NUCLEAR MEDICINE

PAPER-I

NM/D/18/24/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. What is time of flight (TOF) imaging technique? What are the ideal properties of detector crystals for TOF imaging? What are the advantages and challenges in TOF imaging? — 3+4+3

2. a) Pair production. — 5+5
   b) Discuss any one image reconstruction algorithm.

3. a) Specific activity and its unit. Describe its clinical implications with a suitable example. — 5+5
   b) Havar foil.

4. a) Quenching in GM counter. — 5+5
   b) TLD in personal monitoring.

5. a) Gray — 2+2+2+4
   b) Sievert
   c) Roentgen
   d) Schilling's test.

6. What are the different types of clinical studies? Describe briefly about randomized control trials. — 5+5

7. a) Non-parametric tests. — 5+5
   b) Measures of central tendency and dispersion.

8. Describe the decay schemes of Lutetium-177 (Lu-177) and Iodine-131 (I-131) with the help of diagrams. — 5+5

9. Principles of gas filled detectors and their use in day to day Nuclear Medicine practice. — 7+3

10. a) Auger process in radioactivity decay. — 5+5
    b) Transient equilibrium in radioactivity decay with example.

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