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Barasat, Kolkata -700125



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – B.Sc.(MRIT)-2022

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) Which type of radioactive decay results in the emission of a helium nucleus?
 - a) Alpha decay
 - b) Beta decay
 - c) Gamma decay
 - d) Neutron emission
- (ii) Choose the sample volume is increased well counter counting efficiency will be
 - a) Reduced
 - b) Improve
 - c) Uunchanged
 - d) Increase to a point then reduced
- (iii) Identify the following radiopharmaceuticals is boiled during preparation
 - a) MAA
 - b) Sulphur Colloid
 - c) Albumin Colloid
 - d) Diphosphonate
- (iv) What is the key characteristic of a radiopharmaceutical that is essential for effective imaging?
 - a) High biological activity
 - b) High tissue specificity
 - c) High chemical reactivity
 - d) High solubility
- (v) What is the primary concern in the management of radioactive waste in nuclear medicine?
 - a) Cost of disposal
 - b) Radiation exposure to the environment and personnel
 - c) Chemical contamination of water sources
 - d) Non-biodegradable materials
- (vi) What is an ideal feature of a radiopharmaceutical?
 - a) High radiochemical purity
 - b) High cost
 - c) High toxicity
 - d) High molecular weight
- (vii) What is the change in mass number when a nucleus undergoes gamma decay?
 - a) Increases by 1
 - b) Decreases by 1
 - c) Remains the same
 - d) Decreases by 4
- (viii) What is the SI unit of radioactivity?
 - a) Gray (Gy)
 - b) Sievert (Sv)

- c) Becquerel (Bq) d) Roentgen (R)
- (ix) If the half-life of a radionuclide decreases, what happens to its specific activity?
- a) It increases b) It decreases
- c) It remains the same d) It fluctuates
- (x) In transient equilibrium, the half-life of the parent is:
- a) Much longer than the daughter b) Slightly longer than the daughter
- c) Equal to the daughter d) Shorter than the daughter
- (xi) The term scintillation refers to:
- a) Absorption of X-rays b) Light emission after gamma-ray interaction
- c) Electron-hole pair creation d) Nuclear fission
- (xii) The bar phantom test is used to assess:
- a) Energy resolution b) Spatial resolution
- c) Image contrast d) Dead time
- (xiii) What is the standard photopeak energy for Tc-99m imaging?
- a) 140 keV b) 511 keV
- c) 364 keV d) 80 keV
- (xiv) What is the primary reason for using FDG (Fluorodeoxyglucose) in PET imaging?
- a) To track oxygen consumption b) It mimics glucose, which is taken up by metabolically active tissues
- c) It highlights calcium deposits in tissues d) It targets specific proteins in cancer cells
- (xv) Which radiation detector has the best energy resolution?
- a) NaI scintillator b) GM counter
- c) HPGe detector (solid-state) d) Ion chamber

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe Isotope and isobar with example (3)
3. Explain about TLD (3)
4. Discuss About Reactor Principle (3)
5. Discuss about PET advantage and disadvantage (3)
6. Explain about Beta plus decay (3)

OR

Explain about method of radiolabeling. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain about general principle of radiotracer (5)
8. Explain about area monitoring device (5)
9. Explain about Gamma Well counter (5)
10. Discuss about alpha decay and Beta minus decay with example (5)
11. Explain the basic principle of cyclotron (5)
12. Difference between SPECT and PET (5)

OR

Explain in detail principle of Anger Camera (5)
