

Total No. of Questions: 6

Total No. of Printed Pages: 2

Enrollment No.....



Faculty of Engineering

End Sem Examination May-2024

FT3CO42 Nuclear Safety & Radio Active Materials

Programme: B.Tech.

Branch/Specialisation: FT

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. Which of the following radiation have the maximum penetrating power? 1
(a) α -rays (b) β -rays (c) γ -rays (d) Light-rays
- ii. An alpha particle is same as- 1
(a) A helium nucleus (b) A hydrogen nucleus
(c) A proton (d) A positron
- iii. Radio carbon dating techniques is used to estimate the age of- 1
(a) Rocks (b) Soil (c) Fossils (d) Buildings
- iv. Charge on α -particle is how many times the charge on proton: 1
(a) 4 times (b) 2 times (c) 3 times (d) Equal
- v. When silicon is doped with arsenic, each arsenic atom will give the 1
crystal _____.
(a) Two holes (b) Two electrons
(c) One electron (d) One hole
- vi. India has the world's largest reserves of which of the following 1
radioactive metals?
(a) Uranium (b) Radium (c) Bismuth (d) Thorium
- vii. Radioactivity is the characteristic of which of the following? 1
(a) Nucleus (b) Electron (c) Proton (d) Neutron
- viii. In radioactive decay which of the following quantity depends on the 1
number of atoms:
(a) Half life (b) Mean life
(c) Rate of decay (d) Rate of decay and mean life

- ix. Which of the following substance is NOT used as coolant in nuclear 1
reactors?
(a) Graphite (b) Liquid sodium
(c) Carbon dioxide (d) Heavy water
- x. The effects of short-term exposures to high radiation could cause: 1
(a) Tissue damages (b) Inhibit tissue functions
(c) Unrepairable tissue damages (d) All of these
- Q.2 i. Discuss the effect of ionizing radiation. 3
ii. Explain radioactivity and reason of radioactivity. Discuss compare 7
radiation for alpha, beta and gamma.
- OR iii. Describe in detail the handling and prevention of radiation emergency. 7
- Q.3 i. What is a nuclear reactor? 4
ii. Explain the main components of a nuclear reactor. 6
- OR iii. Describe the facilities for cold and hot radiological laboratories. 6
- Q.4 i. Enlist the locations of the installed nuclear reactors in India. 2
ii. Explain in detail types of nuclear reactors. 8
- OR iii. Describe concentration, treatment and disposal techniques of radioactive 8
liquid effluents.
- Q.5 i. What is the public health lessons learned from the response to 3
Fukushima?
ii. How quality assurance is important in nuclear power plant from safety 7
point of view?
- OR iii. Explain the case study of Chernobyl nuclear power plant accident. 7
- Q.6 Attempt any two:
i. What is radiation and how are people exposed to it? 4
ii. Discuss the acute health effects of radiation exposure. 6
- OR iii. What are the three safety objectives defined for nuclear power plant? 6
Explain them.

Marking Scheme

Nuclear Safety & Radio Active Materials (T) -FT3CO42 (T)

Q.1	i.	Which of the following radiation have the maximum penetrating power? c) γ -rays	1
	ii	An alpha particle is same as? a) A helium nucleus	1
	iii	Radio carbon dating techniques is used to estimate the age of c) Fossils	1
	iv	Charge on α -particle is how many times the charge on proton: b) 2 times	1
	v	When silicon is doped with arsenic, each arsenic atom will give the crystal..... c) One electron	1
	vi	India has the world's largest reserves of which of the following radioactive metals? d) Thorium	1
	vii	Radioactivity is the characteristic of which of the following? a) Nucleus	1
	viii	In radioactive decay which of the following quantity depends on the number of atoms: c) Rate of decay	1
	ix	Which of the following substance is NOT used as coolant in nuclear reactors? a) Graphite	1
	x	The effects of short-term exposures to high radiation could cause: d) All of the above	1
Q.2	i.	Discuss the effect of ionizing radiation.	3
	ii.	Explain radioactivity and reason of radioactivity? 3 Marks Discuss compare radiation for Alpha, Beta and Gamma? 4 Marks	7
OR	iii.	Describe in detail the handling and prevention of radiation emergency 4 Marks 3 Marks	7
Q.3	i.	What is a Nuclear Reactor?	4
	ii.	Explain the main Components of a Nuclear Reactor. 6 Component	6

OR	iii.	Describe the facilities for cold and hot radiological laboratories.	3 Marks 3 Marks	6
Q.4	i.	Enlist of the locations of the installed nuclear reactors in India		2
	ii.	Explain in detail types of Nuclear Reactors. Full Details		8
OR	iii.	Describe concentration, treatment and disposal techniques of radioactive liquid effluents.		8
Q.5	i.	What is the public health lessons learned from the response to Fukushima? 3 Points at last		3
	ii.	How quality assurance is important in nuclear power plant from safety point of view?		7
OR	iii.	Explain the case study of Chernobyl nuclear power plant accident.		7
Q.6	i	What is radiation and how are people exposed to it?	2 Marks 2 Marks	4
	ii	Discuss the acute health effects of radiation exposure. 6 radiation exposure		6
OR	iii	What are the three safety objectives defined for nuclear power plant? Explain them. 3 Marks		6
