

**NUCLEAR MEDICINE**

**PAPER - I**

NM/D/13/24/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) Define with examples stochastic and deterministic effects. 5+5  
b) Write about the effects of radiation at cellular and genetic levels.
2. a) Linear energy Transfer (LET) 5+5  
b) Relative Biological Effectiveness
3. a) Define and mention the units of measurement of Absorbed dose. 3+(3+4)  
b) What is Maximum Permissible Dose and mention the ICRP recommended doses for radiation and non-radiation personnel?
4. a) Radiation hormesis 5+5  
b) Tumour apoptosis
5. Define a radionuclide. Describe various modes of radio-active decay with illustrations and examples. 2+8
6. What is Internal dosimetry? Write about MIRD schema for diagnostic Nuclear Medicine. How is the internal radiation dose calculated using MIRD schema and mention the limitations? 1+3+(4+2)
7. Write the mechanism of action and applications of: 5+5  
a) Radio protectors  
b) Radio sensitizers
8. Describe the decay scheme of: 5+5  
a) Lutetium – 177  
b) Iodine – 131
9. Discuss the role of PET-CT in Radiation treatment planning. What are its advantages and limitations over the conventional planning techniques? 5+5
10. a) Bremsstrahlung radiation 5+5  
b) Compton scatter and pair production

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