

**B. Sc. MEDICAL TECHNOLOGY (RADIOGRAPHY & IMAGING) (BRIT)**  
**SEMESTER -IV EXAMINATION, JUNE-2026**

**(BRIT402) QUALITY ASSURANCE AND RADIATION PROTECTION**

**[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><b>a.</b> Who is primarily responsible for implementation of Quality Assurance in a medical radiation facility? (PO4 CO1)</p> <p>i. Physician<br/>ii. Nurse<br/>iii. Medical physicist<br/>iv. Receptionist</p> <p><b>b.</b> Breaks in radiological equipment can lead to: (PO1 CO2)</p> <p>i. Improved imaging speed<br/>ii. Radiation leakage<br/>iii. Less exposure<br/>iv. More patient flow</p> <p><b>c.</b> What is the tolerance for KVP linearity in QA of an X-ray machine? (PO4 CO1)</p> <p>i. <math>\pm 2\text{KVP}</math><br/>ii. <math>\pm 3\text{KVP}</math><br/>iii. <math>\pm 4\text{KVP}</math><br/>iv. <math>\pm 5\text{KVP}</math></p> <p><b>d.</b> Which agency regulates radiation safety in India? (PO1 CO2)</p> <p>i. WHO<br/>ii. IAEA<br/>iii. AERB<br/>iv. ICRP</p> <p><b>e.</b> Which of the following is a stochastic effect? (PO1CO2)</p> <p>i. Cancer<br/>ii. Genetic effect<br/>iii. Cataract<br/>iv. None of the above</p> | <p><b>f.</b> What is the unit of radiation absorbed dose? (PO4 CO2)</p> <p>i. Curie<br/>ii. Roentgen<br/>iii. Gray<br/>iv. Sievert</p> <p><b>g.</b> Which cells are most radiation sensitive? (PO4 CO2)</p> <p>i. Nerve<br/>ii. Muscle<br/>iii. Blood forming<br/>iv. Fat</p> <p><b>h.</b> Central nervous system syndrome is seen when the radiation dose exceeds: (PO1 CO2)</p> <p>i. 1 Gy<br/>ii. 5 Gy<br/>iii. 10 Gy<br/>iv. 15 Gy</p> <p><b>i.</b> The radiation weighting factor (<math>W_r</math>) for electron is: (PO1 CO2)</p> <p>i. 1<br/>ii. 2<br/>iii. 5<br/>iv. 20</p> <p><b>j.</b> Radiation exposure is: (PO1 CO3)</p> <p>i. Directly proportional to the time of exposure<br/>ii. Inversely proportional to the time of exposure<br/>iii. Directly proportional to the square of the time of exposure<br/>iv. Not related to the time of exposure</p> |
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**Q. 2. Short notes/ Short answer type questions (Attempt any Five)**

**(05 x 04 = 20)**

- a.** Write the purpose of warning lights, signage and radiation protection labels in diagnostic imaging rooms. (PO2 CO1)
- b.** Discuss the role of AERB to regulate any radiological facility in India. (PO1 CO1)
- c.** Discuss the 10 days rule and write its significance. (PO3 CO3)
- d.** Explain the concepts of Linear Energy Transfer (LET). (PO4 CO1)
- e.** Discuss the physical and chemical effect of interaction of radiation with cells. (PO4 CO2)
- f.** Differentiate between KERMA and dose. (PO4 CO3)
- g.** What do you mean by TLD? How is it useful in radiation facility? (PO1 CO2)

**Q. 3. Structured questions (Attempt any Three)**

**(03 x 10 = 30)**

- a.** Describe the different phases of the development of a radiological facility. (PO2 CO1)
- b.** Discuss the general care, handling and maintenance of diagnostic radiology equipment. Why is preventive maintenance important in radiology department? (PO2 CO2)
- c.** Discuss the roles and responsibilities of a Radiological Safety Officer (RSO) in a radiation facility. (PO1 CO2)
- d.** Explain the concepts of absorbed dose, effective dose, equivalent dose and dose equivalent. (PO4 CO3)

**Q. 4. Long Answer/ Essay type questions (Attempt any Two)**

**(02 x 15 = 30)**

- a.** Explain the aim and importance of quality assurance (QA) in medical imaging. Discuss how QA improves patient safety and diagnostic accuracy. (PO2 CO1)
- b.** Explain in detail the ICRP principle of radiation protection. (PO1 CO2)
- c.** Describe the biological effects of ionizing radiation on human tissues. Discuss the cellular and molecular mechanisms of radiation damage. (PO3 CO3)