

May 2011

[KY 014]

Sub. Code: 4014

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

**Paper IV – RADIATION DOSIMETRY AND STANDARDIZATION**

*Q.P. Code : 284014*

**Time : Three hours**

**Maximum :100marks**

**Answer All questions.**

**I. Elaborate on :** **(2 x 20 = 40)**

1. Describe the significance of dosimetry parameters used in IAEA TRS-398 protocol. Also explain that how this protocol differs from TG-51 AAPM protocol.
2. How do you calibrate a newly procured dosimeter to be used for calibration of Linear Accelerators? Explain the standardization methods used for Brachytherapy sources.

**II. Write notes on :** **(10 x 6 = 60)**

1. Primary Standard Dosimetry Laboratory.
2. Optical density.
3. Transient charged particle equilibrium.
4. Alpha Dosimetry.
5. Photo-neutron.
6. Radiochemistry of Water.
7. I-125 standardization.
8. Tissue Weighting Factor.
9. IAEA TRS-277.
10. Beer-Lambert's Law.

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[LA0512]

Sub: Code: 4014

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

FIRST YEAR

RADIATION DOSIMETRY AND STANDARDIZATION

Q.P.Code: 284014

Time: 3 hours

Maximum: 100 Marks

180(Min)

Answer All Questions

I. Elaborate on:

pages Time Marks  
(Max) (Max) (Max)

1. a. Explain the terms “primary standard and Secondary Standard”.

Describe with neat diagram how exposure is measured using Free Air Ionization Chamber

b. Explain how the Ir<sup>192</sup> source is standardized using Well type Ionization Chamber. Explain different correction factors involved in this procedure.

17 40 20

2. a. Explain in detail how neutrons of different energies interact with tissue

b. Discuss in detail the Manganese Sulphate bath method for primary standardization of Neutrons.

17 40 20

II. Write short notes on:

1. Define particle Fluence and Energy Fluence. Give their symbols and units.

4 10 6

2. Explain two different types of dead time. Give formula for both.

4 10 6

3. How neutrons are classified? Discuss the energy distribution of

Thermal Neutrons.	4	10	6
4. Write a short notes reactor and cyclotron produced radioisotopes.	4	10	6
5. Define the following and give its unit (a) Mass Attenuation Coefficient			
(b) Mass Stopping Power(c) Linear Energy Transfer.	4	10	6
6. Explain in brief “Bragg-Gray and Burlin Cavity” theories.	4	10	6
7. Explain the principle Ceric and Cerous dosimeters.	4	10	6
8. A 1 mCi point Co <sup>60</sup> source is immersed in a unit density uniform water medium. Calculate the primary component of water- KERMA Rate/ mCi at 1 cm from the source in units of cGy/hr/mCi. The values of mean mass energy absorption coefficient and mass attenuation coefficient of water at Co <sup>60</sup> Energy are 2.965 x 10 <sup>-2</sup> cm <sup>2</sup> /gm and 6.323 x 10 <sup>2</sup> /gm respectively.	4	10	6
9. Compare the characteristics of proportional, GM and scintillation counters.	4	10	6
10. Distinguish between TRS-277 and TRS-398.	4	10	6

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[LC 0413]

APRIL 2013

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

**FIRST YEAR**

**Paper IV – RADIATION DOSIMETRY AND STANDARDIZATION**

*Q.P. Code : 284014*

**Time : Three hours**

**Maximum :100marks**

**I. Elaborate on:**

**(2x20=40)**

1. Describe about Bragg – Gravy cavity theory and derive an expression for the volume of the cavity chamber.
2. Define calibration factors  $N_x$ ,  $N_k$ ,  $N_{D,air}$ ,  $N_{D,w}$  and quality factor. Explain about cross calibration method.

**II. Write notes on :**

**(10X6=60)**

1. W value and G value.
2. Re-entrant ionization chamber.
3. Fricke dosimeter.
4. Define Apparent activity and standardization of HDR Ir-192 source.
5. Types of thermometers and Barometers and method of temperature and pressure correction.
6. Classification of neutron sources based on energy.
7. Compare the protocols of TRS 398 and TG 51.
8. Define particle flux and fluence.
9. Free air ion chamber.
10. Calorimetry.

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[LD 1013]

OCTOBER 2013

Sub. Code: 4014

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

**FIRST YEAR**

**PAPER IV – RADIATION DOSIMETRY AND STANDARDIZATION**

*Q.P. Code : 284014*

**Time : 3 hours**

**Maximum : 100 marks**

**Answer ALL questions**

**I. Elaborate on :**

**(2X20=40)**

1. Describe in detail about the classification of neutron sources and dosimetry procedures.
2. Compare the external beam calibration protocol of TRS 398 and TRS 277.

**II. Write notes on:**

**(10X6=60)**

1. Ir-192 source standardization.
2. Directional dose equivalent.
3. Burlin and spencer Attix cavity theory.
4. Scintillation detector for neutron.
5. Linear and mass attenuation coefficient.
6. Preparation of radio colloids.
7. Transient charged particle equilibrium.
8. Calibration factor  $N_{d,w}$ .
9. Beam Quality correction
10. Air kerma strength.

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