BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Sc.(MRIT)-2022/B.Sc.(MRIT)-2023
Course Name – Radiation Safety & Hazards
Course Code - BMRITC305
(Semester III)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select the correct option regarding medical exposure

a) There is no threshold for medical exposure
b) Medical exposure is depends upon justification.
c) The exposure, applied to a person for diagnostic as well as therapeutic purpose
d) All of these

(ii) Identify which of the following associated with back bone of DNA

a) Sugar
b) Phosphate
c) Both 1 & 2
d) AGCT

(iii) When ionizing radiation energy is deposited in a certain macromolecule associated with observable biological effects, such as DNA, it is termed as

a) Indirect effect of radiation
b) Direct effect of radiation.
c) Both 1 & 2
d) Probability effect

(iv) Statement A: Radiation doses of the order of several sieverts may lead to cell loss.
Statement B: Cells are generally regarded as having been 'killed' by radiation if they have lost reproductive integrity, even if they have physically survived.

a) Statement A is correct
b) Statement B is correct
c) Statement A is correct while B is the correct explanation of A
d) Both statements are wrong

(v) Identify the primary target of ionizing radiation in biological systems

a) Protiens
b) DNA
c) Fat
d) Sugar

(vi) Select the exampleof radioresistant organ

a) Bone
b) Muscles
c) Spinal Cord
d) All of these

(vii) Which of the following statement is incorrect about Linear Energy Transfer (LET) ?

a) Average energy deposited per unit length
b) LET Measured in keV/ µm

c) LET varies along the length
d) All of these

(viii) Indicate the incorrect statement

a) In the living cell,chromosomes can be found in the nucleus of the cell
b) When the repair of DNA DSBs is incomplete, there may be serious implications for a cell
c) It may lead to chromosomal damage (aberrations).
d) DNA consist of Chrosome and proteins forming a thread-like structure containing genetic information

(ix) Identify the shielding material commonly used in radiation protection?

a) Aluminum
b) Glass
c) Lead
d) Copper

(x) Can you identify the beam limiting device that shapes the X-ray beam into a rectangular or square field?

a) Collimator
b) Radiographic grid
c) Intensifying screen
d) Fluoroscopy table

(xi) Can you identify the exposure factor that primarily influences the contrast in an X-ray image?

a) Tube voltage (kV)
b) Tube current (mA)
c) Exposure time (seconds)
d) Grid ratio

(xii) Select: Among the following personal monitoring devices, which is most commonly used to measure radiation exposure for radiologic technologists in radiography?

a) Geiger-Muller counter
b) TLD (Thermoluminescent Dosimeter)
c) Ionization chamber
d) Dosimetry badge

(xiii) List: Personal monitoring devices can include various types of dosimeters. Which of the following is a common passive dosimeter used in radiography?

a) Geiger-Muller counter
b) OSL (Optically Stimulated Luminescence) dosimeter
c) Pocket ionization chamber
d) Scintillation detector

(xiv) Which of the following acts as ionising gas in Geiger Muller counter?

a) Alcohol
b) Argon gas
c) Krypton
d) Hydrogen

(xv) Select the appropriate unit in which the Roentgen (R) exposure is measured.

a) Tissue
b) Water
c) A lab
d) Air

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain About BERT (3)
3. Explain Stochastic effect. (3)
4. Explain, How does the use of collimation in radiography benefit patient radiation exposure? (3)
5. Write a short note on MPB (3)
6. Summarize the concept of filter and its significance in radiation protection (3)

OR

What does AEC stand for, and summarize its purpose in radiography? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain Acute and late radiation effects. (5)
8. Summarize international organizations intended for radiation safety. (5)
9. Explain direct and indirect radiation effects. (5)

10. Summaries regulatory board intended to maintain the compliances in the radiology department. (5)
11. What is half-life? Explain it. (5)
12. Write notes on Pocket dosimeter and also explain about its feature that make it unique from other dosimeter. (5)

OR

Distinguish radiation detector and radiation monitoring devices. (5)

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