

B.Sc. MEDICAL TECHNOLOGY (RADIOGRAPHY & IMAGING) (BRIT)**SEMESTER -II EXAMINATION, JUNE-2026****(BRIT203) BASIC RADIATION PHYSICS -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)

- a. ALU stand for _____. (CO1, PO4)
 - i. Arithmetic logic unit
 - ii. Auto and lead unit
 - iii. Automatic logic unit
 - iv. Aromatic lead unit
- b. In X-ray tubes, rotating anode is used to _____. (CO2, PO2)
 - i. Dissipate heat
 - ii. Improve image quality
 - iii. Reduce patient dose
 - iv. Reduce the time of exposure
- c. The Compton effect involves a _____. (CO2, PO2)
 - i. Free electron
 - ii. Bound electron
 - iii. Free proton
 - iv. Bound proton
- d. Hard drive is a _____. (CO3, PO4)
 - i. Input device
 - ii. Output device
 - iii. Display device
 - iv. Storage device
- e. As the tube current (mA) increases, the intensity of x-rays _____. (CO3, PO2)
 - i. Decreases
 - ii. Increases
 - iii. Remain unaffected
 - iv. Varies randomly
- f. The three best ways to protect yourself from radiation exposures are _____. (CO4, PO4)
 - i. Time, distance, shielding
 - ii. Meditate, focus, breathe
 - iii. Paper, plastic, lead
 - iv. Distance, ear-plugs, shielding
- g. During mobile radiography, the distance between patient and radiographer should be at least _____. (CO4, PO3)
 - i. 1 meter
 - ii. 2 meters
 - iii. 3 meters
 - iv. 4 meters
- h. The speed of sound in air is _____. (CO3, PO4)
 - i. 331 m/sec
 - ii. 6420 m/sec
 - iii. 500 m/sec
 - iv. 3×10^8 m/sec
- i. During radioactive disintegration, the number of atoms of radioactive element decreases exponentially with time. (True/ False) (CO3, PO1)
- j. Compton scattering decreases with lower x-ray energies. (True/ False) (CO1, PO1)

Q. 2. Short notes/ Short answer type questions (Attempt any Five)**(05 x 04 = 20)**

- a. Briefly explain the principle of attenuation of X-rays with matter. (CO2, PO1)
- b. Write a short note on the shielding devices used in radiology. (CO4, PO1)
- c. Define linear attenuation coefficient. (CO1, PO1)
- d. Enumerate the properties of gamma radiation. (CO1, PO1)
- e. What is half-life of a radioactive substance and how it is related to decay constant? (CO1, PO4)
- f. What is the inverse square law and why it is important in radiation protection? (CO4, PO1)
- g. Write a short note on exponential law of radioactive decay. (CO1, PO1)

Q. 3. Structured questions (Attempt any Three)**(03 x 10 = 30)**

- a. Define "activity" of a radioactive substance and write the units of activity. (CO1, PO1)
- b. Which interaction is responsible for absorption of X-rays with matter? Mention about the probability of its occurrence. (CO2, PO2)
- c. Discuss the characteristics of computers. (CO1, PO3)
- d. Explain the Compton scattering. Write its disadvantage in diagnostic radiology. (CO2, PO2)

Q. 4. Long Answer/ Essay type questions (Attempt any Two)**(02 x 15 = 30)**

- a. Explain the principle of thermoluminescent dosimetry and enumerate various merits of TLD over film dosimetry. (CO1, PO1)
- b. Explain dose reduction techniques for radiation workers and members of public. (CO4, PO3)
- c. Draw a block diagram to illustrate the components of a computer and explain the function of each. (CO3, PO4)