

FINAL EXAM  
JUNE 2018

NATIONAL BOARD OF EXAMINATIONS

NUCLEAR MEDICINE  
PAPER-ITIME: 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:

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| 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<br>b) Bremsstrahlung Radiation  | 5+5   |
| 4. a) Gamma Well Counter and its QC methods<br>b) Gamma Ray Spectrometry and identification of unknown radionuclides.  | 5+5   |
| 5. a) Gaussian Distribution and Poisson Distribution.<br>b) Standard Deviation and % Coefficient Variation.  | 5+5   |
| 6. a) Measurements of Concordance.<br>b) ROC Analysis  | 5+5   |
| 7. Enumerate various Personal Dose monitoring devices and describe TLD in detail.  | 2+8   |
| 8. a) Radiation Units in Nuclear Medicine<br>b) QC of Dose Calibrator.   | 5+5   |
| 9. Define Phantoms and discuss the various PET/CT Phantoms.  | 2+8   |
| 10. a) Deterministic and Stochastic effects<br>b) Characteristic X-rays<br>c) Tenth Value Layer<br>d) ICRP Tissue weighing Factors in 1990 vs 2007 publications. | 2.5x4 |

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