

Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2019
FT3EL12 Safety in Chemical Industries
 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.

- Q.1 i. Which is the major human health effect because of benzene air pollution **1**
 (a) Respiratory (b) Cardiovascular
 (c) Leukemia (d) Brain and Kidney
- ii. The list of industrial sources of air pollution and their emissions are given. Match the following. **1**
 A. Ammonia I. Carbon monoxide
 B. Plating II. Particulates
 C. Fertilizers III. Metal fumes
 The correct order is
 (a) A-I, B-II, C-III (b) A-III, B-II, C-I
 (c) A-I, B-III, C-II (d) A-III, B-I, C-II
- iii. Design pressure for unfired pressure vessels is 1.05 times of _____ **1**
 (a) Minimum working pressure
 (b) Maximum working pressure
 (c) Hydrostatic test pressure
 (d) None of these
- iv. What are blanking flanges used for? **1**
 (a) For shutting valves or pressure valves in storage tanks.
 (b) For moving pipework when working on storage tanks.
 (c) To shut off supply lines to storage tanks
 (d) None of these
- v. Which phenomenon can lead to the creation of an explosion- hazardous area? **1**
 (a) Dust clouds (b) Clouds of nitrogen
 (c) Clouds of steam (d) None of these

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vi.	The specification for specify symbols for piping system, is	1
	(a) BS 1853:1976 (b) BS 1753:1976	
	(c) BS 1863:1976 (d) BS 1553:1976	
vii.	_____ is best suited to extinguishing oil or flammable liquid fire.	1
	(a) Soda acid (b) Vaporizing liquid	
	(c) Foam (d) Dry chemical	
viii.	What is the type accident involves extensive loss of property and life?	1
	(a) Minor (b) Moderate (c) Major (d) Disaster	
ix.	What is the first stage of risk assessment?	1
	(a) Exposure assessment (b) Hazard identification	
	(c) Toxicity study (d) Risk characterization	
x.	What type of appropriate method for process hazards analysis	1
	(a) FMEA (b) HAZOP (c) Checklists (d) All of these	
Q.2	i. How toxic substances entry into human body?	2
	ii. Explain the dispersion model with diagram.	3
	iii. Describe the dose response curve for toxicity with an example.	5
OR	iv. Describe the importance of the following :	5
	(a) LDL (b) STEL (c) TLV (d) LD ₅₀	
Q.3	i. List any four petroleum products with their flash point'.	2
	ii. Discuss the handling, transportation and storage of flammable liquids & gases.	8
OR	iii. What are the major operations of LPG bottling plant? Discuss the fire prevention and protection LPG storage.	8
Q.4	i. Describe "Fire Triangle" and it's different components	3
	ii. Briefly explain the various methods and fire extinguishing agents used for controlling or reducing fire	7
OR	iii. What are the different types of explosion-proof equipments used in chemical industry? Name and briefly state their applications.	7
Q.5	i. What are flammability limits? What are factors that influence flammability limits? How flammability limits are dependent on temperature and pressure.	4

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	ii.	What are the factors causes fire in the plant? Discuss about provisions for fire fighting in the plant.	6
OR	iii.	Discuss the various components of the fire water system in a large tank farm	6
Q.6		Attempt any two:	
	i.	What is an Fault tree? What are the different symbols used in the construction of Fault trees?	5
	ii.	Explain HAZOP technique with emphasis on guidewords, parameters and possible results. Writes the steps of performing HAZOP.	5
	iii.	What is the difference between probabilistic risk assessment (PRA) and quantitative risk analysis (QRA)?	5

Marking Scheme

Safety in Chemical Industries

Q.1	i.	Which is the major human health effect because of benzene air pollution (c) Leukemia	1
	ii.	The list of industrial sources of air pollution and their emissions are given. Match the following. A. Ammonia B. Plating C. Fertilizers I. Carbon monoxide II. Particulates III. Metal fumes The correct order is (c) A-I, B-III, C-II	1
	iii.	Design pressure for unfired pressure vessels is 1.05 times of _____ (b) Maximum working pressure	1
	iv.	What are blanking flanges used for? (c) To shut off supply lines to storage tanks	1
	v.	Which phenomenon can lead to the creation of an explosion-hazardous area? (a) Dust clouds	1
	vi.	The specification for specify symbols for piping system, is (d) BS 1553:1976	1
	vii.	_____ is best suited to extinguishing oil or flammable liquid fire. (c) Foam	1
	viii.	What is the type accident involves extensive loss of property and life? (d) Disaster	1
	ix.	What is the first stage of risk assessment? (b) Hazard identification	1
	x.	What type of appropriate method for process hazards analysis (d) All of these	1
Q.2	i.	Toxic substances entry in body	2
	ii.	Dispersion model Definition Diagram	3 2 marks 1 mark
	iii.	Explanation of dose response curve Graph	5 4 marks 1 mark

OR	iv.	Importance of (a) LDL (b) STEL (c) TLV (d) LD ₅₀	1 mark 1 mark 2 marks 1 mark	5
Q.3	i.	Any four petroleum products with their flash point'. 0.5 mark for each	(0.5 mark * 4)	2
	ii.	Handling, transportation of flammable liquids & gases Storage of flammable liquids & gases		8
OR	iii.	Operations of LPG bottling plant Fire prevention and protection LPG storage	4 marks 4 marks	8
Q.4	i.	Fire Triangle and its components		3
	ii.	controlling methods List of fire extinguishing media	4 marks 3 marks	7
OR	iii.	List of explosion-proof equipment Applications	4 marks 3 marks	7
Q.5	i.	Definition of flammability limits Factors that influence flammability limits and flammability limits are dependent on temperature and pressure	1 mark 3 marks	4
	ii.	Causes of fire Provisions techniques	3 marks 3 marks	6
OR	iii.	Water supply system Tank farm with diagram	4 marks 2 marks	6
Q.6		Attempt any two:		
	i.	Fault tree and symbols used in the construction of Fault trees Method for fault tree analysis		5
	ii.	Technique for HAZOP with flowchart		5
	iii.	Five differences b/w probabilistic risk assessment (PRA) and quantitative risk analysis (QRA) 1 mark for each		5
			(1 mark * 5)	
