

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

[AHS 0321]

**MARCH 2021**

**Sub. Code: 2402**

**(OCTOBER 2020 EXAM SESSION)**

**M.Sc. RADIOTHERAPY TECHNOLOGY**

**FIRST YEAR (From 2019-2020 onwards)**

**PAPER II – IMAGING MODALITIES, EQUIPMENT OPERATION SAFETY  
AND MAINTENANCE RELATED TO RADIOTHERAPY AND MEDICAL  
PHYSICS**

***Q.P. Code : 282402***

**Time: Three hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate notes on:**

**(2 x 20 = 40)**

1. As per IAEA TRS 398 protocol, write in detail calibration of Telecobalt machine.
2. What is workload, Occupancy and Use factor? Explain with suitable diagrams the barrier calculations of a 6MV linear accelerator.

**II. Write Short Notes on:**

**(10x6 = 60)**

1. Define the term radiation. Compare X-rays and gamma rays. Explain the three types of half-life.
2. What is cavity theory? Explain in detail.
3. What is Radiation field analyzer? Explain its uses.
4. What is shutter error? How will you measure and correct it?
5. Explain in detail the philosophy of radiation protection.
6. Write the occupational dose limits in detail.
7. Write a notes on Telecobalt source and HDR brachytherapy source.
8. Explain with suitable diagram free air chamber.
9. Explain Chromosomal aberration and its application for the biological dosimetry
10. Write the principles of Thermo Luminescence Dosimeters and their use in personnel monitoring badges with suitable diagrams.

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

[AHS 0921]

**SEPTEMBER 2021  
(MAY 2021 EXAM SESSION)**

**Sub. Code: 2402**

**M.Sc. RADIOTHERAPY TECHNOLOGY  
FIRST YEAR (From 2019-2020 onwards)  
PAPER II – IMAGING MODALITIES, EQUIPMENT OPERATION SAFETY  
AND MAINTENANCE RELATED TO RADIOTHERAPY AND MEDICAL  
PHYSICS**

***Q.P. Code : 282402***

**Time: Three hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

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

1. As per IAEA TRS 398 protocol, write in detail calibration of 6MV X-ray beam.
2. Briefly explain photoelectric effect, Compton effects and pair production and relative importance of each other.

**II. Write Short Notes on: (10x6 = 60)**

1. What is heel effect? How will you compensate it? Explain clinical importance.
2. Define and explain exposure, kerma and absorbed dose and its relationship.
3. Compare stationary and rotating anode X-ray tubes.
4. Write a note on telecobalt source and HDR brachytherapy source.
5. Explain Chromosomal aberration and its application for the biological dosimetry.
6. What is Radiation field analyzer? Explain its role in beam data measurements.
7. Explain in detail linear and mass attenuation coefficients, HVL and TVL.
8. Define the following ; Organ dose, Equivalent dose, Effective dose, Committed dose and Collective dose
9. Write in detail with suitable diagrams the Thermo Luminescence Dosimeters (TLD) and Optically stimulated Luminescence dosimeters (OSLD)
10. Write a detailed note Iridium-192 HDR source calibration.

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

[AHS 0222]

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

**Sub. Code: 2402**

**M.Sc. RADIOTHERAPY TECHNOLOGY  
FIRST YEAR**

**(Candidates admitted from 2019-2020 onwards – Paper II)**

**(Candidates admitted from 2020-2021 onwards – Paper III)**

**PAPER II & III – IMAGING MODALITIES, EQUIPMENT OPERATION  
SAFETY AND MAINTENANCE RELATED TO RADIOTHERAPY AND  
MEDICAL PHYSICS**

*Q.P. Code : 282402*

**Time: Three hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate notes on:**

**(2 x 20 = 40)**

1. Explain different types of ion chambers with suitable diagrams.
2. What is workload, Occupancy and Use factor? Explain with suitable diagrams the barrier calculations of a 6MV linear accelerator.

**II. Write Short Notes on:**

**(10x6 = 60)**

1. Explain the effect of voltage and current on the intensity of X – rays with suitable figures.
2. Write the occupational dose limits in detail.
3. What is shutter error? How will you measure and correct it?
4. Explain Somatic effects and hereditary effects.
5. Write the principles of Thermo Luminescence Dosimeters and their use in personnel monitoring badges with suitable diagrams
6. Write a notes on Telecobalt source and HDR brachytherapy source.
7. Compare stationary and rotating anode X-ray tubes
8. Define and explain exposure, kerma and absorbed dose and its relationship
9. What is primary standard? Explain in detail.
10. Explain with suitable diagram free air chamber.

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