NUCLEAR MEDICINE

PAPER – I

NM/D/14/24/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) Principles of Gas filled detectors. 6+4
   b) Dose calibrator.

2. Describe various radioactive decay modes and draw the decay chart of Lu-177. 7+3

3. a) Collimators 2.5x4
   b) Spectrometer
   c) Line spread function
   d) Flood Source

4. a) PACS 5+5
   b) PET Radionuclide Generators

5. Enumerate various compartmental analysis models and describe in details a two-compartmental model system. 3+7

6. Enumerate various mathematical filters and describe Butterworth filter and its applications in image processing. 4+6

7. Discuss biological effects of low-level radiation. What is radiation hermesis? 7+3

8. Compare and contrast the ICRP 1990 and ICRP 2006 recommendations. 10

9. a) McNemmar Test 5+5
   b) Compare and contrast Gaussian and Poission's distribution systems.

10. Compare and contrast PET/CT and PET/MR in oncological applications. 10

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