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MANIPAL UNIVERSITY

**FOURTH SEMESTER M.Sc. (MEDICAL RADIATION PHYSICS)
DEGREE EXAMINATION – DECEMBER 2012**

SUBJECT: RECENT ADVANCES IN RADIOTHERAPY

Monday, December 17, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

Answer ALL the questions.

1. The three major linear accelerator manufacturers all use different MLC designs. Contrast these design variations.
2. Discuss in detail X-ray knife and Gamma knife for SRS.
3. Describe three different types of on-line digital portal imaging systems. Discuss the advantages and disadvantages of each of these systems.

(20×3 = 60 marks)

4. **Write short notes on:**

- 4A. Motorized Wedge
- 4B. Integrated Brachytherapy
- 4C. ICRU reference point in external beam therapy
- 4D. Patient Immobilisation

(5×4 = 20 marks)



MANIPAL UNIVERSITY**FOURTH SEMESTER M.Sc. (MEDICAL RADIATION PHYSICS)
DEGREE EXAMINATION – DECEMBER 2012****SUBJECT: CLINICAL RADIATION DOSIMETRY AND RADIATION STANDARDIZATION**

Tuesday, December 18, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

Answer ALL the questions.

1. Elucidate TRS 277 protocol for the output measurement of high energy electron beams. (20 marks)

- 2A. Explain the standardization procedure for the brachytherapy sources in terms of Air Kerma Strength.
- 2B. Elucidate standardization of electron beams used in radiotherapy. (10+10 = 20 marks)

- 3A. Discuss about the phantoms used for reference and non-reference dosimetry.
- 3B. Discuss the operational quantities used for area and personnel monitoring. (10+10 = 20 marks)

4. **Write a short note on:**
 - 4A. Air Kerma rate and its relationship with air kerma strength
 - 4B. Calibration of protection level dosimeters in terms of dose equivalent units
 - 4C. Electrometer calibration
 - 4D. ICRU sphere(5×4 = 20 marks)



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MANIPAL UNIVERSITY
FOURTH SEMESTER M.Sc. (MEDICAL RADIATION PHYSICS)
DEGREE EXAMINATION –MAY 2012

SUBJECT: RECENT ADVANCES IN RADIOTHERAPY

Tuesday, May 29, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ Answer ALL the questions.

1A. Explain in detail about ICRU volumes.

1B. Discuss in detail about Tomotherapy.

(10+10 = 20 marks)

2. Discuss in detail about MLC as an Intensity Modulator.

(20 marks)

3. Describe three different types of on-line digital portal imaging systems. Discuss the advantages and disadvantages of each of these systems.

(20 marks)

4. Write short notes on:

4A. MLC – leaf transmission

4B. Dynamic Wedge

4C. Beam collimation in SRS

4D. Dose Volume Histogram

(5×4 = 20 marks)



MANIPAL UNIVERSITY**FOURTH SEMESTER M.Sc. (MEDICAL RADIATION PHYSICS)
DEGREE EXAMINATION –MAY 2012****SUBJECT: CLINICAL RADIATION DOSIMETRY AND RADIATION STANDARDIZATION**

Thursday, May 31, 2012

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ **Answer ALL the questions.**

1. Elucidate TRS 277 protocol for the output measurement of high energy X-ray beams.
(20 marks)

- 2A. Discuss in detail about calibration of protection level instruments.
- 2B. Write a short note on Air Kerma rate and its relationship with air kerma strength.
- 2C. Write a short note on standardization of brachytherapy sources in terms of activity.
(10+5+5 = 20 marks)

3. Elucidate the design and characteristics of free air ion chamber and graphite chambers.
(20 marks)

4. **Write short notes on:**
 - 4A. Electron beam calibration using AAPM TG 51 protocol
 - 4B. TRS 398 protocol for Co-60 beam
 - 4C. Calibration of ion chambers in terms of absorbed dose in water
 - 4D. Define exposure, Kerma and Absorbed dose
(5×4 = 20 marks)

