NUCLEAR MEDICINE
PAPER – I

NM/D/16/24/I

Time : 3 hours
Max. Marks : 100

Important instructions:

- *Attempt all questions in order.*
- *Each question carries 10 marks.*
- *Read the question carefully and answer to the point neatly and legibly.*
- *Do not leave any blank pages between two answers.*
- *Indicate the question number correctly for the answer in the margin space.*
- *Answer all the parts of a single question together.*
- *Start the answer to a question on a fresh page or leave adequate space between two answers.*
- *Draw table/diagrams/flowcharts wherever appropriate.*

Write short notes on:

1. a) Draw a typical Gamma ray spectrum and mention the various components.   5+1+(1+3)
   b) Define Ionising Radiation.
   c) What are the types of radioactive decay? Briefly mention about each with their clinical significance.

2. a) What is Bremsstrahlung radiation? How it is different from collisional losses? What is the practical use of Bremsstrahlung radiation?   (2+2+1)+(3+2)
   b) Calculate the P-32 Beta particle percentage radiation losses in water and lead.

3. a) Chi-square test.   5+5
   b) Student 't' test.

4. QC of SPECT-CT scanner.   10

5. a) Basic design and components of a cyclotron with a diagram.   5+5
   b) Compartmental analysis.

6. Working principle and clinical applications of: 5+5
   a) Liquid Scintillation Counter.
   b) Semi conductor detectors.

7. a) Stochastic and deterministic effects of radiation.   5+5
   b) Transport Index.

8. a) PACS- uses and architectural design   (2+3)+(2+3)
   b) SISCOM & SISCOS

9. a) Artefacts in PET-CT.   5+5
   b) Attenuation correction algorithms used in PET-MRI.

10. a) Symptoms and management of acute radiation exposure.   5+5
    b) Cherenkov effect and Cherenkov radiation.

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