

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

[AHS 0222]

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

Sub. Code: 2304

**M.Sc. NUCLEAR MEDICINE TECHNOLOGY
FIRST YEAR**

(Candidates admitted from 2019-2020 onwards – Paper IV)

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

PAPER IV & V – RADIATION PHYSICS AND RADIATION CHEMISTRY

Q.P. Code : 282304

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Explain the construction and production of Radionuclides in a Nuclear Reactor.
2. What is pH value? Describe role of pH in preparation of radiopharmaceuticals.

II. Write Short Notes on:

(10x6 = 60)

1. Explain beta plus and beta minus decay with examples.
2. What is radioactivity? Derive the decay equation $N = N_0 e^{-\lambda t}$.
3. Radio isotopes used in Nuclear Medicine.
4. Liquid Scintillation Detectors.
5. Multi channel analyser system.
6. Describe the coordinate covalent bond.
7. Preparation of standard (Reference) solution.
8. Normality of solution.
9. Difference of Solute and Solvents.
10. What are Buffer solutions?

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

[AHS 0522]

MAY 2022

Sub. Code: 2304

M.Sc. NUCLEAR MEDICINE TECHNOLOGY

FIRST YEAR

(Candidates admitted from 2019-2020 onwards – Paper IV)

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

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

[AHS 1022]

OCTOBER 2022

Sub. Code: 2304

M.Sc. NUCLEAR MEDICINE TECHNOLOGY

FIRST YEAR

(Candidates admitted from 2019-2020 onwards – Paper IV)

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

PAPER IV & V – RADIATION PHYSICS & RADIATION CHEMISTRY

Q.P. Code : 282304

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Describe in detail about types of radioactivity and explain physical characteristics Tc-99m and F-18 isotope commonly used in nuclear medicine application.
2. Explain about construction and functioning of gas filled radiation detectors.

II. Write Short Notes on:

(10x6 = 60)

1. Explain the principle of thermo luminescence dosimeter.
2. Write about hydrogen ion concentration.
3. Write about covalent bonding.
4. Differentiate between solute and solvent.
5. Write about molecular structure.
6. Explain about beta minus decay with example.
7. Write about pair production.
8. Explain about chemical reaction.
9. Write about sub atomic particles.
10. Explain the function of scintillation detectors.

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

[AHS 1023]

OCTOBER 2023

Sub. Code: 2304

**M.Sc. NUCLEAR MEDICINE TECHNOLOGY
FIRST YEAR (From 2020-2021 onwards)
PAPER V – RADIATION PHYSICS & RADIATION CHEMISTRY**

Q.P. Code: 282304

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Explain in details about the working principle and construction of ionization chamber.
2. Describe about different types of chromatography.

II. Write Short Notes on:

(10x6 = 60)

1. Write about atomic structure with example of I-131.
2. Explain about Compton Effect.
3. Write about law of disintegration.
4. Write about radioactivity.
5. The eluted activity of Tc-99m at 9.00 a.m is 10 mCi. What will be the activity at 5.00 p.m?
6. Explain about beta decay with example.
7. Write about covalent bonding.
8. Write about cyclotron.
9. Briefly explain crystallization.
10. Explain hydrogen ion concentration.

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

[AHS 1024]

OCTOBER 2024

Sub. Code: 2304

**M.Sc. NUCLEAR MEDICINE TECHNOLOGY
FIRST YEAR (From 2020-2021 onwards)
PAPER V – RADIATION PHYSICS & RADIATION CHEMISTRY**

Q.P. Code: 282304

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. What are the interactions of radiation with matter? Explain with examples.
2. Enumerate on the principle, operation of Geiger Muller counters and its practical application in Nuclear Medicine.

II. Write Short Notes on:

(10x6 = 60)

1. Thin Layer Chromatography – principle and uses.
2. What is Specific activity and how do you calculate it.
3. Explain Isomeric transition with example.
4. What is Nuclear binding energy?
5. Explain Specific Ionisation. What are the factors that influence it.
6. What are the properties and application of a NaI (Tl) detector?
7. Principle and working of Liquid scintillation counters.
8. Enumerate on Ionisation chamber.
9. Properties of a cyclotron produced radionuclide?
10. Explain the Cerenkov Effect.

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

[AHS 1025]

OCTOBER 2025

Sub. Code: 2304

**M.Sc. NUCLEAR MEDICINE TECHNOLOGY
FIRST YEAR (From 2020-2021 onwards)
PAPER V – RADIATION PHYSICS & RADIATION CHEMISTRY**

Q.P. Code: 282304

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Scintillation detectors and its working principle.
2. Construction of cyclotrons and production of radionuclides.

II. Write Short Notes on:

(10x6 = 60)

1. Redox reaction.
2. Normality of solution.
3. Proportional counters.
4. Decay of radionuclides.
5. Ligands and chelating agents.
6. Sizes of an atom and a nucleus.
7. Buffer solutions and describe their role.
8. HPLC and describe its uses in nuclear medicine.
9. Coordination number and explain complex formation.
10. Differences between an ionization chamber and a Geiger Muller counter.
