CLINICAL
RADIOGRAPHY/IMAGING
Q.P. Code: 801942**

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain in detail about Film Processing Method.
2. Write principle of Fluoroscopy and explain the construction and working of an Image Intensifier.
3. Explain the construction and working of a Stationary Anode X-ray tube.

II. Write notes on:

(8 x 5 = 40)

1. Step up and step down transformer.
2. Explain atomic number, mass number, electron orbit and energy levels.
3. Continuous spectrum, characteristic spectrum.
4. Basic Principles of MRI.
5. Quantum theory of radiation.
6. Explain Linear and mass attenuation coefficients, HVT and TVT.
7. Photoelectric absorption.
8. Importance of filters in an X-ray tube.

III. Short answers on:

(10 x 3 = 30)

1. Define Isotope and Isobar.
2. Fog and noise.
3. Coulomb's law.
4. Half-life.
5. Difference between CT and MRI.
6. Nuclear fission.
7. Bio effects of MRI.
8. Ohm's Law
9. Specific activity.
10. Relationship between Wavelength, Frequency and Energy.

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

[AHS 1123]

NOVEMBER 2023

Sub. Code: 1942

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019 onwards)
PAPER II – RADIATION PHYSICS & BASIC OF CLINICAL
RADIOGRAPHY/IMAGING
Q.P. Code: 801942**

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain in detail about the different type of Interaction of X and Gamma Radiation with matter.
2. Computed Tomography with suitable diagram.
3. Explain the process of Alpha decay, Beta decay and Gamma decay with suitable examples.

II. Write notes on :

(8X5=40)

1. Quality and Intensity of X-rays.
2. X-ray film construction.
3. Image intensifier tube.
4. Electromagnetic spectrum.
5. Factors affecting the Fluoroscopic image.
6. Latent Image.
7. Tomography.
8. Film processing.

III. Short answers on :

(10X3=30)

1. Ohms laws of Electricity.
2. Linear attenuation co-efficient.
3. Define Half-life of Radioactive materials.
4. Define isotope and isobar.
5. What is Image quality?
6. Fog and Noise.
7. Hysteresis losses.
8. What is Thermionic emission?
9. Filters used in X-ray tube.
10. Define Fluorescence.

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

[AHS 0424]

APRIL 2024

Sub. Code: 1942

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019 onwards)
PAPER II – RADIATION PHYSICS & BASIC OF CLINICAL
RADIOGRAPHY/IMAGING
Q.P. Code: 801942**

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Draw the Graph for Total Mass Attenuation Coefficient for Water and Lead.
Explain relative importance of Photoelectric, Coherent, Compton and Pair production.
2. Explain the Basic Principle of Image Formation in Magnetic Resonance Imaging.
3. With neat diagram, explain the principle and construction of Image Intensifier Fluoroscopy.

II. Write notes on:

(8 X 5 = 40)

1. Relationship between Wavelength, Frequency and Energy.
2. Explain the factors affecting the Quality and Quantity of X-rays.
3. Explain and draw the circuit diagram to control the kVp of X-ray unit.
4. Draw the decay scheme of Co-60 source.
5. Explain the interaction of Charged Particle with matter.
6. Draw and explain the different regions of characteristic curve of X-ray film.
7. Write down the differences between the CT and MRI imaging.
8. Explain the basic principle of Single Photon Emission Computed Tomography.

III. Short answers on:

(10 X 3 = 30)

1. Specific Activity.
2. What are Isotopes and Isobars?
3. Atomic number and Mass number.
4. Biological effects of MRI.
5. What is Direct Fluoroscopy?
6. What is Mass Attenuation Coefficient?
7. Define Half life with examples.
8. Write the Ohm's Law and Joules Law.
9. Hysteresis losses.
10. What is Coulombs Law?

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

[AHS 1125]

NOVEMBER 2025

Sub. Code: 1942

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019 onwards)
PAPER II – RADIATION PHYSICS & BASIC OF CLINICAL
RADIOGRAPHY/IMAGING
Q.P. Code: 801942**

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain the working of a stationary anode X-ray tube and mention its applications.
2. Explain the process of Alpha, Beta and Gamma decay with suitable examples.
3. Describe the constituents of developer and fixer. Explain automatic film processing.

II. Write notes on:

(8 x 5 = 40)

1. Quantum theory of Radiation.
2. Ionization and Excitation.
3. Electron capture and internal conversion.
4. Bremsstrahlung X- ray spectrum.
5. Importance of filters in an X-ray tube.
6. Voltmeter and Ammeter.
7. What is Isotope, Isomer, Isotone and Isobar? Give example
8. Compton effect.

III. Short answers on:

(10 x 3 = 30)

1. Relationship between wavelength, Frequency and Energy.
2. Heel effect.
3. SI units of work, force, power and energy.
4. Bio effects of MRI.
5. Exponential Decay of Radioactivity.
6. Natural and artificial Radioactivity
7. Ohms law.
8. Difference between CT and MRI.
9. Define Nuclear Fission. What are its products?
10. Attenuation and its types.
