Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 29-May-2024

Time: Three Hours **Max. Marks: 60 Marks**

RADIOTHERAPY (Part– I – A)
FUNDAMENTAL OF PHYSICS (RS - 3)
Q.P. CODE: 1356

Your answers should be specific to the questions asked
Draw neat, labeled diagrams wherever necessary

LONG ESSAYS (Answer any Two) **2 x 10 = 20 Marks**

1. Explain free air ionization chamber and its limitations
2. Explain in detail about factors affecting quality and intensity of X-ray image
3. Explain about electromagnetic spectrum and its properties

SHORT ESSAYS (Answer any FIVE) **5 x 5 = 25 Marks**

4. Exposure and absorbed dose
5. Series and parallel capacitors
6. **Radioactive transformation law**
7. Self induction
8. **Small focus and large focus**
9. Dose equivalent and effective dose
10. LET

SHORT ANSWERS (Answer any FIVE) **5 x 3 = 15 Marks**

11. Linear absorption coefficient
12. Bremsstrahlung X ray
13. Conductor and insulators
14. Unit of radioactivity
15. Inverse square law
16. Cooling system in X ray tube
17. HVL

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 29-May-2024

Time: Three Hours **Max. Marks: 100 Marks**

Radiotherapy - Part – I A (RS-4)

Q.P. CODE: 3285

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Second Question Choice) **2 x 10 = 20 Marks**

1. Explain about basic interactions between X-rays and matter.
2. What is the meaning of Rectification? Explain in detail about the Full wave rectification and Half wave rectification.

   OR

   Explain about radioactive disintegration process and radiation emission of daughter products.

SHORT ESSAYS (Question No 5 & 10 choice) **10 x 5 = 50 Marks**

3. The basic of the X-rays measurements.
4. Explain the principles of semiconductor.
5. Relation between Kerma and absorbed dose.

   OR

   Radium and its daughter elements.
6. Mutual induction and self-induction.
7. What is Linear Energy Transfer? Explain about Low and High LET Radiation.
8. Principles of the nuclear reactor.
9. Continuous spectrum and line spectrum of X-rays.
10. The physics of the radiograph.

    OR

    Radioactive equilibrium.
11. Describe the Electromagnetic waves and their properties.
12. Importance of focal spot.

SHORT ANSWER **10 x 3 = 30 Marks**

13. Coulombs law.
14. **Anode heel effect.**
15. Coherent scattering.
16. HVL
17. TLD badge.
18. ALARA.
19. P-n junction diode.
20. Ohm’s law.
21. Kilo voltage peak.
22. Isotope.

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 04-Jun-2024

Time: 3 Hours **Max. Marks: 30 Marks**

Radiation Biology, Applied Anatomy and Pathology (RS-3)
Q.P. Code: 1357

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary
(Note: Both QP Codes 1357 and 1358 are to be answered within total duration of 3 hours)

LONG ESSAYS (Answer any One) **1 x 10 = 10 Marks**

1. Explain DNA strand breaks and chromosomal aberrations.
2. Write a note on the radiation tolerance of the following organs.
   a) Spinal cord b) Parotids c) Lungs d) Brainstem e) Kidney
   How do you protect these organs while treating malignancy in the vicinity of these organs?

SHORT ESSAYS (Answer any Two) **2 x 5 = 10 Marks**

3. Time, dose and fractionation in radiotherapy
4. New radiation modalities
5. Characteristics of benign and malignant tumours

SHORT ANSWERS (Answer any Five) **5 x 2 = 10 Marks**

6. TNM staging
   Or
   Neoplasia
7. Brain tumours
8. Effect of embryo and fetus
9. Radio sensitivity
10. Effect of reoxygination
11. Cell survival curve

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 04-Jun-2024

Time: 3 Hours **Max. Marks: 30 Marks**

Principles of Radiotherapy (RS-3)
Q.P. Code: 1358

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary
(Note: Both QP Codes 1357 and 1358 are to be answered within total duration of 3 hours)

LONG ESSAYS (Answer any One) **1 x 10 = 10 Marks**

1. Explain brachytherapy and its types.
2. Write a note on steps used in external radiation therapy.

SHORT ESSAYS (Answer any Two) **2 x 5 = 10 Marks**

3. Explain IMRT and its importance.
   Or
   Advantages and disadvantages of hypofractionation compared to standard fractionation schedules.
4. Explain the prevention of side effects of radiation treatment.
5. **Explain treatment preparation for carcinoma Esophagus.**

SHORT ANSWERS (Answer any Five) **5 x 2 = 10 Marks**

6. Role of Brachytherapy in cancer management.
   Or
   Role of Chemotherapy in cancer management.
7. Role of sedation in radiation therapy.
8. TNM staging.
9. Symptoms of Neoplasia on the patient body.
10. Carcinoma breast.
    Or
    CT simulation of Ca.Breast.
11. Neoplasia and its effects on body.
    Or
    Common acute side effects of radiotherapy of skin.

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 04-Jun-2024

Time: Three Hours **Max. Marks: 50 Marks**

Radiotherapy - Part – I B (RS-4)
Radiation Biology & Applied Anatomy and Pathology
Q.P. CODE: 3286

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Answer any one) **1 x 10 = 10 Marks**

1. Discuss in detail about R's of Radiobiology.
2. Describe the anatomy of Breast. Explain the pathology and tumour spread of cancer breast.

SHORT ESSAYS (Answer any five) **5 x 5 = 25 Marks**

3. What is acute radiation syndrome? Discuss about the haematopoietic syndrome.
4. Pathology and features of skin cancer.
5. Staging cancer cervix.
6. Oxygen effect and reoxygenation.
7. OER.
8. Cell cycle.

SHORT ANSWER **5 x 3 = 15 Marks**

9. Malignant tumours.
10. Types of cell damages.
11. High LET radiation.
12. Cell survival curve.
13. **Cancer staging and grading.**

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 04-Jun-2024

Time: Three Hours **Max. Marks: 50 Marks**

Radiotherapy - Part – I B (RS-4)
Principles of Radiotherapy
Q.P. CODE: 3287

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Answer any one) **1 x 10 = 10 Marks**

1. Write about rationale, preparation of patient and simulation for external beam radiotherapy for middle third esophageal cancer.
2. Altered fractionation schedules.

SHORT ESSAYS (Answer any five) **5 x 5 = 25 Marks**

3. Acute effects of radiotherapy.
4. Particle beam therapy
   Or
   Role of chemotherapy in cancer management.
5. Brachytherapy.
6. Clinical signs and symptoms of neoplasia.
7. TNM classification.
8. Prevention of spinal cord over dosage in head and neck cancer radiotherapy.

SHORT ANSWER **5 x 3 = 15 Marks**

9. Osteoradionecrosis.
10. Care taken in paediatric patient.
11. Cancer cachexia.
12. Palliative radiotherapy.
13. Virtual simulation.

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Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 21-Nov-2024

Time: Three Hours **Max. Marks: 100 Marks**

Radiotherapy - Part – I A (RS-4)

Q.P. CODE: 3285

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Second Question Choice) **2 x 10 = 20 Marks**

1. Explain with diagram about half-wave and full-wave rectifier.
2. Discuss about construction of modern X-ray tubes.
   OR
   Explain in detail about protection quantities.

SHORT ESSAYS (Question No 5 & 10 choice) **10 x 5 = 50 Marks**

3. Anode design.
4. Describe the construction and working of stationary anode. Write any two advantages and disadvantages.
5. Explain photoelectric effect and Compton effect.
   OR
   Transformers used in X-ray equipment.
6. Explain characteristic and Bremsstrahlung X-rays.
7. Parallel and series capacitor.
8. Ohm's law and Kirchhoff's law.
9. Explain in detail electromagnetic waves and their properties.
10. Explain in briefly about the production of X-rays.
    Or
    Cooling of X-ray tubes.
11. Explain in detail line focus principle and Anode heel effect.
12. Mutual induction and self – induction.

SHORT ANSWER **10 x 3 = 30 Marks**

13. Properties of radium and its daughter elements.
14. Principles of semiconductors.
15. Low LET and High LET.
16. Definition of Rem and Sievert.
17. Explain exposure and absorbed dose.
18. Advantages of semiconductor devices over thermionic devices.
19. Ionization and excitation.
20. HVL.
21. Change the question as Radioactive equilibrium.
22. Principles of nuclear reactor.

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 26-Nov-2024

Time: Three Hours **Max. Marks: 50 Marks**

Radiotherapy - Part – I B (RS-4)
Radiation Biology & Applied Anatomy and Pathology
Q.P. CODE: 3286

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Answer any one) **1 x 10 = 10 Marks**

1. **Explain cell cycle and the effect of radiation in different phases of cell cycle.**
2. Discuss the different varieties of Brain tumour.

SHORT ESSAYS (Answer any five) **5 x 5 = 25 Marks**

3. LET and RBE.
4. Radiation induced cancer.
5. **Effects of Radiation on embryo and fetus.**
6. Explain the types of radiation and its biological effects.
7. Write a note on the radiation tolerance of the following organs.
   a. Spinal cord
   b. Liver

   How do you protect these organs while treating malignancy in the vicinity of these organs?
8. Describe in detail Anatomy, Pathology and staging of cancer of Breast.

SHORT ANSWER **5 x 3 = 15 Marks**

9. Skin cancer.
10. Staging and grading system.
11. Differences between benign and malignant tumour.
12. **Stochastic effect v/s deterministic effect.**
13. Precancerous lesion.

Rajiv Gandhi University of Health Sciences, Karnataka

II Year B.Sc. Radiotherapy Technology Degree Examination – 26-Nov-2024

Time: Three Hours **Max. Marks: 50 Marks**

Radiotherapy - Part – I B (RS-4)
Principles of Radiotherapy
Q.P. CODE: 3287

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS (Answer any one) **1 x 10 = 10 Marks**

1. What is Neoplasia, signs and symptoms and general principles of Cancer treatment?
2. What are Acute and late complications of radiation therapy, role of radiation therapy technologist in prevention of acute complications?

SHORT ESSAYS (Answer any five) **5 x 5 = 25 Marks**

3. Explain Altered fractionation.
4. What is HDR-Brachytherapy? How it is used in Cancer treatment?
5. What is concurrent Chemo-radiation?
6. What is cancer staging, explain TNM staging.
7. Role of radiation therapy in treating solid tumours in different settings.
8. Explain uses of anaesthesia in Radiation therapy.

SHORT ANSWER **5 x 3 = 15 Marks**

9. Enumerate different EBRT (External Beam Radiotherapy) techniques.
10. **Complications of chemotherapy.**
11. **Cachexia**
12. Explain Hypo-fractionated radiation therapy.
13. Role of Immobilization in Radiation therapy.