

B.Sc. RADIOTHERAPY TECHNOLOGY
(New Syllabus 2014-2015)
SECOND YEAR
PAPER III – RADIOTHERAPY TECHNIQUES

Q.P. Code: 801933

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe the indications, technique, dose and complications of radiotherapy in pituitary adenoma.
2. Describe staging of carcinoma of carcinoma of vocal cord and management of a patient with stage 1 disease.
3. Describe staging and preoperative long course radiotherapy for carcinoma of rectum.

II. Write notes on: **(8 x 5 = 40)**

1. Radiotherapy techniques in carcinoma of maxilla.
2. Role of CT in radiotherapy planning.
3. Brief note on Wedges.
4. Indications and techniques of prophylactic cranial radiotherapy.
5. Quality assurance in Cobalt 60 machine.
6. Write a note on bolus and clinical use.
7. Treatment planning in Stereotactic Radiation Therapy (SRT).
8. Techniques of radiotherapy in the treatment of carcinoma of upper third esophagus.

III. Short answers on: **(10 x 3 = 30)**

1. Post operative radiotherapy for carcinoma lung.
2. Adaptive radiotherapy.
3. Brachytherapy in carcinoma of esophagus.
4. Post head and neck radiotherapy complications.
5. SSD treatment.
6. Radiotherapy for brain secondaries.
7. Electronic Portal Imaging Device (EPID).
8. Properties and clinical use of Proton beam therapy.
9. Indications and details of radiotherapy in secondaries bone.
10. Imaging for head and neck tumours.

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Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe the indication, technique, dose and complications of radiotherapy in seminoma of testis.
2. Describe staging of carcinoma nasopharynx and management of a patient with T2 N1 M0 disease.
3. Describe staging and radiotherapy for carcinoma endometrium.

II. Write notes on:

(8 x 5 = 40)

1. Simulation and 2 D planning for carcinoma breast.
2. Role of PET CT in radiotherapy planning.
3. Immobilization in head and neck.
4. Errors in radiotherapy treatment delivery.
5. Quality assurance in Linac.
6. Beam modifying devices.
7. Treatment planning in Stereotactic Radiosurgery (SRS).
8. Techniques of radiotherapy in the treatment of carcinoma of middle third esophagus.

III. Short answers on:

(10 x 3 = 30)

1. Intracavitary brachytherapy in carcinoma of cervix.
2. SAD treatment.
3. Imaging for CNS tumours.
4. Properties and clinical use of Electrons.
5. Indications and details of radiotherapy in solitary plasmacytoma.
6. Mammogram.
7. Dose Volume Histograms (DVH).
8. Imaging during treatment delivery.
9. Brachytherapy in carcinoma of esophagus.
10. Short course preoperative radiotherapy for carcinoma rectum.

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Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe the indications, technique, dose and complications of radiotherapy in carcinoma oropharynx.
2. Describe the technique of total body irradiation and treatment verification for the same.
3. Mention various set up verification systems available and describe any 2 of them in detail.

II. Write notes on:

(8 x 5 = 40)

1. Immobilization for stereotactic body radiotherapy.
2. Enumerate beam shaping devices and describe one of them in detail.
3. Describe any three radiation safety features in a teletherapy radiation room.
4. Describe conventional technique for pituitary adenoma.
5. Compare and contrast 3DCRT and IMRT techniques.
6. Write formula to calculate treatment time. Explain any 2 factors that affect treatment time.
7. Build-up material and its use.
8. Brachytherapy for thigh sarcoma.

III. Short answers on:

(10 x 3 = 30)

1. What is the conventional technique used for carcinoma cervix and why?
2. Dwell time and dwell position.
3. What energy X-rays would you prescribe for an obese person to treat his pelvis? Why?
4. Intraoperative radiation therapy- indications and energies used.
5. Advise on care of a person on radiation to head and neck region.
6. Prescribe prophylactic cranial irradiation for Acute lymphoblastic leukemia.
7. Difference in isodose charts for Cobalt 60 and 6 MV xrays for same field size and depth.
8. Define OAR. Write constraints for lungs in mediastinal radiation therapy planning.
9. Name 6 benign conditions in which radiation therapy is used for treatment.
10. Name 3 conditions where intraluminal brachytherapy can be used.

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Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe the indications, technique, dose and complications of radiotherapy in carcinoma breast.
2. Describe conventional technique for carcinoma maxilla including contour and distribution.
3. Describe any three immobilization devices and mention the possibility of errors with each of them.

II. Write notes on: **(8 x 5 = 40)**

1. HDR (high dose rate) Vs LDR (low dose rate) brachytherapy.
2. Advantages of CT simulator.
3. Compare and contrast wedges and compensators.
4. Treatment position verification methods.
5. Daily Quality assurance in Linear accelerator machine.
6. Radiation dermatitis and its management.
7. Dose volume histogram and mention its disadvantages.
8. Multileaf collimator.

III. Short answers on: **(10 x 3 = 30)**

1. Define set up errors and its types.
2. Cerrobend block - its composition.
3. Sources used commonly in high dose rate (HDR) brachytherapy and its half lives.
4. Which is better: SAD or SSD technique? Why?
5. Acute complications expected in radiation therapy to brain tumors.
6. Name 3 concurrent chemotherapeutic agents and the cancers in which they are used?
7. Mention dose rates for LDR, MDR and HDR.
8. Beam profile of proton beam therapy.
9. What care/preventive measures will you advise the patient to prevent radiation mucositis?
10. Which is the best radiation technique for carcinoma oropharynx and why?

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Maximum: 100 Marks

Answer all questions

I. Elaborate on: (3 x 10 = 30)

1. Describe the indications, technique, dose and complications of radiotherapy in carcinoma cervix.
2. Describe the conventional technique and planning for craniospinal irradiation.
3. Mention the beam modifying devices and describe any 2 of them.

II. Write notes on: (8 x 5 = 40)

1. What are the advantages of 3DCRT over 2D conventional techniques?
2. Beam profile of electron beam therapy. Mention the effect at photon electron field junction.
3. Methods of photon – photon fields matching.
4. What all will you do when a Cobalt 60 source is stuck?
5. Quality assurance in IMRT.
6. Optimization in high dose rate (HDR) brachytherapy.
7. Immobilization devices used in stereotactic treatments in brain tumors.
8. Difference between divergent and non-divergent shielding blocks.

III. Short answers on: (10 x 3 = 30)

1. Cone beam CT.
2. Mention three critical structures in brain and their tolerance doses.
3. Mention the various limb positions used for planning extremity sarcomas in lower limb.
4. Mention acute and chronic complications of local radiation therapy in breast cancer.
5. Mention 2 examples for irregular fields in radiation therapy. Whose method is used to calculate for irregular fields?
6. Mention the six positions of TSET.
7. Define GTV, CTV and PTV.
8. Mention 2 types of particle external beam therapy available currently in the world.
9. Mention 3 indications for palliative radiation therapy.
10. How is MRI scan useful in radiation planning?

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Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Simulation and its application in radiotherapy.
2. Describe indication, technique dose and complications of radiotherapy in carcinoma anorectum.
3. Electron beam therapy.

II. Write notes on:

(8 x 5 = 40)

1. ICRU 50.
2. ISODOSE curve.
3. Dose volume histogram.
4. Intracavitary brachytherapy.
5. Tomotherapy.
6. Write a note on bolus and its clinical uses.
7. Percentage depth dose.
8. Dog leg technique.

III. Short answers on:

(10 x 3 = 30)

1. Half value layer.
2. Various dose fractionation used in palliative radiotherapy to bone metastases.
3. Mention field borders for treating case of Carcinoma Nasopharynx.
4. Adaptive radiotherapy.
5. Define point “A”, point “B”, bladder point in brachytherapy of carcinoma cervix.
6. What is the best radiation technique to chordoma of base of skull? Why?
7. Tissue air ratio.
8. Advantages of preoperative radiotherapy.
9. Difference between 3DCRT and IMRT.
10. Therapeutic ratio.

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Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Immobilisation devices and its role in radiotherapy.
2. Describe indication, technique dose and complications of radiotherapy in carcinoma anorectum.
3. Enumerate indications of craniospinal irradiation and describe its techniques with illustration.

II. Write notes on: **(8 x 5 = 40)**

1. ICRU 62.
2. Prophylactic cranial irradiation.
3. Interstitial brachytherapy.
4. Indications for emergency radiotherapy and describe any two in detail.
5. Adaptive radiotherapy.
6. Total skin electron beam therapy.
7. Radioimmunotherapy.
8. CT/MRI in tumour localisation.

III. Short answers on: **(10 x 3 = 30)**

1. Integral dose.
2. What are radioprotectors and mention any three?
3. Short course preoperative radiotherapy in carcinoma rectum.
4. Properties and clinical uses of electrons.
5. What are beam flattening filters?
6. Cerrobend blocks and its composition and properties.
7. Sentinel lymph node biopsy.
8. Field borders for chest wall radiotherapy in carcinoma breast.
9. Dmax.
10. PET-CT.

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Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Brachytherapy.
2. Describe indication, technique, dose and complication of radiotherapy in carcinoma cervix.
3. Principles and basics of chemoradiation.

II. Write notes on:

(8 x 5 = 40)

1. SSD technique.
2. Tomotherapy.
3. Gamma knife.
4. Half beam block technique.
5. Workflow of conformal radiotherapy.
6. Radiotherapy techniques in carcinoma glottic larynx stage I disease.
7. Intraluminal brachytherapy in carcinoma oesophagus.
8. 4r's and its relevance in radiotherapy.

III. Short answers on:

(10 x 3 = 30)

1. Mention six beam modifying devices.
2. Low dose rate brachytherapy.
3. What are radiosensitisers and mention any five?
4. Advantages of intraoperative radiotherapy.
5. Wedges in radiotherapy.
6. Hypofractionation.
7. Mammogram.
8. Lasers in radiotherapy.
9. Post head and neck radiotherapy complications.
10. Field borders for chest wall radiotherapy in carcinoma breast.

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

[AHS 0321]

MARCH 2021

Sub. Code: 1933

(AUGUST 2020 EXAM SESSION)

B.Sc. RADIOTHERAPY TECHNOLOGY

SECOND YEAR (Regulations 2014-2015 & 2018-2019)

PAPER III – RADIOTHERAPY TECHNIQUES

Q.P. Code : 801933

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail about 3DRT technique (conformal radiotherapy).
2. Describe conventional Technique for carcinoma oral cavity.
3. Describe in detail about TSET (total skin electron irradiation technique).

II. Write notes on:

(8 x 5 = 40)

1. Immobilization devices.
2. Chemoradiation.
3. Brief short notes on wedges.
4. TNM staging.
5. Techniques of radiotherapy in carcinoma tongue.
6. Write about X-ray simulator.
7. Electron beam therapy.
8. Write about radiotherapy technique in carcinoma cervix.

III. Short answers on:

(10 x 3 = 30)

1. I 125.
2. Write about T-rod.
3. Write about megavoltage x-ray energies used and cobalt 60 is equivalent to which x-ray energy?
4. What is hyperfractionation?
5. Define OAR.
6. Write about Intra- luminal brachytherapy with 3 indications.
7. DVH.
8. Write about bolus.
9. What is OBI?
10. QA in cobalt.

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

[AHS 0222]

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

Sub. Code: 1933

**B.Sc. RADIOTHERAPY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019)
PAPER III – RADIOTHERAPY TECHNIQUES
Q.P. Code : 801933**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Describe immobilization techniques, dose and complications of radiotherapy in medulloblastoma.
2. Describe indications of electron beam therapy and mention techniques of electron arc therapy.
3. Describe the immobilization device, radiotherapy techniques used for Carcinoma nasopharynx.

II. Write notes on:

(8 x 5 = 40)

1. Implications of MRI in radiotherapy.
2. Absorbed dose.
3. 2D conventional radiotherapy techniques for carcinoma breast.
4. Complications of head and neck radiotherapy.
5. Intra-cavitary brachytherapy for carcinoma cervix.
6. Iridium 192.
7. Multileaf collimator.
8. Immobilization for SRT (stereotactic radiotherapy).

III. Short answers on:

(10 x 3 = 30)

1. Imaging for CNS tumors.
2. What is Cranio-spinal irradiation? Mention 2 indications.
3. What is half beam block technique?
4. Write about wedge angle and hinge angle.
5. Total body irradiation.
6. 2D technique for T1N0 vocal cord.
7. Define set up errors.
8. What is cerrobend blocks?
9. Write about compensator.
10. Fluoroscopy.

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

[AHS 0922]

SEPTEMBER 2022

Sub. Code: 1933

(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)

**B.Sc. RADIOTHERAPY TECHNOLOGY
SECOND YEAR (Regulations from 2014-2015 & 2018-2019)
PAPER III – RADIOTHERAPY TECHNIQUES
Q.P. Code : 801933**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Mention Beam modifying devices and describe any 3 in detail.
2. Indications of Emergency Radiotherapy and describe any 3 with illustration.
3. LINAC.

II. Write Notes on:

(8 x 5 = 40)

1. Total body irradiation.
2. Monoisocentric Technique.
3. Radioiodine therapy in Carcinoma Thyroid.
4. Febrile Neutropenia management.
5. Radiation dermatitis RTOG grading and management.
6. Bolus.
7. Isodose curves.
8. Inverse square law.

III. Short Answers on:

(10 x 3 = 30)

1. Paraortic Nodal irradiation in Carcinoma cervix - dosage and portals.
2. Linear energy transfer.
3. Mention any 6 imaging techniques in Radiotherapy.
4. Premalignant Lesions of oral cavity.
5. Clinical Target Volume.
6. Inverse planning.
7. Advantages of concurrent Chemoirradiation.
8. Picture Archival and Communication Systems (PACS).
9. What are Radioprotectors and mention any 3.
10. Compensators - Merits and Demerits.

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

[AHS 0423]

APRIL 2023

Sub. Code: 1933

**B.Sc. RADIOTHERAPY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER III – RADIOTHERAPY TECHNIQUES
Q.P. Code : 801933**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on: **(3 x 10 = 30)**

1. Describe in detail about Electron Beam Therapy.
2. Immobilization devices and its role in Radiotherapy.
3. Principles and basics of Chemoradiation.

II. Write Notes on: **(8 x 5 = 40)**

1. Dose Volume Histogram.
2. Percentage depth dose.
3. Isodose curve.
4. CT/MRI in tumor localisation.
5. Linear Energy Transfer.
6. SAD technique.
7. ICRU 62.
8. Intraluminal Brachytherapy in Carcinoma Oesophagus.

III. Short Answers on: **(10 x 3 = 30)**

1. Short course preoperative Radiotherapy in Carcinoma Rectum.
2. Advantages of Intraoperative Radiotherapy.
3. Hyperfractionation.
4. Tumour Registry.
5. Megavoltage cone beam CT.
6. Tissue Air Ratio.
7. High dose rate Brachytherapy.
8. Penumbra.
9. Relative biological effectiveness.
10. Involved field Radiotherapy.

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

[AHS 1123]

NOVEMBER 2023

Sub. Code: 1933

**B.Sc. RADIOTHERAPY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER III – RADIOTHERAPY TECHNIQUES
Q.P. Code: 801933**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on: (3 x 10 = 30)

1. Explain about the Staging of Carcinoma Cervix and discuss about the role of Radiation Therapy in its Management.
2. Types of Beam Modifying Devices and its Importance.
3. Discuss about the Importance of Immobilization in Radiotherapy and write in detail about the commonly used Immobilization devices.

II. Write Notes on: (8 x 5 = 40)

1. Intraoperative Brachytherapy.
2. TSET.
3. Electron Beam Therapy.
4. Symmetric and Asymmetric Jaws.
5. Commonly encountered Emergencies in Radiation Therapy.
6. Bolus and its Application.
7. ICRU 62.
8. Role of CT in Radiation Therapy planning.

III. Short Answers on: (10 x 3 = 30)

1. Intraluminal Brachytherapy.
2. SSD and SAD treatment.
3. Multileaf Collimator.
4. Dose Volume Histogram.
5. Instructions to patients with Head and Neck tumors undergoing Radiation Therapy.
6. Dwell position and dwell time.
7. Types of setup errors.
8. Name any three commonly used Brachytherapy sources with their half life.
9. Indications for Palliative Radiation Therapy.
10. Electronic Portal Imaging Device.

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

[AHS 0424]

APRIL 2024

Sub. Code: 1933

**B.Sc. RADIOTHERAPY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER III – RADIOTHERAPY TECHNIQUES
Q.P. Code: 801933**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Image Guided Brachytherapy in Carcinoma Cervix.
2. Describe Indication, technique, dose and complications of Radiotherapy in Carcinoma Anorectum.
3. Enumerate indications of Craniospinal Irradiation and describe its techniques with illustration.

II. Write Notes on:

(8 x 5 = 40)

1. Simulator.
2. Mention any five Radioisotopes with its properties and uses.
3. Multileaf Collimator.
4. TBI.
5. Information technology and networking in Radiotherapy.
6. Indications of Emergency Radiotherapy and describe any two with illustration.
7. World Health Organization (WHO) Pain Ladder.
8. Interstitial Brachytherapy in Carcinoma Cervix.

III. Short Answers on:

(10 x 3 = 30)

1. Electronic Portal Imaging Device.
2. Mention Organ at risk and dose constraints for Radiotherapy planning in Parotid cancer.
3. Radioprotectors.
4. PET-CT.
5. Hypofractionation.
6. Mention Indication of Radiotherapy in Benign diseases.
7. Remote after loading technique in Brachytherapy.
8. Compton effect.
9. Internal Target Volume.
10. Monitor units.

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

[AHS 1125]

NOVEMBER 2025

Sub. Code: 1933

**B.Sc. RADIOTHERAPY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)**

PAPER III – RADIOTHERAPY TECHNIQUES

Q.P. Code: 801933

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on: **(3 x 10 = 30)**

1. Describe the staging and management of a patient with $T_3N_1M_0$ carcinoma Nasopharynx. Mention the acute toxicities.
2. Mention various setup verification systems available and describe any two of them in detail.
3. Describe the indication, technique, dose and toxicity of Radiotherapy in Carcinoma Breast.

II. Write Notes on: **(8 x 5 = 40)**

1. Total skin electron beam therapy.
2. Indications of emergency radiotherapy and describe any two in detail.
3. Half beam block technique.
4. Radiotherapy techniques in carcinoma glottic larynx stage I disease.
5. Radiotherapy technique in carcinoma endometrium.
6. MRI in Radiotherapy.
7. Immobilization for Stereotactic Radiotherapy.
8. Total body irradiation.

III. Short Answers on: **(10 x 3 = 30)**

1. RTOG grading of acute radiation dermatitis.
2. Inverse Square law.
3. Define Radio protectors. Mention any two.
4. Premalignant lesion of oral cavity.
5. Linear Energy transfer.
6. Penumbra.
7. Involved field radiotherapy.
8. Indications of Palliative radiotherapy.
9. Picture archival and communication system (PACS).
10. Write about Thermoplastic mould.
