

NUCLEAR MEDICINE

PAPER-I

TIME: 3 HOURS
MAX. MARKS: 100

NM/J/18/24/I

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 are various methods of radioactive decays? Derive the radioactivity equation. 5+5
2. What is NEMA? Describe the QC of a SPECT/CT system. 2+8
3. a) Linear Energy Transfer 5+5
b) Bremsstrahlung Radiation
4. a) Gamma Well Counter and its QC methods 5+5
b) Gamma Ray Spectrometry and identification of unknown radionuclides.
5. a) Gaussian Distribution and Poisson Distribution. 5+5
b) Standard Deviation and % Coefficient Variation.
6. a) Measurements of Concordance. 5+5
b) ROC Analysis
7. Enumerate various Personal Dose monitoring devices and describe TLD in detail. 2+8
8. a) Radiation Units in Nuclear Medicine 5+5
b) QC of Dose Calibrator.
9. Define Phantoms and discuss the various PET/CT Phantoms. 2+8
10. a) Deterministic and Stochastic effects 2.5x4
b) Characteristic X-rays
c) Tenth Value Layer
d) ICRP Tissue weighing Factors in 1990 vs 2007 publications.
