

**B. Sc. MEDICAL TECHNOLOGY (RADIOTHERAPY) (BRT)
SEMESTER -VI EXAMINATION, SEPTEMBER- 2026**

ADVANCED RADIOTHERAPY TECHNIQUES-II

[Time allotted: Three Hours]

[Max Marks: 100]

Note: Read all the instructions carefully

Answer all questions in serial order. Draw suitable diagrams wherever necessary

Q. 1. Objective type questions: (Attempt All)**(10 x 02 = 20)**

(Very short/ short answer/ MCQ/ One liners/ Fill in the blanks/ True/False)

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| <p>a. Total Skin Electron Irradiation (TSEI) is primarily used for the treatment of: CO3,PO1, 3, 4, 5</p> <p>i. Prostate cancer</p> <p>ii. Mycosis Fungoides</p> <p>iii. Cervical cancer</p> <p>iv. Brain tumour</p> <p>b. Which beam is commonly used for treatment of superficial lesions? CO3,PO1, 2, 3, 4, 5</p> <p>i. Photon beam</p> <p>ii. Electron beam</p> <p>iii. Proton beam</p> <p>iv. Neutron beam</p> <p>c. IMRT stands for: CO3,PO1, 2, 3, 4, 5</p> <p>i. Intensity Modulated Radiotherapy</p> <p>ii. Image Modulated Radiation Technique</p> <p>iii. Intensity Managed Radiation Therapy</p> <p>iv. Image Managed Radiotherapy</p> <p>d. The primary function of a Multi Leaf Collimator (MLC) is to: CO3,PO1, 2, 3, 4, 5</p> <p>i. Increase dose rate</p> <p>ii. Shape the treatment beam</p> <p>iii. Reduce gantry speed</p> <p>iv. Measure patient dose</p> <p>e. Which IMRT delivery technique involves continuous movement of MLC leaves during irradiation?</p> <p>i. Step and Shoot</p> <p>ii. Sliding Window</p> <p>iii. Wedge Technique</p> <p>iv. Arc Therapy</p> | <p>f. IGRT mainly helps in: CO3,PO1, 2, 3, 4, 5</p> <p>i. Chemotherapy planning</p> <p>ii. Verification of patient positioning</p> <p>iii. Blood investigations</p> <p>iv. Histopathology</p> <p>g. VMAT delivers radiation by: CO3,PO1, 2, 3, 4, 5</p> <p>i. Static treatment fields</p> <p>ii. Continuous gantry rotation</p> <p>iii. Electron beam only</p> <p>iv. Proton beam only</p> <p>h. Which advanced radiotherapy technique uses helical delivery of radiation? CO3,PO1, 2, 3, 4, 5</p> <p>i. IMRT</p> <p>ii. Tomotherapy</p> <p>iii. Brachytherapy</p> <p>iv. Orthovoltage Therapy</p> <p>i. CBCT is routinely used in radiotherapy for: CO2,PO1, 2, 3, 4, 5</p> <p>i. Treatment verification</p> <p>ii. Blood analysis</p> <p>iii. Biopsy guidance only</p> <p>iv. Chemotherapy administration</p> <p>j. DICOM is mainly used for: CO2,PO1, 2, 3, 4, 5</p> <p>i. Image storage and transfer</p> <p>ii. Dose calculation only</p> <p>iii. Machine calibration</p> <p>iv. Radiation measurement</p> |
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Q. 2. Short notes/ Short answer type questions (Attempt any Five)**(05 x 04 = 20)**

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| <p>a. Explain the role of PET-CT and MRI-CT co-registration in radiotherapy.</p> <p>b. Explain the importance of patient-specific quality assurance before treatment.</p> <p>c. Write a short note on tomo therapy.</p> <p>d. Explain the functioning of Multi Leaf Collimator (MLC).</p> <p>e. Why kVCBCT is required for prostate IGRT.</p> <p>f. Explain the differences between SSD method and IGRT method of pretreatment verification.</p> <p>g. Explain SOPB in proton therapy.</p> | <p>CO3, PO4, 5</p> <p>CO2, 3, PO2, 3, 4, 5</p> <p>CO3, PO4, 5</p> <p>CO3, PO4, 5</p> <p>CO2, 3, PO4, 5</p> <p>CO2, PO3, 4, 5</p> <p>CO3, PO3, 4, 5</p> |
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Q. 3. Structured questions (Attempt any Three)**(03 x 10 = 30)**

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| <p>a. Explain the flow chart of three-dimensional conformal radiotherapy (3DCRT).</p> <p>b. Describe the principles of proton therapy and compare them with conventional photon therapy.</p> <p>c. Explain the various motions of treatment couch and how these motions help in patient positioning during radiotherapy treatment.</p> <p>d. Describe the principles, advantages and clinical applications of Volumetric Modulated Arc Therapy (VMAT).</p> | <p>CO3, PO3, 4, 5</p> <p>CO3, PO3, 4, 5</p> <p>CO2, CO3, 4, 5</p> <p>CO3, PO4, 5</p> |
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Q. 4. Long Answer/ Essay type questions (Attempt any Two)**(02 x 15 = 30)**

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| <p>a. Discuss the principle of DIBH and its clinical application in carcinoma breast radiotherapy treatment.</p> <p>b. Explain the workflow and types of MLC based Intensity Modulated Radiotherapy (IMRT).</p> <p>c. Describe the various types of imaging techniques in IGRT and discuss their importance in improving treatment accuracy and patient safety.</p> | <p>CO3, PO4, 5</p> <p>CO2, 3, PO4, 5</p> <p>CO2, 3, PO4, 5</p> |
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