



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Sc.(MRIT)-2022/B.Sc.(MRIT)-2023

Course Name – Basic Nuclear Medicine Technology

Course Code - BMRITC601

(Semester VI)

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) ^{99m}Tc is obtained from
 - a) ^{90}Mo
 - b) ^{67}Ga
 - c) ^{111}In
 - d) ^{125}I
- (ii) Which of following radiopharmaceuticals is used in PET for metabolism study
 - a) More radiation to patient
 - b) More sensitive to humidity
 - c) The large cost of building
 - d) All of these
- (iii) ^{18}F FDG is useful for imaging tumors because
 - a) It is a glucose analog
 - b) There is an elevated rate of glycolysis in tumor
 - c) Its become trapped in tumor cells
 - d) All of these
- (iv) Which of the following methods is typically used to produce short-lived radionuclides such as Fluorine-18?
 - a) Gamma irradiation
 - b) Cyclotron
 - c) Reactor fission
 - d) Electron capture
- (v) Which of the following is the most important factor when selecting a radionuclide for use in a radiopharmaceutical?
 - a) Half-life
 - b) Chemical reactivity
 - c) Stability in the human body
 - d) Radiation energy
- (vi) What happens to the atomic number of an element when it undergoes beta-plus decay?
 - a) Increases by 1
 - b) Decreases by 1
 - c) Remains the same
 - d) Decreases by 2
- (vii) The unit of the decay constant λ is:
 - a) Seconds (s)
 - b) Becquerel (Bq)
 - c) Per unit time (time⁻¹)
 - d) Kilogram per second (kg/s)
- (viii) The main component responsible for detecting gamma radiation in a gamma camera is:

- a) Photomultiplier tubes
c) Scintillation crystal
- (ix) The sensitivity of a gamma camera is defined as:
- a) Ability to distinguish two closely spaced objects
c) Image contrast of different tissues
- (x) Which component converts light flashes into an electrical signal?
- a) Photodiode
c) Optical filter
- (xi) Which collimator is preferred in SPECT imaging?
- a) Pinhole
c) Converging
- (xii) PET is most commonly used to evaluate which of the following diseases?
- a) Infections
c) Cancer
- (xiii) What is the typical half-life of F-18 used in PET scanning?
- a) 5 minutes
c) 18 hours
- (xiv) What is the primary radionuclide used in PET imaging?
- a) I-131
c) F-18
- (xv) A cyclotron is required for
- a) Producing positron-emitting isotopes
c) Gamma-ray detection
- b) Collimator
d) Computer system
- b) Number of counts detected per unit time per unit activity
d) Field of view of the detector
- b) Photomultiplier tube
d) Digital processor
- b) Parallel-hole
d) Fan beam
- b) Metabolic disorders
d) Bone fractures
- b) 110 minutes
d) 2 days
- b) Tc-99m
d) C-14
- b) Image reconstruction
d) Patient positioning

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Discuss Relationship between decay constant and half life (3)
3. Explain about Methods to determine decay factor (3)
4. Discuss about wipe test (3)
5. Discuss about Cyclotrone (3)
6. Explain about radiotracer principle. (3)

OR

Explain about PMT (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Discuss about annihilation radiation and its effect in nuclear medicine (5)
8. Discuss briefly about disposal of radioactive waste (5)
9. Explain about area monitoring device (5)
10. Elaborate the principle of Anger Camera (5)
11. Explain the basic principle of cyclotron (5)
12. Explain about Radiation detection event in gamma camera (5)

OR

Explain about positron decay (5)
