THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0122]   **JANUARY 2022**   **Sub. Code: 2311**
(OCTOBER 2021 EXAM SESSION)

M.Sc. NUCLEAR MEDICINE TECHNOLOGY
SECOND YEAR (From 2019-2020 onwards)
PAPER I-NUCLEAR MEDICINE INSTRUMENTATION – II - MRI, PET & SPECT
Q.P. Code : 282311

Time: Three hours   **Answer ALL Questions**   **Maximum: 100 Marks**

I. Elaborate notes on: (2 x 20 = 40)

1. Discuss the principle, working and components of gamma camera?

2. Explain the advantages and disadvantages of hybrid nuclear medicine imaging modalities?

II. Write Short Notes on: (10x6 = 60)

1. Use of Collimators and different collimators used in gamma imaging?
2. Explain working of Analogue to digital converter (ADC)?
3. Brief note on Time-of-flight (TOF) imaging in PET?
4. Explain Filtered back projection and filters used in nuclear medicine (High pass and low pass filters)?
5. Ideal properties of scintillating crystals used in Nuclear Medicine?
6. Factors affecting resolution of PET imaging?
7. Compare 2D and 3D PET imaging?
8. Attenuation correction imaging in PET imaging?
9. Explain the working of a photo multiplier tube (PMT) with help of a diagram?
10. What is Standardized Uptake Value (SUV), its significance in PET imaging and Factors affecting SUV?

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M.Sc. NUCLEAR MEDICINE TECHNOLOGY
SECOND YEAR (From 2019-2020 & 2020-2021 onwards)
PAPER I - NUCLEAR MEDICINE INSTRUMENTATION – II MRI, PET & SPECT
Q.P. Code : 282311

Time: Three hours   Answer ALL Questions   Maximum: 100 Marks

I. Elaborate notes on: **(2 x 20 = 40)**

1. Briefly explain the factors affecting performance characteristics of gamma camera.

2. Explain the working principle of PET scanner.

II. Write Short Notes on: **(10x6 = 60)**

1. What is the function of light guide, amplifier and pulse height analyser?
2. Explain why the sodium iodide doped with thallium [NaI (Tl)] crystal is not used in recent PET scanners and mention other crystals used in PET scanners.
3. Explain partial volume effect.
4. What is scatter radiation and how is it corrected in NM imaging?
5. Write short note on common image artifacts in SPECT imaging and the corrective measures.
6. Explain the trade-off between resolution and sensitivity in regards of collimator and crystal properties.
7. What is Non collinearity in PET imaging? Explain with the help of diagram.
8. Explain edge packing. What is central field of view (CFOV) and useful field of view (UFOV)?
9. Factors affecting resolution and sensitivity in PET imaging.
10. Write short note on iterative reconstruction.

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THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1023]   **OCTOBER 2023**   Sub. Code: 2311

M.Sc. NUCLEAR MEDICINE TECHNOLOGY
SECOND YEAR (From 2020-2021 onwards)
PAPER I - NUCLEAR MEDICINE INSTRUMENTATION – II MRI, PET & SPECT

Q.P. Code: 282311

Time: Three hours   **Answer ALL Questions**   **Maximum: 100 Marks**

I. Elaborate notes on: (2 x 20 = 40)

1. Data acquisition for SPECT.

2. Performance Characteristics of PET System.

II. Write Short Notes on: (10x6 = 60)

1. Receiver Operating Characteristic Study (ROC study).
2. Simple back projection.
3. Expectation maximization reconstruction.
4. Whole body PET system.
5. Basic principle of PET MR.
6. Correction for random coincidences in PET imaging.
7. Noise Equivalent Counting Rate (NECR).
8. Possible sources of Artifacts for CT based correction.
9. Time of flight PET.
10. X-ray tube.

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