



# GIET UNIVERSITY, GUNUPUR - 765022

## B. Tech (Fifth Semester Regular) Examinations, December - 2023 21BCHPE35001 - Process utility and Industrial Safety (Chemical )

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks)

**PART – A****(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. What is Scale? Discuss any two reasons with chemical reaction for formation of scale.	CO2	K2
b. Explain why water containing $\text{Ca}^{2+}$ and $\text{HCO}_3^-$ ion is said to be hard.	CO2	K2
c. How Fire-tube boiler and Water-tube boiler are differentiated?	CO2	K2
d. Give the classification of compressor based on the movement of piston	CO2	K2
e. What are the different Stages in Risk Management?	CO1	K1

**PART – B****(15 x 4 = 60 Marks)**Answer **ALL** questions

	Marks	CO #	Blooms Level
2. a. What do mean by scale and sludge formation in Boiler? Enumerates the possible cause of formation of scale and sludge inside a Boiler.	7	CO2	K2
b. Define carbonate and non-carbonate hardness of water. List out the various disadvantages of hard water for domestic use.	8	CO3	K2
(OR)			
c. Demonstrate the Reverse Osmosis process for Desalination of Brackish Water.	7	CO2	K2
d. Describe in detail how boiler corrosion is caused by dissolved oxygen and carbon dioxide.	8	CO2	K2
3.a. Illustrate with suitable diagram and constructional design. Discuss about Lancashire Boiler.	8	CO2	K2
b. Discuss about the purpose and classification of draught system used in boiler.	7	CO3	K2
(OR)			
c. Classify the Boiler according to its different constructional design.	8	CO2	K2
d. Elaborate the Key Terms Concerning Steam Boilers.	7	CO2	K2
4.a. What are the different types of air compressors according to different design and principle of operation?	8	CO3	K1
b. Analyse the centrifugal and rotary type air compressor under Isentropic,	7	CO4	K2

Polytrophic and Isothermal Compression.

(OR)

- |      |  |   |     |    |
|------|--|---|-----|----|
| c.   | What is an air compressor? Give the classification of compressor based on the movement of piston.                            | 8 | CO3 | K1 |
| d.   | Differentiate among Low pressure, Medium Pressure and High Pressure Air Compressor   | 7 | CO4 | K2 |
| 5.a. | How will you do the risk assessment in process plant? Also write its advantages and disadvantages.                           | 8 | CO4 | K1 |
| b.   | Elaborate the objectives the of Risk Management and elaborate the procedure to analyse, Assessment and Controlling measures. | 7 | CO4 | K2 |

(OR)

- |    |   |   |     |    |
|----|---|---|-----|----|
| c. | What is fire hazard? Discuss in detail about the conditions that favors fire development or growth. | 8 | CO4 | K1 |
| d. | Analyze the 4 E'S principle of Industrial safety.   | 7 | CO3 | K2 |

--- End of Paper ---