

[Time: Three Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Question.No.1 is compulsory.
  2. Answer any three out of remaining five questions.
  3. Use legible handwriting.
  4. Draw neat diagram with proper labeling.

Q.1 Answer the following:-

- |  |    |
|--|----|
| a) What do you understand by Lithium ion drifted solid state detector?           | 05 |
| b) Explain principle of detector of radioactivity using scintillation detectors. | 05 |
| c) What are the different laws of radioactivity?                                 | 05 |
| d) Define thyrotoxicosis (Hyper and hypo).                                       | 05 |

- |  |    |
|--|----|
| Q.2 a) Explain photoelectric effect and pair production process. | 10 |
| b) Explain various regions of operations of gas filled detector. | 10 |

- |   |    |
|---|----|
| Q.3 a) Explain the need of quenching in G.M counter. Also discuss methods of quenching. | 10 |
| b) Explain the working of "Gamma camera" with block diagram.                            | 10 |

- |  |    |
|--|----|
| Q.4 a) Explain the nuclear instrumentation for power reactor.    | 10 |
| b) What are different agricultural application of radioactivity? | 10 |

- |   |    |
|---|----|
| Q.5 a) Explain "radiation uptake studies" with block diagram. | 10 |
| b) Classify solid state detectors and explain any one.        | 10 |

Q.6 Write short note on (any two):-

- |  |    |
|--|----|
| a) Properties of $\alpha, \beta, \gamma$ . | 20 |
| b) 'RAD and REM'                           |    |
| c) Pocket dosimeter                        |    |
| d) Count rate meter                        |    |