

Question Paper Code: 21835

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Seventh Semester

Mechanical Engineering

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

(Common to Mechanical and Automation Engineering)

(Regulations 2008/2010)

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

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — $(10 \times 2 = 20 \text{ marks})$

1. Define mean life and decay constant.

2. Define Transmutation.

3.3 What are the requirements to sustain a nuclear chain reaction?

4. What are the methods for extraction of Thorium?

5. What do you mean by closed nuclear fuel cycle?

6. What is the composition of nuclear spent fuel?

7.7. Classify the different types of coolant with example.

8. State the disadvantages of sodium fast reactor.

9. What is breeding cycle?

10. Explain any two radiation effects on human beings.

PART B — $(5 \times 16 = 80 \text{ marks})$

11.	(a)	(i)	Discuss the detailed procedure of Half-life measurement.	(8)
		(ii)	Write notes on Elastic scattering and inelastic scattering.	(8)
Or				
	(b)	(i)	Explain the Transmission method for determining the cross	section. (8)
		(ii)	Write notes on types of scattering cross section	(8)
12.	(a) [*]	(i)	Explain nuclear fission process for U-235 with help of a near	t sketch. (8)
		(ii)	Explain the nuclear fusion reaction process with example.	(8)
Or				
	(b)	(i)	Explain the nuclear fuel cycle with neat diagram.	(8)
		(ii)	Explain the production of Beryllium and its Uses.	(8)
13.	(a)	Expl proc	lain (i) FLUOREX process with diagram and (ii) spe essing.	nt fuel (8 + 8)
Or				
•	(b)	Explain the working principle with a diagram of solvent and extraction equipment used in nuclear industry. (16		
14.	(a)	Explain the construction and working principle of the Liquid-Metal fa breeder reactor with a neat sketch. (1		tal fast (16)
Or				
	(b)	Expl	ain the principle of operation of fusion reactors in detail.	(16)
15.	(a)	(i)	Explain the components of nuclear safety.	(8)
		(ii)	Discuss the criteria for the nuclear and radiation accidents a do you evaluate the nuclear accidents.	ind how (8)
Or				
	(b)	(i)	State long term effects and beneficial effects of nuclear radia	tion. (8)

(ii) Give account on different types of radioactive wastes. (8)