Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2023
Sixth Semester

18CHE361T – SAFETY AND HAZARD ANALYSIS IN PROCESS INDUSTRIES
(For the candidates admitted from the academic year 2020-2021 to 2021-2022)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer **ALL** Questions

	Marks	BL	CO	PO
1. _____is called the combination of training and knowledge sharing (A) Safety training (B) Safety promotion (C) Safety culture (D) Safety inspection	1	1	1	3,2
2. The main importance in a safety program is (A) Accident investigation and analysis (B) Risk analysis (C) Hazard analysis (D) Corrective actions	1	1	1	3,2
3. Under the OSH act, employers are responsible for providing a (A) Workplace (B) Estimation (C) Insurance (D) Land	1	1	1	3,2
4. When was the attempt to transfer methyl isocyanate from tank 610 to the processing facility failed? (A) 1980 (B) 1981 (C) 1982 (D) 1984	1	1	1	3,2
5. The minimum concentration of vapour in air which can form an explosive mixture is called the (A) Auto ignition point (B) Flash point (C) Lower explosive limit (D) Threshold limit value	1	2	2	3,2
6. _____is an example of toxic gas (A) Methyl alcohol (B) Ethyl alcohol (C) Sulphur dioxide (D) Methyl cuprite	1	2	2	3,2
7. What is the most common route of entry to the body for substances that causes industrial poisoning? (A) Ingestion (B) Inhalation (C) Absorption (D) Injection	1	1	2	3,2

8. The label danger on a chemical container most accurately signifies 1 1 2 3,2

(A) That the hazards can cause serious injury
(B) That the hazards can cause less than serious injury
(C) The users should be careful when using, handling or storing the chemical
(D) The chemical container should be disposed

9. Sodium metal falls under _____class of hazardous chemicals. 1 2 3 3,2

(A) Flammables
(B) Combustibles
(C) Reactives
(D) Oxidizers

10. _____fire extinguishers are specifically designed in order to tackle a class F fire 1 1 3 3,2

(A) Carbon dioxide
(B) Wet chemical
(C) Foam
(D) Water

11. Fires that are fueled by _____require you to use water fire extinguishers inorder to fight them. 1 1 3 3,2

(A) Live electricity
(B) Gasoline, kerosene and other flammable liquids
(C) Solid materials; such as wood, paper and textile
(D) Propane, butane and other flammable gases

12. _____accident causation theory states "within a given set of workers, there exists a subset of workers who are more liable to be involved in accidents". 1 1 3 3,2

(A) Domino theory
(B) Pure chance theory
(C) Biased liability theory
(D) Accident proness theory

13. _____developed by petrochemicals division of imperial chemical industries. 1 2 4 3,2

(A) HAZOP
(B) FMEA
(C) FTA
(D) Risk analysis

14. Fire and explosion index is calculated based on _____and _____ 1 1 4 3,2

(A) Physical properties, chemical properties
(B) Nature of the hazard, properties of the hazardous materials
(C) Nodes, parameters
(D) Nature of the process, properties of process materials

15. _____is used as a reliability evaluation technique to determine the effect of the system and failure? 1 1 4 3,2

(A) FTA
(B) FMEA
(C) HAZOP
(D) PHA

16. PID diagram is necessary for _____ 1 1 4 3,1

(A) Fault tree analysis
(B) Failure modes and effects analysis
(C) Hazard and operability study
(D) Risk analysis

17.	Poor illumination in working environment leads to _____occupational disease (A) UK (B) USA (C) India (D) Australia	1	1	5	3,1
18.	Which of the following types of gloves should you wear when working with chemicals? (A) Butyl rubber gloves (B) Fabric gloves (C) Leather gloves (D) Butyl and leather gloves	1	2	5	1,2
19.	Which respirator is used for protecting against dust hazards? (A) Mechanical respirator (B) Chemical respirator (C) Airline supplying respirator (D) Gas respirator	1	2	5	1,2
20.	Class B hard hats useful for withstanding the electrical voltage (A) 2200 volts (B) 4000 volts (C) 20000 volts (D) 30000 volts	1	1	5	1,2

PART – B (5 × 4 = 20 Marks)

Answer **ANY FIVE** Questions

		Marks	BL	CO	PO
21.	List out any four roles and responsibilities of safety supervisor in an organization.	4	1	1	1,3
22.	Define chemical hazard. What are the ways of controlling chemical hazards in the workplace?	4	2	2	1,3
23.	What are the three main steps in management of hazards? List out some ways to identify the hazards in working environment.	4	2	3	1,3
24.	Explain on risk analysis.	4	2	4	1,3
25.	Why is hand protection being important? Mention the important PPE used for the hand hazards.	4	1	5	1,2
26.	Differentiate acute toxicity and chronic toxicity with examples.	4	2	2	1,3
27.	Compare accident, incident and a near miss.	4	2	3	1,3

PART – C (5 × 12 = 60 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
28. a.	Explain any four elements of safety organization.	12	2	1	1,3
	(OR)				
b.	Discuss the employee training procedures followed in industries in detail.	12	2	1	1,3
29. a.	Explain the industrial siting criteria, guidelines and the importance of environmental impact assessment.	12	2	2	1,3
	(OR)				
b.	Classify the important classes of hazardous chemicals with examples and give suitable pictorial representations followed in industries.	12	2	2	1,3

30. a. Discuss a detailed procedure on accident investigation analysis. 12 3 3 1,3

(OR)

b. Calculate any five safety performance parameters for an automobile industry. 12 3 3 1,3

Year	2020	2021
Total workers employed	800	820
Accidents happened	15	20
Average hours worked by the workers	2000	2400
Days lost during the accidents	450	480

31. a. Describe the principle and procedure of HAZOP study for a suitable process. 12 2 4 1,3

(OR)

b. Describe the Dow fire explosion index calculation procedure with a neat diagram. 12 2 4 1,3

32. a. What is the purpose of respirators? Explain the air purifying and air supplying respirator types in detail. 12 2 5 1,2

(OR)

b. Explain the five types of occupational health hazards with examples. 12 2 5 1,2

* * * * *