

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

[AHS 1122]

NOVEMBER 2022

Sub. Code: 1943

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019)
PAPER III – RADIOTHERAPY PHYSICS & PRINCIPLES OF RADIOTHERAPY
Q.P NO. 801943**

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Describe in detail about the construction and working of Co-60 teletherapy unit.
2. Describe the Intensity Modulated Radiotherapy.
3. What are the disadvantages of conventional radiotherapy? Describe briefly the three dimensional techniques and their advantages.

II. Write notes on:

(8 x 5 = 40)

1. Factors that influence percentage depth dose.
2. Tissue Equivalent Materials.
3. Various patient immobilization devices used in radiotherapy.
4. Physical, biological half-life and their relationship.
5. Simulator.
6. Shielding blocks.
7. Explain SSD and SAD techniques and list their merits and demerits.
8. What is Radioactive series and radioactive equilibrium?

III. Short answers on:

(10 x 3 = 30)

1. Ionization.
2. Wedges.
3. Secondary electrons.
4. Port film.
5. SRS.
6. What is the role of bolus in radiotherapy?
7. Define linear energy transfer and state its unit.
8. Usage of compensators.
9. Particle range.
10. Bragg curve.

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

[AHS 0423]

APRIL 2023

Sub. Code: 1943

B.Sc. RADIOTHERAPY TECHNOLOGY

FIRST YEAR (Regulation 2018-2019 onwards)

PAPER III – RADIOTHERAPY PHYSICS & PRINCIPLES OF RADIOTHERAPY

Q.P. Code: 801943

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Artificial Radioactivity. List out the various types of sources used in RT and their properties.
2. Describe in detail the construction and working of a remote after loading Brachytherapy unit.
3. Elaborate on Stereotactic Radiotherapy and Radio surgery and their advantages over other Radiotherapy techniques.

II. Write notes on:

(8 x 5 = 40)

1. Total attenuation co-efficient.
2. Image Guided Radiotherapy.
3. Factors affecting Tissue Air Ratio, Back Scatter factor and Tissue Maximum Ratio.
4. Radio isotopes used in Medicine.
5. SRT and SRS.
6. Immobilization devices in Radiotherapy.
7. Relationship between half life and decay constant.
8. Tissue Equivalent Materials.

III. Short answers on:

(10 x 3 = 30)

1. Decay Process of Co-60 Source.
2. Wedge filter
3. Tissue Maximum dose.
4. Port film.
5. Particle range.
6. What is the role of a phantom in dosimetry?
7. Define Linear Energy Transfer and state its unit?
8. What is the advantage of Tomotherapy over conventional RT?
9. Explain Binding Energy.
10. Absorbed dose.

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

[AHS 1123]

NOVEMBER 2023

Sub. Code: 1943

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019 onwards)
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Q.P. Code: 801943**

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain about the construction and working of a Remote afterloading Brachytherapy Unit.
2. Write about SSD, SAD and Rotational techniques. Write down the procedure to convert PDD at a particular SSD to PDD of another SSD.
3. Write in detail about the various modes of Interaction of Photons with matter.

II. Write notes on:

(8 x 5 = 40)

1. Tissue Air Ratio.
2. Role of Immobilisation in Radiotherapy.
3. Styrofoam cutter.
4. Relationship between Linear attenuation coefficient and HVL.
5. Wave guide.
6. Phantom and its types.
7. Tissue compensators.
8. Procedure for Acquiring port films.

III. Short answers on:

(10 x 3 = 30)

1. Attenuation.
2. Stopping power ratio.
3. Ionisation and excitation.
4. Energy absorption coefficient.
5. Wedges.
6. Physical characteristics of Electron beam.
7. Write any two Cytotoxic drugs.
8. Define Gray.
9. MLC.
10. Isodose curves.

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

[AHS 0424]

APRIL 2024

Sub. Code: 1943

**B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019 onwards)
PAPER III – RADIOTHERAPY PHYSICS & PRINCIPLES OF RADIOTHERAPY
Q.P. Code: 801943**

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain about the construction and working of a Telecobalt Therapy Unit.
2. Discuss about Immobilisation and Tissue compensation.
3. Write down the Physical characteristics of common sources used in Radiotherapy.
Draw the decay scheme of Cobalt-60 and Iridium-192.

II. Write notes on:

(8 x 5 = 40)

1. Compton effect.
2. Interaction of charged particle with matter.
3. Klystron and Magnetron.
4. Use of Simulator in Radiotherapy.
5. Compare and Contrast SRS and SRT.
6. Physical half-life, Biological half-life and Mean life.
7. What is a Bolus? Write down its application and give two examples of Bolus materials.
8. Radioactive equilibrium.

III. Short answers on:

(10 x 3 = 30)

1. Write down the SI unit of Exposure, Absorbed dose and Activity.
2. SSD.
3. HVL and TVL.
4. Linear attenuation coefficient.
5. Brachytherapy.
6. EPID.
7. Radioprotectors.
8. Delta rays.
9. TAR and list of factors affecting it.
10. Phantom.

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

[AHS 1125]

NOVEMBER 2025

Sub. Code: 1943

B.Sc. RADIOTHERAPY TECHNOLOGY
FIRST YEAR (Regulation 2018-2019 onwards)
PAPER III – RADIOTHERAPY PHYSICS & PRINCIPLES OF RADIOTHERAPY
Q.P. Code: 801943

Time: Three Hours

Answer All questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Describe the construction and working of Co-60 teletherapy unit.
2. Construction and working of linear accelerator.
3. What is the purpose of simulation? Explain the working of a conventional Radiotherapy simulator with a neat diagram.

II. Write notes on:

(8 x 5 = 40)

1. Physical properties of any four Radioactive sources used in Radiotherapy.
2. Factors that affect percentage depth dose.
3. Intensity modulated Radiotherapy.
4. Remote after loading Brachytherapy units.
5. Gamma Knife.
6. Bolus and Phantom materials.
7. Interaction of charged particles.
8. Tissue compensators.

III. Short answers on:

(10 x 3 = 30)

1. Half life.
2. Bragg curve.
3. LET (Linear Energy Transfer).
4. Stopping power ratio.
5. Compton effect.
6. Advantages of rotational technique.
7. Phantom material.
8. Secondary electrons.
9. Port film.
10. Delta rays.
