APRIL 2001

[KD 1517]   Sub. Code : 3025

DIPLOMA IN MEDICAL RADIOLOGY — THERAPY
EXAMINATION.

(New Regulations)

Paper I — MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIOTHERAPY

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

1.   What are Wedge Filters? Give clinical examples of
various wedges with diagrams.   (25)

2.   What are the biological effects of Radiation? What
are the recent developments in Radiation protection?
                                                 (25)

3.   Write short notes on :   (5 × 10 = 50)

    (a) TLD dosimeter

    (b) Iridium 192

    (c) Technitium 99 m

    (d) P 32

    (e) Maximum Permissible Dose.

NOVEMBER 2001

[KE 1517]   **Sub. Code : 3025**

DIPLOMA IN MEDICAL RADIOLOGY – THERAPY EXAMINATION.

(New Regulations)

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

1. Discuss the various modes of Radioactive decay. (25)

2. Define and explain : Backscatter factor, Wedge factor, Tissue weighting factor, Use factor, f–factor. (25)

3. Write briefly on :   (5 × 10 = 50)

   (a) Tissue–Air ratio

   (b) Role of CT and Ultrasound in treatment planning

   (c) Stochastic and non–stochastic effects

   (d) Different types of chambers used in Radiation Dosimetry

   (e) Recent developments in Brachytherapy.

———————.

[KG 1517]   **Sub. Code : 3025**

DIPLOMA IN MEDICAL RADIOLOGY – THERAPY EXAMINATION.

(New Regulations)

Part I

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

1.   Explain preloading, afterloading, Low Dose Rate, Medium Dose Rate, High Dose Rate, manual and remote techniques used in brachytherapy. Discuss on the advantages of micro High Dose Rate machines.   (25)

2.   Compare the advantages and disadvantages of telecobalt machines and linear accelerators. Physical, therapeutic and protection parameters to be discussed.   (25)

3.   Write short notes on : $(5 \times 10 = 50)$

    (a) Phantom materials.

    (b) Various units for exposure, absorbed dose and dose equivalent.

    (c) Source to skin distance and source to axis distance techniques in teletherapy.

    (d) Thermoluminescent dosimetry.

    (e) Tissue compensators.

———————

SEPTEMBER 2002

[KH 1517]   **Sub. Code : 3025**

DIPLOMA IN MEDICAL RADIOLOGY – THERAPY EXAMINATION.

(New Regulations)

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

1. Describe the features of diagnostic and therapeutic X ray tubes. (25)

2. Compare and contrast a Co^{60} unit with high energy Linear Accelerator. (25)

3. Write short notes on : $(5 \times 10 = 50)$

   (a) SSD and SAD technique

   (b) Mantle field

   (c) Ir^{192} and its applications

   (d) LDR–MDR–HDR

   (e) Treatment techniques in Ca Cx.

———————

[KI 1517]   Sub. Code : 3025

DIPLOMA IN MEDICAL RADIOLOGY THERAPY EXAMINATION.

(New Regulations)

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

1. Discuss the physical properties of various radioisotopes used in brachytherapy. Detail their application and compare advantages of each.   (25)

2. Discuss in detail on beam directing, defining and modifying devices used in teletherapy.   (25)

3. Write short notes on :   (5 × 10 = 50)

    (a) Timer error in telecobalt machines

    (b) Modern Radiotherapy simulator

    (c) Manchester system for treatment of cancers of uterine cervix

    (d) Tissue Air ratio, Tissue Phantom ratio and Tissue Maximum Ratio

    (e) Compton Scattering.

———

[KJ 1517]   Sub. Code : 3025

DIPLOMA IN MEDICAL RADIOLOGY
THERAPY EXAMINATION.

(New Regulations)

Paper I — MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIOTHERAPY

Time : Three hours   Maximum : 100 marks

Theory : Two hours and   Theory : 80 marks
forty minutes

M.C.Q. : Twenty minutes   M.C.Q. : 20 marks

M.C.Q. must be answered **SEPARATELY** on the
answer sheet provided as per the instructions
on the first page of M.C.Q. Booklet.

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I.   Two Essay Questions each carries 15 marks :

(2 × 15 = 30)

(1) Discuss in detail about various quality assurance tests to be carried out in a newly installed cobalt teletherapy unit.

(2) Analyse the following concepts and their usage in treatment planning :

(a) Tissue-Air ratio

(b) Tissue – Phantom ratio

(c) Percentage depth dose.

II.   Ten short notes :   (10 × 5 = 50)

(1) Bragg–Gray Cavity principle.

(2) X–Ray production.

(3) Role of Computed Tomography [C.T.] in treatment planning.

(4) Intensity Modulated Radiotherapy. [IMRT]

(5) Electron beam interaction with tissues.

(6) Tissue inhomogeneities correction methods.

(7) Importance of Time, Dose and distance in radiation protection.

(8) Manual after loading of Ir–192.

(9) Beta minus emission.

(10) Photo electric absorption.

———

2   [KJ 1517]

[KL 1517]   Sub. Code : 3025

DIPLOMA IN MEDICAL RADIOLOGY THERAPY EXAMINATION.

(New Regulations)

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Time   : Three hours   Maximum : 100 marks

Theory : Two hours and   Theory :   80 marks
             forty minutes

M.C.Q. : Twenty minutes   M.C.Q. :   20 marks

Answer ALL questions.

I.   Essay Questions : $(2 \times 15 = 30)$

(1) What is meant by radioactivity and what are the important properties of the particles and radiation emitted during radioactivity process. Write about the different radioactive disintegration processes with an example.

(2) What do you mean by radiation exposure and absorbed dose. Define their units. Explain how the radiation exposure can be estimated from a telecobolt machine using a thimble ionization chamber.

II.   Write short notes on : $(10 \times 5 = 50)$

(a) Compton effect

(b) Exponential attenuation

(c) Bremsstrahlung X-rays

(d) Linear accelerator

(e) Tissue maximum ratio

(f) Universal wedge filters

(g) Radiation beam directional devices

(h) Patterson parner rules

(i) Maximum permissible dose equivalent limits

(j) Field shaping in radiation therapy.

2   **[KL 1517]**

[KO 1517] Sub. Code : 3025

DIPLOMA IN MEDICAL RADIOLOGY THERAPY EXAMINATION.

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Time : Three hours Maximum : 100 marks

Theory : Two hours and Theory : 80 marks
forty minutes

M.C.Q. : Twenty minutes M.C.Q. : 20 marks

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I. Essay questions : $(2 \times 15 = 30)$

(1) Explain with the help of suitable cross sectional diagram, the design and working of a linear accelerator capable of producing photon and electron beams.

(2) Write in detail regarding various dosimetric systems in interstitial brachytherapy with relevance to head and neck implants.

II. Short notes : $(10 \times 5 = 50)$

(a) Compensators.

(b) Roentgen and rad.

(c) Immobilisation devices.

(d) Simulator.

(e) TAR and TMR.

(f) Shielding blocks.

(g) Effective doses equivalent.

(h) Spinal cord tolerance dose.

(i) Time, distance and shielding.

(j) Wedges.

[KQ 1517]   Sub. Code : 3025

DIPLOMA IN M.R.T. EXAMINATION.

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO THERAPY

Common to :

(Candidates admitted from 1993-94 onwards)

and

(Candidates admitted from 2004-05 onwards)

Time : Three hours   Maximum : 100 marks

Theory : Two hours and   Theory : 80 marks
      forty minutes

M.C.Q. : Twenty minutes   M.C.Q. : 20 marks

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I.   Essay :

1.   Discuss with a neat diagram about the
construction of Linear Accelerator and its functioning.
Discuss two specific clinical situations in which electron
beam therapy is useful.   (20)

2.   Explain simulation process and simulator design
and purpose of each of the components with a diagram.
                                                     (15)

3.   Compare and contrast the dose distribution rules
for interstitial application. Discuss Remote after loading
systems.   (15)

II.   Short notes :   (6 × 5 = 30)

   (a)   TLD

   (b)   Absorbed dose and effective dose.

   (c)   Area monitoring.

   (d)   Beam modifying devices.

   (e)   Immobilization devices.

   (f)   Hand molded and image related contours.

———————

MARCH 2008

[KS 1517]   **Sub. Code : 3025**

DIPLOMA IN M.R.T. EXAMINATION.

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

(Common to all Regulations)

Q.P. Code : 343025

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I.   Write essay on : $(2 \times 20 = 40)$

1.   Discuss merits and demerits of various radioactive isotopes used in Brachy therapy.   (20)

2.   Compare the physical characteristics of Co60 beam with that of 18Mv x-rays with special reference to their clinical relevance.   (20)

II.   Write short notes on : $(10 \times 6 = 60)$

1.   Treatment Planning System.

2.   Penumbra.

3.   Dose Volume Histogram.

4.   TLD.

5.   SAD Technique.

6.   Multi Leaf Collimator.

7.   Step and Shoot IMRT.

8.   Immobilization Devices.

9.   Cylindrical Mould.

10.   Strontium 90.

———————

DIPLOMA IN MEDICAL RADIO THERAPY EXAMINATION.

Paper I – MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

(Common to all candidates)

Q.P. Code : 343025

Time : Three hours   **Maximum : 100 marks**
Draw suitable diagram wherever necessary.

Answer ALL questions.

I. Essay questions :   **(2 X 20 = 40)**

1. Write about permanent interstitial implants, its principle and applications.

2. Discuss about intra cavitary radiotherapy principles, its applications.

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

1. Hyper fractionation.
2. Negative II mesons (Pimesons).
3. Production of Neutron beam.
4. Conformal therapy.
5. Half life.
6. Gama Knife.
7. Bolus.
8. Thermoluminesoence docimeter.
9. Tissue-Air-Ratio. (T.A.R.).
10. Ionization.

_____

[KU 1517]   **Sub. Code: 3025**

DIPLOMA IN MEDICAL RADIO THERAPY
EXAMINATION.
Paper I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIOTHERAPY
(Common to all candidates)
Q.P. Code : 343025

Time : Three hours   **Maximum : 100 marks**
Draw suitable diagram wherever necessary.
Answer ALL questions.

I. Essay questions : (2 X 20 = 40)

1. What is a Linear Accelerator? Draw a block diagram and discuss the parts of a typical medical linear accelerator. Discuss the clinical advantages of a Linear accelerator over a telecobalt machine.

2. What is the basis of fractionation? What is conventional fractionation? Write briefly on altered fraction and its clinical advantages. Explain linear quadratic model infractionation.

II. Write short notes on : (10 X 6 = 60)

1. Commissioning tests for a Telecobalt machine.
2. Isotopes used for various intraluminal brachytherapy and intravascular branchytherapy.
3. Pair production.
4. Define the following a) Half life b) Radioactivity c) Half value layer d) Tissue Air Ratio.
5. Beam modifying devices.
6. Gamma knife and cyber knife.
7. Chemical dosimetry.
8. List six distinct radiation protection features to be found in or around a 6 MV linear accelerator suite.
9. Absorption of low LET X ray photons by tissue generates fast electrons which in turn cause cell damage via two district mechanisms. Describe these two mechanisms with the aid of a diagram indicating the duration of molecular events involved.
10. Strontium 90**.**

DIPLOMA IN MEDICAL RADIO THERAPY EXAMINATION.

Paper I – MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY
(Common to all candidates)

Q.P. Code : 343025

Time : Three hours   **Maximum : 100 marks**

Draw suitable diagram wherever necessary.
Answer ALL questions.

I. Essay questions :   **(2 X 20 = 40)**

1. Discuss interaction of radiation with matter.

2. Write about linear accelerator's physical principle and applications.

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

1. Ionization chamber.
2. Linear energy transfer.
3. Alpha rays.
4. Wedges.
5. Low dose brachy.
6. Stochastic effects of radiation.
7. Galium 67.
8. Multi leaf collimeters.
9. Mantle field calculation.
10. Proton therapy principle.

******

DIPLOMA IN MEDICAL RADIO THERAPY EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

(Common to all candidates)

Q.P. Code : 343025

Time : Three hours   Maximum : 100 marks

Draw suitable diagram wherever necessary

Answer ALL questions

I. Essay questions :   **(2 x 20 = 40)**

1. Discuss the various isotopes used in brachytherapy and their physical characteristics. Describe the ideal isotope used in brachytherapy.

2. What are photons? With suitable diagrams explain the different ways with which photons interact with matter. Draw a graph and illustrate the relative importance of the three principal modes of interaction as function of photon energy and atomic number of the absorber.

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

1. Back scatter.

2. Beam defining devices.

3. Commissioning tests for a telecobalt machine.

4. Multi leaf collimation.

5. Which is the most suitable radionuclide for external beam radiotherapy and explain the reasons for the same?

6. HDR versus LDR brachytherapy.

7. Compton effect.

8. Define the following:
   a) Absorbed dose
   b) Kerma
   c) ALARA
   d) Integral dose.

9. Wedge filters.

10. Radiation filed analyzer (RFA).

******

[KX 1517]   **Sub. Code: 3025**

DIPLOMA IN MEDICAL RADIO THERAPY (D.M.R.T.) EXAMINATION.
Part I for Candidates admitted upto 2003-04 & Candidates admitted from 2008-09 onwards
And
Paper I for Candidates admitted from 2004-05 to 2007-08

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Q.P. Code : 343025

Time : Three hours   Maximum : 100 marks
Draw suitable diagram wherever necessary.
Answer ALL questions.

I. Essay questions :   **(2 X 20 = 40)**

1. Discuss the various modes of interaction of radiation with matter and their relevance as applicable to radiotherapy.

2. Describe the particle radiations of clinical use in radiotherapy and their relative merits and demerits.

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

1. Radiotherapy stimulators.

2. Remote after loading.

3. Rectal dosimetry.

4. Beam modifying devices.

5. Tomotherapy.

6. Iodine 125.

7. Compton Effect.

8. Heavy particle radiotherapy.

9. Permanent Implants.

10. Production of Neutron beam.

******

[KY 1517]   **Sub. Code: 3025**

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY
Q.P. Code : 343025

Time : 3 hours   **Maximum : 100 marks**
            (180 Min)

Answer ALL questions in the same order.

I. Elaborate on :	Pages (Max.)	Time (Max.)	Marks (Max.)
1. Compare the advantages and disadvantages of different radiation sources used in Brachytherapy. Discuss remote after loading system.	11	35	15
2. Discuss Stereotactic Radiotherapy.	11	35	15

II. Write notes on :			
1. Iodine – 131.	4	10	7
2. Hemibody irradiation.	4	10	7
3. Wedge filters.	4	10	7
4. Radiotherapy simulators.	4	10	7
5. Proton therapy.	4	10	7
6. Hyperthermia.	4	10	7
7. Thermoluminicent Dosimeter.	4	10	7
8. Multileaf collimation.	4	10	7
9. Isodose curve.	4	10	7
10. Interaction of radiation with matter.	4	10	7

****

[KZ 1517]   **Sub. Code: 3025**

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Q.P. Code : 343025

Time : 3 hours   **Maximum : 100 marks**
(180 Min)

Answer ALL questions in the same order.

I. Elaborate on :	Pages (Max.)	Time (Max.)	Marks (Max.)
1. Describe the interaction of radiation with matter.	11	35 min.	15
2. Describe in detail the fundamental requirements and radiation safety aspects in installing a Linear Accelerator in your department.	11	35 min.	15
II. Write notes on :			
1. Pair Production.	4	10 min.	7
2. Dose specification in brachytherapy.	4	10 min.	7
3. Dose volume histograms.	4	10 min.	7
4. IMRT.	4	10 min.	7
5. Maximum Permissible dose.	4	10 min.	7
6. HVL.	4	10 min.	7
7. Personal monitoring device in radiation.	4	10 min.	7
8. Mould room techniques.	4	10 min.	7
9. Isodose charts.	4	10 min.	7
10. Target volumes.	4	10 min.	7

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Q.P. Code : 343025

Time : 3 hours   **Maximum : 100 marks**
       (180 Min)

Answer ALL questions in the same order.

I. Elaborate on :

	Pages (Max.)	Time (Max.)	Marks (Max.)
1. Discuss the merits and demerits of Cobalt therapy and Linear Accelerator.	16	35	15
2. Discuss the physics aspects and the applications of various particle therapy in radiation practice.	16	35	15

II. Write notes on :

1. Describe the applications of Wedge filters.	4	10	7
2. Describe the applications of Beam Modifiers.	4	10	7
3. Describe the Quality Assurance in Linear Accelerator .	4	10	7
4. Describe Inverse Square law and its basis in radiation therapy.	4	10	7
5. Describe the Compton Effect.	4	10	7
6. Describe the Shielding Devices .	4	10	7
7. Describe the Radiation Protection Aspects.	4	10	7
8. Describe the applications of Electron therapy.	4	10	7
9. Describe the Scattered radiation.	4	10	7
10.Describe the Gammazone monitor.	4	10	7

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY
Q.P. Code : 343025

Time: Three Hours   Maximum: 100 marks

I. Elaborate on: (2X15=30)

  1.Discuss the interaction of Radiation with Matter
  2.Describe the rationale for Intensity Modulated radiotherapy

II. Write notes on: (10X7=70)

  1.Discuss Short lived Isotopes
  2.Describe the Beam Modifying devices
  3.Describe the usefulness of On Board Imaging
  4.Describe the applications of Bolus
  5.Describe various Immobilisation in Radiation therapy
  6.Describe the Air Kerma
  7.Describe the Isocentre Mounting technique
  8.Describe the Micro Multileaf Collimators
  9.Describe the various Isodose patterns
10.Describe the Volume Implantation

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY
Q.P. Code : 343025

Time: Three Hours   **Maximum: 100 marks**

I. Elaborate on: **(2X15=30)**

1. Discuss the merits and demerits of Cobalt therapy and Linear Accelerator.
2. Discuss the physics aspects and the applications of various particle therapy in radiation practice.

II. Write notes on: **(10X7=70)**

1. Describe the applications of Wedge filters.
2. Describe the applications of Beam Modifiers.
3. Describe the Quality Assurance in Linear Accelerator.
4. Describe Inverse Square law and its basis in radiation therapy.
5. Describe the Compton Effect.
6. Describe the Shielding Devices.
7. Describe the Radiation Protection Aspects.
8. Describe the applications of Electron therapy.
9. Describe the Scattered radiation.
10. Describe the Gammazone monitor.

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT)
EXAMINATION
MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Q.P. Code : 343025

Time: Three Hours   **Maximum: 100 marks**

Answer ALL questions

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss fractionation in radiotherapy practice.

2. Describe Image guided radiotherapy and its clinical applications.

II. Write notes on: **(10 x 7 = 70)**

1. Cobalt 60.

2. Conformal Radiotherapy.

3. Conformity Index.

4. Tissue equivalent materials.

5. Stochastic and non-stochastic effect.

6. Proton Therapy.

7. Helical Tomotherapy.

8. Oxygen enhancement ratio.

9. Accelerated fractionation.

10. Beam modifying devices.

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Q.P.Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss Parts of Linear Accelerator and housing requirement.

2. Discuss methods of Brachytherapy and dosimetry method in industrial implants.

II. Write notes on: **(10 x 7 = 70)**

1. Wedges.
2. Characteristic X Rays.
3. Isodose Chart.
4. Half value layer.
5. Total Body Irradiation.
6. Radiation sickness
7. Beam modifying devices in electron beam therapy.
8. Bragg Peak.
9. CT simulation.
10. Multileaf Collimator as Intensity Modulator.

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Q.P.Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Describe the four 'R's of Radiobiology and their clinical relevance.

2. Discuss function and differences between Tele Cobalt unit and linear accelerator.

II. Write notes on: **(10 x 7 = 70)**

1. Treatment planning system.
2. Compton scatter.
3. Personal monitoring devices.
4. Electronic Portal Imaging Device.
5. LQ. Model.
6. Source Axial Distance (SAD) technique.
7. Image based brachytherapy.
8. Physical basis of Image guided radiotherapy.
9. Characteristics of electrons.
10. Immobilisation devices and their relevance in Radiotherapy.

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Q.P.Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss: Tumor Dose Specification for External Photon Beams.

2. Treatment planning system and verification in Radiotherapy.

II. Write notes on: **(10 x 7 = 70)**

1. Attenuation Coefficient.

2. Pocket Dosimetry.

3. Interstitial implants in cancer cervix.

4. Integral Dose.

5. Remote afterloading in Brachytherapy.

6. Protection against radiation from Brachytherapy sources.

7. Helical Tomotherapy.

8. Treatment Planning for Electron Beam Therapy.

9. Rapid Arc Technique.

10. Basis of Stereotactic Radiosurgery.

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Q.P.Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. What are particle radiation? Discuss their clinical applications.

2. Describe the parts of linear accelerator as its clinical application.

II. Write notes on: **(10 x 7 = 70)**

1. Remote after loading Technique.
2. Importance of rectal dose in Gynaec brachytherapy.
3. Tomotherapy.
4. Hypofractionation.
5. Permanent Implants in brachytherapy.
6. Compare Iso-dose curves of cobalt and 6MV x-ray therapy.
7. Iridium – 192.
8. Therapeutic Ratio.
9. Dose Volume Histograms.
10. Cyber knife.

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Q.P. Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss in detail the production of proton beam and their properties.

2. Discuss in detail image based brachytherapy.

II. Write notes on: **(10 x 7 = 70)**

1. Wedges.
2. Intensity modulated radiation therapy.
3. Bolus.
4. Linear Quadratic model.
5. Deterministic effect.
6. Percentage depth dose.
7. TLD badge.
8. Total body irradiation.
9. Electronic portal imaging.
10. Thermoplastic mould.

****

DIPLOMA IN MEDICAL RADIO THERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO THERAPY

Q.P. Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss various Treatment Verification Methods and its clinical application in the treatment of cancers.

2. What are the field matching techniques available and explain it in detail with reference treatment of Medulloblastoma.

II. Write notes on: **(10 x 7 = 70)**

1. Flattening filter and Flattening filter free and its clinical applications.

2. Modes of radioactive decay.

3. Personnel Monitoring Devices and Maximum Permissible Dose.

4. Define: SSD and SAD. Discuss the differences between the two techniques and its clinical applications.

5. What is meant by Secondary Dosimeter? Give an example for secondary dosimeter and discuss in detail.

6. Stochastic and non-stochastic effects of radiation.

7. What are the types of wedge filters? Define wedge angle, hinge angle and wedge transmission factor.

8. What is pair production? Discuss its clinical application.

9. Use of Lasers in Radiotherapy.

10. Radioactive Iodine Ablation.

****

DIPLOMA IN MEDICAL RADIOTHERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Q.P. Code: 343025

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

I. Elaborate on: (2 x 15 = 30)

1. Discuss in detail the production of electron beam and their properties.

2. What are beam modifying devices explain with examples in detail?

II. Write notes on: (10 x 7 = 70)

1.   Dynamic wedges.

2.   Volumetric modulated arc therapy.

3.   Bragg Peak.

4.   Maximum permissible dose.

5.   Multi Leaf Collimator (MLC)

6.   Pure beta emitters.

7.   Electron field percentage depth dose.

8.   Half Value Layer.

9.   Total skin electron therapy.

10. Immobilization in radiotherapy planning.

****

DIPLOMA IN MEDICAL RADIOTHERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Q.P. Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Describe interaction of energy with matter and give the importance of same in clinical practice.

2. Define brachytherapy and describe in detail classifications and Clinical applications.

II. Write notes on: **(10 x 7 = 70)**

1. Multileaf / Collimation.

2. Isodose charts

3. Discuss parallel opposed fields

4. Discuss the various patient data acquisition methods.

5. Compensators.

6. Characteristics of electron beam.

7. Discuss GEC-ESTRO guidelines in ca. cervix.

8. Radiation protection survey.

9. IGRT

10. Particulate radiation.

*****

DIPLOMA IN MEDICAL RADIOTHERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Q.P. Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Describe the features and working of modern linear accelerator with schematic diagram.

2. Discuss physics in IMRT and clinical applications.

II. Write notes on: **(10 x 7 = 70)**

1. Wedge Filters

2. Define isocentre and isocentric technique in stationary beam and rotational therapy.

3. Describe various volumes as described in ICRU 50 and 62.

4. Describe various methods of simulations in radiotherapy.

5. Treatment planning in electron arc therapy.

6. Write short notes on radioisotopes used in brachytherapy.

7. Implant dosimetry.

8. Short notes on periodic QA in linac.

9. 3DERT

10. Beam collimation and penumbra

*****

DIPLOMA IN MEDICAL RADIOTHERAPY (DMRT) EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIOTHERAPY

Q.P. Code: 343025

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

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss the various particle beams used in radiotherapy and its advantages.

2. Discuss the various interactions of photon with matter and its relevance to radiotherapy.

II. Write notes on: **(10 x 7 = 70)**

1. Intensity modulated radiotherapy.
2. Stereotactic body radiotherapy.
3. Gamma rays.
4. Inverse square law.
5. Shielding blocks.
6. Bremsstrahlung radiation.
7. Calibration of radiotherapy equipments.
8. Gamma zone monitor.
9. Tissue compensators.
10. Half-life.

*****