Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: ME371

Course Name: NUCLEAR ENGINEERING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks Marks

1		Binding energy of Iron (Fe) is 8.8 Mev, while for Uranium (U) is less than that, still Uranium is used as a fuel in nuclear reactor. How binding energy influencenuclear fission process in a nuclear reactor.	(10)
2	a)	How neutron to proton ratio (N/P ratio) plays a role in stability of an atom?	(4)
	b)	Explain the interaction of α, β and γ with matter.	(6)
3	a)	Explain how the nuclear reactors are classified.	(4)
	b)	Differentiate between nuclear fission and nuclear fusion with examples.	(6)
4	a)	Critical size is an important parameter in fission process how it affects fissionreaction, also point out factors affecting critical mass.	(3)
	b)	What is neutron flux and rate of neutron interaction?	(3)
	c)	Explain multiplication factor ($K\propto$) and four-factor formulae.	(4)

PART B

Answer any three full questions, each carries 10 marks

5		What are the main components of a boiling water reactor (BWR) system? Explain with a neat figure.	(10)
6	a)	What are the different nuclear fuels used in nuclear reactor now a day. List the important properties of fuels.	(5)
	b)	Why coolants are used in nuclear reactors? What are the different coolants used in a nuclear reactor also explain the parameters to be considered while selecting coolants?	(5)
7		Uranium is the commonly used nuclear fuel,explain the Uranium fuel cycle indetail.	(10)
8		Explain any two methods of recovery of fissionable fuel from the spent nuclear fuel.	(10)

PART C

Answer any four full questions, each carries 10 marks

9		Prime concern of an industry is safety, what are the different nuclear reactor safety systems.	(10)
10	a)	Derive the temperature distribution in a solid fuel rod.	(6)
	b)	Write a note on the heat generation after the shutdown of reactor.	(4)
11	a)	How reactor shielding is relevant in reactor construction?	(5)
	b)	What is radiation dozes and how they are classified?	(5)
12	a)	Explain briefly the different steps involved in the radio-active waste management.	(4)
	b)	Compare incineration and cementation method of nuclear waste treatment.	(6)
13		Explain any five methods of nuclear waste disposal.	(8)
		Examine the biological effects of radiation.	(2)
14	a)	Compare between the low-level waste and high-level nuclear wastes.	(6)
	b)	Write a brief note on nuclear weapon proliferation.	(4)

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