NUCLEAR MEDICINE
PAPER - 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.
   b) Write about the effects of radiation at cellular and genetic levels.

2. a) Linear energy Transfer (LET)
   b) Relative Biological Effectiveness

3. a) Define and mention the units of measurement of Absorbed dose.
   b) What is Maximum Permissible Dose and mention the ICRP recommended doses for radiation and non-radiation personnel?

4. a) Radiation hormesis
   b) Tumour apoptosis

5. Define a radionuclide. Describe various modes of radio-active decay with illustrations and examples.

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?

7. Write the mechanism of action and applications of:
   a) Radio protectors
   b) Radio sensitizers

8. Describe the decay scheme of:
   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?

10. a) Bremsstrahlung radiation
    b) Compton scatter and pair production

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