Reg. No. | | | | | | | | | | | | |

Question Paper Code : 91617

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Seventh Semester

Mechanical Engineering

ME 2034/ME 708/ME 1004/10122 MEE 33 — NUCLEAR ENGINEERING

(Common to B.E. Mechanical and Automation Engineering)

(Regulation 2008/2010)

(Common to PTME 2034 — Nuclear Engineering for B.E. (Part–Time) Sixth Semester – Mechanical Engineering – Regulation 2009)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is saturation of nuclear forces?

2. Define binding energy.

3. Differentiate critical size and critical mass.

4. What is function of moderator in nuclear reactors?

5. Define reprocessing.

6. What are vitrification and its process steps?

7. Define fuel cladding.

8. What is the purpose of shielding in nuclear reactor?

9. List the three types of nuclear waste.

10. Define safety system in nuclear power plant.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain spin pairing in the liquid drop model. (8)

(ii) Define half-life and how measures the rate of radiation decay. (8)

Or

(b) (i) Define differential cross- section. (8)

(ii) Explain the concept of isotopic spin with example. (8)

12. (a) Explain nuclear chain reaction process with example and its uses. (16)

Or

(b) Explain the production process of enriched uranium with flow diagram. (16)

13. (a) (i) Explain the various reprocessing techniques. (8)

(ii) What are the factors that affect the economics of reprocessing? (8)

Or

(b) Describe some issues and challenges related to spent fuel reprocessing. (16)

14. (a) Explain the construction and working of pressurized heavy water reactor. (16)

Or

(b) Explain the concept of nuclear fusion process with example. (16)

15. (a) Explain the process of reprocessing as a waste management strategy. (16)

Or

(b) Explain the various causes of nuclear weapons proliferation. (16)

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