

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

[AHS 0222]

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

Sub. Code: 4015

M.Sc. MEDICAL PHYSICS

FIRST YEAR

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

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

PAPER V & VI – RADIATION DETECTORS AND INSTRUMENTATION

Q.P. Code : 284015

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on:

(2 x 20 = 40)

1. Explain in detail about the variation of the charge collection with operating voltage in a gas filled radiation detector using a trend graphically and write various regions of gas filled operation.
2. Describe the construction of Radiation Field Analyzer and its applications

II. Write Short Notes on:

(10x6 = 60)

1. MOSFET
2. Explain the quenching mechanism of organic quenched GM detectors.
3. Semiconductor detector and its advantages and disadvantages
4. Well type ion chamber and its application in Brachy-therapy
5. Contamination monitor
6. AC-DC convertor
7. Radio immunoassay (RIA)
8. Thimble chamber
9. Solid State Nuclear track detectors
10. Calibration and maintenance of dosimeter

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

[AHS 1022]

OCTOBER 2022

Sub. Code: 4015

M.Sc. MEDICAL PHYSICS

FIRST YEAR

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

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

PAPER V & VI – RADIATION DETECTORS AND INSTRUMENTATION

Q.P. Code: 284015

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(2 x 20 = 40)

1. What is Personal monitoring? Explain about TLD as a personal monitoring device. Discuss about TLD reader.
2. i) Write in detail about the construction and working of chambers used in the Calibration of reference field size of linear accelerators.
(ii) Write down the applications of radiochromic films.

II. Write notes on:

(10 x 6 = 60)

1. Calorimeter.
2. Decoders and encoders.
3. Contamination monitor.
4. Chemical dosimeter and its applications.
5. Principle of Op-amp.
6. JFET and its use.
7. AC-DC convertor.
8. Head and foot monitors and its applications.
9. Solid state nuclear track detectors.
10. Stem effect and correction for condenser chambers.

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

[AHS 1023]

OCTOBER 2023

Sub. Code: 4015

**M.Sc. MEDICAL PHYSICS
FIRST YEAR (From 2020–2021 onwards)
PAPER VI – RADIATION DETECTORS AND INSTRUMENTATION**

Q.P. Code: 284015

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(2 x 20 = 40)

1. Explain in detail about the construction and working of Scintillation type Radiation detector. Write about the properties of ideal scintillating material.
2. Discuss about OP-amp and its various operations.

II. Write notes on:

(10 x 6 = 60)

1. JFET.
2. Radio isotope calibrator.
3. Whole body counter.
4. Thimble chamber.
5. Radiographic films in Radiotherapy.
6. GM counter.
7. Suitable survey meters for continuous and pulsed radiation.
8. Calorimeters.
9. Film densitometers.
10. TLD film readers.

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

[AHS 1024]

OCTOBER 2024

Sub. Code: 4015

**M.Sc. MEDICAL PHYSICS
FIRST YEAR (From 2020–2021 onwards)
PAPER VI – RADIATION DETECTORS AND INSTRUMENTATION**

Q.P. Code: 284015

Time: Three Hours

Maximum: 100 Marks

Answer ALL questions

I. Elaborate on:

(2 x 20 = 40)

1. Discuss in detail about gas filled detectors.
2. What is Personnel monitoring? Discuss about the various personnel monitoring devices.

II. Write notes on:

(10 x 6 = 60)

1. Solid State Nuclear Track Detectors.
2. Principle of Op- amp.
3. AC-DC convertor.
4. Characteristics of ideal scintillating material.
5. Maintenance of survey meters and dosimeters.
6. RIA counter.
7. Stem effect.
8. Parallel plate chamber.
9. Phantoms used in radiotherapy.
10. Role of Radio chromic films in radiotherapy.

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

[AHS 1025]

OCTOBER 2025

Sub. Code:4015

**M.Sc. MEDICAL PHYSICS
FIRST YEAR (From 2020–2021 onwards)
PAPER VI – RADIATION DETECTORS AND INSTRUMENTATION**

Q.P. Code: 284015

Time: Three Hours

Maximum: 100 Marks

Answer ALL questions

I. Elaborate on:

(2 x 20 = 40)

1. Explain the principle of luminescence dosimeters and their application in radiation dosimetry. Explain in detail, a) Thermo-luminescent dosimeters.
b) Optically Stimulated Luminescence dosimeters.
2. Radiation Field Analyzer.

II. Write notes on:

(10 x 6 = 60)

1. Dead time and recovery time of gas filled detectors.
2. Well type ion chamber and its application in Brachytherapy.
3. Radio immunoassay (RIA).
4. Quenching and its types.
5. Area gamma monitor.
6. Liquid Scintillation detector.
7. Calibration and maintenance of dosimeter.
8. Gas multiplication.
9. Construction of a thimble chamber with a neat diagram.
10. The properties of ideal semiconductor detector material.
