[LJ 0816] AUGUST 2016 **Sub.Code :1932**

B.Sc. RADIOTHERAPHY TECHNOLOGY
(New Syllabus 2014-2015)

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS AND MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum : 100 Marks**

Answer All Questions

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

1. Explain in detail the physical components of a tele-Cobalt unit.
2. Explain in detail about wedges, types and their uses with suitable diagram.
3. Discuss about some radioactive sources, their physical characteristics used in brachytherapy,

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

1. Write about Gamma Knife unit.
2. Write about the merits and de-merits of tele cobalt unit and linear accelerator.
3. Write the process of CT simulation.
4. Tissue compensators.
5. Explain with diagram the pin and arc technique.
6. Write about orthogonal simulation procedure for intracavitory Brachytherapy.
7. Define Percentage Depth Dose. Explain the different parameters in a PDD curve with a neat diagram.
8. Write the differences between Magnetron and Klystron.

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

1. Define Off Axis Ratio.
2. Define Isocentric technique.
3. Draw the decay scheme of Cs-137.
4. What is meant by dynamic Wedge?
5. Draw a diagram of a linear accelerator head in electron mode.
6. What is collimator scatter factor?
7. Define Air Kerma Strength.
8. What is Skin Sparring effect?
9. Bolus materials and their uses.
10. Transmission Penumbra.

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[LK 0217] FEBRUARY 2017 **Sub.Code :1932**

B.Sc. RADIOTHERAPHY TECHNOLOGY
(New Syllabus 2014-2015)

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS AND MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum : 100 Marks**

Answer All Questions

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

1. Explain with diagram about the working of High Dose Rate remote afterloading Brachytherapy.
2. Define Percentage Depth Dose and explain in detail the factors affecting them.
3. Explain the different applications of Brachytherapy in detail.

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

1. Principle and working of a vande graff generator.
2. Radiation Field Analyzer and its uses.
3. Write the different shutter mechanisms to move the source to ON and OFF in telecobalt unit.
4. Explain front and back pointer with diagram.
5. Explain with diagram the commercially available multi leaf collimators.
6. Write about Intraluminal Brachytherapy.
7. Explain about the different electron interactions with matter.
8. Describe about the Low Dose Rate (LDR) Bhabha Atomic Cesium-137 kit.

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

1. Define Tissue Air Ratio.
2. Define Physical Penumbra.
3. Define Isocentre.
4. What is motorized Wedge?
5. Draw a diagram of a linear accelerator head in photon mode.
6. What are isodose charts and its uses?
7. What are the factors used for treatment time calculation in SSD technique?
8. Heavy Particle beams.
9. Define the Depth of Dose maximum (Dmax).
10. What is timer error?

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[LL 0817] AUGUST 2017 **Sub. Code: 1932**

B.Sc. RADIOTHERAPY TECHNOLOGY

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

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

1. Explain the methods to correct for contour irregularities.
2. List out the various acceptance testing for tele-cobalt machines and explain them.
3. Explain brachytherapy and its classification based on dose rate.

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

1. Explain BARC Cs-137 Kit.
2. Write about Vande Graff Generator.
3. Write about the light and radiation field congruence test.
4. Write notes on Phantoms.
5. Write about the physical characteristics of Cs-137 brachytherapy source.
6. Explain percentage depth dose.
7. Write about the mechanical QA checks in tele-Cobalt machine.
8. Microtron.

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

1. What is wedge angle and write the relationship between wedge angle and hinge angel?
2. Collimator Scatter Factor.
3. Skin sparring effect.
4. Corrections for tissue inhomogeneties.
5. Isocentre.
6. Scatter air ratio.
7. Calculate the equivalent square field for 25 x 10 cm^2.
8. What is the difference between LDR, MDR and HDR brachytherapy?
9. Gross Tumor Volume (GTV).
10. Bolus and its uses.

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[LM 0218] FEBRUARY 2018 **Sub. Code: 1932**

B.Sc. RADIOTHERAPY TECHNOLOGY

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

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

1. Write in detail about front and back pointers with a suitable diagram.
2. What is a CT Simulator? Explain the process of CT simulation.
3. Explain the different types of brachytherapy procedures.

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

1. Explain autoradiography.
2. Tissue compensators.
3. Treatment planning system.
4. Distinguish between Magnetron and Klystron.
5. Write about the physical characteristics of C-60 brachytherapy source.
6. Explain tissue phantom ratio.
7. Write about multileaf collimators.
8. Characteristics of a clinical electron beam.

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

1. Dynamic wedges.
2. Isodose curves.
3. Exposure rate constant.
4. Mention few dosimetry systems in brachytherapy.
5. Contact therapy.
6. Off-Axis ratio.
7. Calculate the equivalent square field for 15 x 5 cm^2.
8. What are heavy particles? Mention two of them used in radiotherpy.
9. Clinical Target Volume (CTV).
10. Permanent implants.

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[LN 0818] AUGUST 2018 **Sub. Code: 1932**

B.Sc. RADIOTHERAPY TECHNOLOGY

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

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

1. Discuss in detail about the different source movement mechanism in tele-Cobalt machine with suitable diagram.
2. Explain in detail about the physical components of a linear accelerator.
3. Explain the orthogonal simulation procedure for an intracavitory brachytherapy application.

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

1. Write about physical and motorized wedges.
2. Write about Gamma Knife unit.
3. Write about simulator.
4. Differences between SSD and SAD treatment techniques.
5. Write about the physical characteristics of Ir-192 brachytherapy source.
6. Explain Tissue Air Ratio.
7. Write about the mechanical QA checks in a linear accelerator.
8. Betatron.

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

1. Define Air Kerma Strength.
2. Flatness and Symmetry.
3. Draw the decay scheme of Co-60.
4. Penumbra.
5. Radiation Field Analyzer.
6. Back Scatter factor.
7. Calculate the equivalent square field for 8 x 16 cm^2.
8. Orthovoltage therapy.
9. Planning Target Volume (PTV).
10. Wedge transmission factor.

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[LO 0219] FEBRUARY 2019 **Sub. Code: 1932**

B.Sc. RADIOTHERAPY TECHNOLOGY

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

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

1. Explain the different types of brachytherapy procedures.
2. Explain the methods to correct contour irregularities.
3. Draw a diagram of linear accelerator and explain in detail about Linac head and its constituents.

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

1. Exposure rate constant.
2. Dynamic wedges.
3. Treatment planning system.
4. What are heavy particles/mention its use in radiotherapy?
5. Isodose curve.
6. Explain percentage depth dose.
7. SSD, SAD technique.
8. Quality assurance in Cobalt - 60.

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

1. Scatter air ratio.
2. Mould.
3. Bolus and its uses.
4. Collimator scatter factor.
5. Skin sparing factor.
6. Isocentre.
7. BETATRON.
8. Define off axis ratio.
9. Explain autoradiography.
10. Write the different shelter mechanism to move source to on and off in telecobalt unit.

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[LP 0819] AUGUST 2019 **Sub. Code: 1932**

B.Sc. RADIOTHERAPY TECHNOLOGY

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

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

1. Explain the methods to correct for contour irregularities.
2. Define the process of CT simulation.
3. Explain brachytherapy and its classification based on dose rate.

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

1. Explain autoradiography.
2. Write about Vande Graff Generator.
3. Write about penumbra.
4. Explain the characteristics of electron beam therapy.
5. Write about the mechanical QA checks in tele-Cobalt machine.
6. Isodose chart.
7. Microtron.
8. Distinguish between magnetron and klystron.

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

1. OFF Axis ratio.
2. ICRU - 50.
3. What is wedge angle and write the relationship between wedge angle and hinge angle?
4. Grenz therapy.
5. Kilovoltage unit.
6. What are heavy particles/mention its use in radiotherapy?
7. What is PTV?
8. Beam directional devices.
9. What is timer error?
10. Calculate the equivalent square field for 25 x 10 cm^2.

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[LQ 0220] FEBRUARY 2020 **Sub. Code: 1932**

B.Sc. RADIOTHERAPY TECHNOLOGY

SECOND YEAR

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE

Q.P. Code: 801932

Time: Three Hours **Maximum: 100 Marks**

Answer all questions

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

1. Discuss about some radioactive sources, their physical characteristics used in Brachytherapy.
2. List out the various acceptance testing for tele-cobalt machines and explain them.
3. Explain the orthogonal simulation procedure for an intracavitory brachytherapy application.

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

1. Write the difference between Magnetron and Klystron.
2. Characteristics of a clinical electron beam.
3. Wedge filters.
4. Isodose chart.
5. Cyclotron.
6. Explain autoradiography.
7. Characteristics of photon beams.
8. Simulators and its uses.

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

1. Define Air Kerma strength.
2. What is meant by dynamic wedge?
3. What is contact therapy?
4. Peak scatter factor.
5. Percentage depth dose.
6. Calculate the equivalent square field for 8 x 16 cm^2.
7. Clinical target volume.
8. Transmission penumbra.
9. Measurement of entry and exist dose.
10. Bolus.

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

[AHS 0321] MARCH 2021 Sub. Code: 1932

(AUGUST 2020 EXAM SESSION)

B.Sc. RADIOTHERAPHY TECHNOLOGY

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

PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE

Q.P. Code : 801932

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Explain in detail the physical components of Co-60 teletherapy unit.
2. Explain various radioactive sources and their physical characteristics used in brachytherapy.
3. Explain the process of CT simulation.

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

1. Define %depth dose and discuss the parameters that affect the % depthdose.
2. Multileaf collimator.
3. Isodose chart.
4. Wedge filters.
5. Radiation field analayser.
6. Intraluminal brachytherapy.
7. SSD&SAD Technique.
8. corrections for contour irregularities.

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

1. What is timer error in cobalt teletherapy machine?
2. Calculate the equivalent square field for 10x16.
3. What are Bolus, why it is used?
4. Field shaping blocks.
5. Define Air Kerma Strength.
6. Draw the decay scheme of cobalt-60.
7. Define TAR.
8. What are the factors used for treatment time calculation in SSD technique.
9. LDR,HDR, and PDR.
10. Beam directional devices.

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

[AHS 0222] **FEBRUARY 2022** **Sub. Code: 1932**
(AUGUST 2021 EXAM SESSION)

B.Sc. RADIOTHERAPHY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019)
PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE
Q.P. Code : 801932

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. What is a CT Simulator? Explain the process of CT Simulation.
2. Explain in detail about wedges, types and their uses with suitable diagram.
3. Explain with diagram about the working of High Dose Rate remote afterloading Brachytherapy.

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

1. Explain with diagram the pin & arc technique.
2. Radiation Field Analyzer and its uses.
3. Output Factors.
4. Explain with diagram the commercially available multi leaf collimators.
5. Microtron.
6. Write about the light and radiation field congruence test.
7. IMRT.
8. Explain BARC Cs-137 kit.

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

1. Define off Axis Ratio.
2. Transmission Penumbra.
3. What is timer error.
4. Tissue Compensator.
5. Exposure rate constant.
6. What is superficial therapy.
7. Electron Contamination.
8. Gross Tumor Volume.
9. Collimator Scatter Factor.
10. Symmetry.

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

[AHS 0922] SEPTEMBER 2022 Sub. Code: 1932
(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)

B.Sc. RADIOTHERAPHY TECHNOLOGY
SECOND YEAR (Regulations from 2014-2015 & 2018-2019)
PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE
Q.P. Code : 801932

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. What are the physical components of Cobalt 60 unit?
2. Discuss about radioactive sources, their physical characteristics used in brachytherapy.
3. Define Percentage Depth Dose and explain in detail the factors affecting them.

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

1. Write the process of CT simulation.
2. Write about Tissue compensation.
3. Write about Magnetron.
4. Write about radiation field analyser and its uses.
5. Explain with diagram about multi leaf collimators and types.
6. Write notes on phantoms.
7. Write about characteristics of electron beam and isodose curve.
8. What are heavy particles and its use in radiotherapy?

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

1. Define Off-Axis ratio.
2. What is physical penumbra?
3. Define Isocentre.
4. What is timer error?
5. What is skin sparing effect?
6. Define Clinical Target Volume (CTV).
7. Define Air kerma strength.
8. Write about kilo voltage unit.
9. What are primary and scattered radiations in teletherapy beam machines?
10. Define Field size.

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

[AHS 0423] **APRIL 2023** **Sub. Code: 1932**

B.Sc. RADIOTHERAPHY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE
Q.P. Code: 801932

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. What is a CT Simulator? Explain the Process of CT Simulation.
3. What is Intracavitary Brachytherapy? Write about the Simulation procedure for Intracavitary Brachytherapy.

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

1. Grenz Therapy.
2. Record and Verify system.
3. Difference between Magnetron and Klystron.
4. Isodose chart and their use.
5. What is Penumbra? Explain its types.
6. Phantoms.
7. Merits of LA over Telecobalt machine.
8. What is a Wedge? Explain its types.

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

1. Off axis Ratio.
2. Skin sparing effect.
3. Physical characteristics of Cobalt – 60.
4. Isocentre.
5. Depth of Dose Maximum.
6. Immobilisation devices.
7. Air Kerma strength.
8. Write any three daily Quality Assurance Tests for LA.
9. SSD vs SAD.
10. Define Flatness.

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

[AHS 1123] **NOVEMBER 2023** **Sub. Code: 1932**

B.Sc. RADIOTHERAPHY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER II – RADIOTHERAPY EQUIPMENTS, APPLICATIONS & MAINTENANCE
Q.P. Code: 801932

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. Give a detailed description of X-ray Simulator and mark parts with help of diagram.
2. Explain with diagram about working of High Dose Rate remote afterloading Brachytherapy.
3. Explain the methods to Correct for Contour Irregularities.

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

1. Write about merits and de-merits of Telecobalt unit and Linear accelerator.
2. Define Percentage Depth Dose. Explain the different parameters in a PDD curve with a neat diagram.
3. Write about Klystron.
4. Write the different Shutter mechanisms to move the source to ON and OFF in Telecobalt unit.
5. Explain Front and Back Pointer with diagram.
6. Write about Vande Graft Generator.
7. Write about difference between SSD and SAD treatment techniques.
8. Write about mechanical QA checks in Linear Accelerator.

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

1. What is Collimator Scatter factor?
2. Define Air Kerma Strength.
3. What is Transmission Penumbra?
4. Define the Depth of Dose Maximum (Dmax).
5. Define Exposure Rate Constant.
6. Define Internal Target Volume (ITV).
7. What are Permanent implants?
8. Write about Grenz Ray therapy.
9. What is Film densitometry?
10. Wedges and its uses.

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

[AHS 0424] **APRIL 2024** **Sub. Code: 1932**

B.Sc. RADIOTHERAPHY TECHNOLOGY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER II – RADIOTHERAPY EQUIPMENTS,
APPLICATIONS & MAINTENANCE
Q.P. Code: 801932

Time: Three hours **Answer ALL Questions** **Maximum: 100 Marks**

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

1. What are the Physical Components of Linear Accelerator and Mention parts with Diagram.
2. Explain in detail about Wedges, Types and their Uses with suitable diagram.
3. Explain the different Applications of Brachytherapy in detail with respect to Cervical Cancer, Endometrial Cancer and Tongue Cancer.

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

1. Radiosensitisers.
2. Explain with diagram the Pin and Arc technique.
3. Principle and Working of Van de Graff Generator.
4. Different Electron interactions with Matter.
5. Iridium-191.
6. Light and Radiation Field Congruence Test.
7. Treatment Planning System.
8. Tissue Air Ratio.

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

1. Define Isocentric technique.
2. Bolus materials and their uses.
3. What are Isodose charts and its uses?
4. What are factors used for treatment time calculation in SSD technique?
5. Define Gross Tumor Volume (GTV).
6. Define Physical and Transmission Penumbra.
7. Write about different Shutter Mechanism to move source ON and OFF in Telecobalt unit.
8. LMD.
9. Raycast and Vacloc.
10. Bolus.

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