

May 2011

[KY 015]

Sub. Code: 4015

M.Sc (MEDICAL PHYSICS) DEGREE EXAMINATION
(Revised Regulations for Candidates admitted from 2010-2011)
FIRST YEAR

Paper V – RADIATION DETECTORS AND INSTRUMENTATION

Q.P. Code : 284015

Time : Three hours

Maximum :100marks

Answer All questions.

I. Elaborate on :

(2 x 20 = 40)

1. Explain the principle of luminescence dosimeters. Explain in detail
 - a) Thermoluminescent dosimeters.
 - b) Optically Stimulated Luminescence dosimeters.
 - c) Its application in radiation dosimetry.
2. Explain ionization chamber, proportional counter, GM counter.

II. Write notes on :

(10 x 6 = 60)

1. Explain the principle of calorimetry.
2. What are the desirable characteristics of thimble ionization chamber?
3. Explain about single channel analyzer and multi-channel analyzer.
4. Discuss in detail construction and working of condenser type chamber.
5. What is meant by area monitoring and personnel monitoring. Explain about BARC TLD badge.
6. Explain the working principle of Rem counter.
7. How Brachytherapy sources are calibrated. Explain any one method in detail.
8. Discuss MOSFET dosimetry.
9. Discuss Radiation field analyzer.
10. How OP-AMP works. Explain its application in radiation dosimeters.

[LA 0512]

Sub. Code: 4015

**M.Sc (MEDICAL PHYSICS) DEGREE EXAMINATION- MAY 2012
FIRST YEAR**

Paper V – RADIATION DETECTORS AND INSTRUMENTATION

Q.P. Code: 284015

**Time: Three hours
180 (Min)**

Maximum: 100marks

Answer All questions.

I. Elaborate on:

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

- | | | | |
|---|----|----|----|
| 1. Explain the principle of gas filled detectors. Discuss the construction and working of thimble ionization chamber. | 17 | 40 | 20 |
| 2. Explain the basic principle of Thermoluminescent dosimeter (TLD). Discuss about TLD reader, personal monitoring badge, calibration and maintenance of dosimeter. | 17 | 40 | 20 |

II. Write notes on:

- | | | | |
|---|---|----|---|
| 1. Principle of MOSFET. How it is used in radiation dosimetry. | 4 | 10 | 6 |
| 2. Explain desirable characteristics of thimble ionization chamber. | 4 | 10 | 6 |
| 3. Construction and working of condenser type chambers. | 4 | 10 | 6 |
| 4. Working principle of OP- AMP with schematic diagram. | 4 | 10 | 6 |
| 5. Radiation field analyzer. | 4 | 10 | 6 |
| 6. Use of well type ionization chamber in Brachytherapy source calibration. | 4 | 10 | 6 |
| 7. Single channel analyzer and multichannel analyzer. | 4 | 10 | 6 |
| 8. Film dosimetry system. | 4 | 10 | 6 |
| 9. What are the different types of personnel monitoring dosimeters? Discuss in detail about any one dosimetry system. | 4 | 10 | 6 |
| 10. Liquid scintillation counting system. | 4 | 10 | 6 |

[LC 0413]

APRIL 2013

Sub. Code: 4015

M.Sc (MEDICAL PHYSICS) DEGREE EXAMINATION
(Revised Regulations for Candidates admitted from 2010-2011)

FIRST YEAR

Paper V – RADIATION DETECTORS AND INSTRUMENTATION

Q.P. Code : 284015

Time : Three hours

Maximum :100marks

I. Elaborate on:

(2x20=40)

1. Write in detail about the gas filled detectors.
2. (a) Explain the principle of luminescence Dosimetry.
(b) Write in detail about.
(i) TLD (ii) OSLD and (iii) Radiophotoluminescent Dosimeters.

II. Write notes on :

(10X6=60)

1. Calorimetry.
2. JFET.
3. Radio isotope calibrator.
4. Stem effect and stem correction for condenser chambers.
5. Film dosimetry.
6. Radiation Field Analyser.
7. Liquid Scintillation Counting.
8. Construction of a thimble chamber with a neat diagram.
9. Personnel Monitoring.
10. Contamination Monitors.

[LD 1013]

OCTOBER 2013

Sub. Code: 4015

M.Sc (MEDICAL PHYSICS) DEGREE EXAMINATION
(Revised Regulations for Candidates admitted from 2010-2011)

FIRST YEAR

PAPER V – RADIATION DETECTORS AND INSTRUMENTATION

Q.P. Code : 284015

Time : 3 hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on :

(2X20=40)

1. (a) How the charge collection varies with operating voltage in a gas filled radiation detector using a trend graphically and write various regions of gas filled operation
(b) The important properties of ideal scintillation material
2. (a) Draw the block diagram of typical scintillation detector based radiation measuring system and explain briefly the function of each block
(b) Explain the quenching mechanism of organic quenched GM detectors

II. Write notes on:

(10X6=60)

1. Single and multi channel Analyzer
2. OSL and MOSFET dosimetry
3. Characteristics of operational amplifiers
4. Construction and working of thimble chamber
5. Dead time and recovery time
6. The properties of ideal semiconductor detector material
7. Characteristics of organic and inorganic counters
8. RIA counter
9. Teletector and contamination monitor
10. Radioisotope calibrator
