

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

[AHS 0222]

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

Sub. Code: 4011

M.Sc. MEDICAL PHYSICS

FIRST YEAR

(Candidates admitted from 2010-2011 onwards – Paper I)

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

PAPER I & II – RADIATION PHYSICS

Q.P. Code : 284011

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Explain the Electromagnetic wave Spectrum and Quantum model.
2. Explain the Transformer working principle and its types

II. Write Short Notes on:

(10x6 = 60)

1. Write the SI unit of Magnetic flux density and Electric capacitance.
2. Explain the Alpha-Proton nuclear reactions.
3. Explain Pair production and its application.
4. Explain the Atomic Structure.
5. What is the fraction of radiation comes out from 15cm thick brick wall, if its Half Value Layer(HVL) is 5cm.
6. Explain about Radiation Weighting Factor.
7. What is LET(Linear Energy Transfer) and RBE(Relative Biological Effectiveness).
8. What is Half Life Period and give 3 radioactive material's half life period.
9. Explain the Mutual and Self Induction.
10. Explain the Beta negative decay with example.

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[AHS 1022]

OCTOBER 2022

Sub. Code: 4011

M.Sc. MEDICAL PHYSICS

FIRST YEAR

(Candidates admitted from 2010-2011 onwards - Paper - I)

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

PAPER I & II – RADIATION PHYSICS

Q.P. Code: 284011

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate notes on:

(2 x 20 = 40)

1. Explain in detail the various nuclear reactions with examples.
2. Describe in detail the construction and working of transformers, Describe various losses in transformer.

II. Write Short Notes on

(10 x 6 = 60)

1. Ionization and Radiation losses.
2. Derive the relationship between half value layer and linear attenuation coefficient.
3. Classical theory of inelastic collision
4. Compton effect of radiation.
5. Explain about radioactivity.
6. What is meant by neutron activation?
7. Equivalent and effective dose.
8. Inverse square law of radiation.
9. What is the radiation exposure at 1 meter distance if it is exposure at 2 meters is 25R?
10. Define Gray and Kerma compare.

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

[AHS 1023]

OCTOBER 2023

Sub. Code: 4011

**M.Sc. MEDICAL PHYSICS
FIRST YEAR (From 2020-2021 onwards)
PAPER II – RADIATION PHYSICS**

Q.P. Code: 284011

Time : Three Hours

Answer ALL questions

Maximum : 100 marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Interaction of charged particles with matter and their clinical importance.
2. Various methods of radioactive decay.

II. Write notes on:

(10 x 6 = 60)

1. Wave theory and Quantum theory of electromagnetic radiation.
2. Linear and Mass attenuation coefficient.
3. Law of radioactive disintegration and derive the equation for the number of atoms present at any instant.
4. Neutron bombardment and proton bombardment.
5. Liquid and nuclear shell model.
6. Autotransformer and its applications.
7. Cerenkov radiation.
8. Bragg Peak Curve and the spread of Bragg peak in clinical use.
9. Relationship between Kerma, Exposure and Absorbed dose.
10. Continuous Slowing Down Approximation (CSDA).

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[AHS 1024]

OCTOBER 2024

Sub. Code: 4011

**M.Sc. MEDICAL PHYSICS
FIRST YEAR (From 2020-2021 onwards)
PAPER II – RADIATION PHYSICS**

Q.P. Code: 284011

Time: Three Hours

Answer ALL questions

Maximum: 100 marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Interaction of heavy charged particles with matter.
2. Construction and working of Transformer and its losses. Explain the application of the autotransformer.

II. Write notes on:

(10 x 6 = 60)

1. Force on a current carrying conductor.
2. Define Isotopes, Isobars, Isotones and Isomers. Give one example.
3. Merits and demerits of Bohr's atomic model.
4. Alpha and beta particle decay.
5. Pair production and the photoelectric effect.
6. Electronic equilibrium.
7. Bragg curve- depth dose curve and the spread of Bragg peak in clinical use.
8. Linear Energy Transfer (LET) and Relative Biological Effectiveness (RBE).
9. Mutual induction and self-induction with relevant diagram.
10. Relationship between Kerma, Exposure and Absorbed dose.

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

[AHS 1025]

OCTOBER 2025

Sub. Code: 4011

**M.Sc. MEDICAL PHYSICS
FIRST YEAR (From 2020-2021 onwards)
PAPER II – RADIATION PHYSICS**

Q.P. Code: 284011

Time: Three Hours

Answer ALL questions

Maximum: 100 marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Describe in detail about the Interaction of neutron with matter.
2. Discuss the various methods of radioactive decay.

II. Write notes on:

(10 x 6 = 60)

1. Explain about Radiation weighting factor.
2. Coherent Scattering.
3. What is Half Life Period and give 3 radioactive material's half- life period?
4. Internal Conversion.
5. Write short note on Bremsstrahlung radiation.
6. Liquid drop model.
7. Cerenkov radiation.
8. Explain Pair production and its application.
9. Nuclear isomerism.
10. Beth Bloch formula.
