QP Code: SN23BTECH225 | Reg. No | | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester - Regular) Examinations, November 2025

23BCHPE35001– Process Utility & Industrial Safety

(Chemical)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(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 the principle behind Calgon treatment?	CO1	K1
b. Discuss the consequent effect of physical and chemical impurities on quality of water.	CO1	K2
c. What are personal protective equipment's (PPE)? Give examples.	CO4	K1
d. What are the principles of health and safety?	CO6	K2
e. What is the role of safety training in an industry?	CO6	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Discuss about Ion exchange or demineralisation Process.	5	CO1	K1
b.	Explain how scale and sludge formation occur in boilers and how they can be controlled by internal treatment methods.	5	CO1	K2
	(OR)			
c.	Discuss the Lime-soda process for water softening	5	CO1	K2
d.	Calculate the quantity of lime and Soda required for softening 50000 litres of water containing Ca(HCO 3) 2 = 8.1mg, Mg(HCO 3) 2 = 7.5 mg,CaSO4 =13.6 mg,,MgSO4 =13.6 mg, MgCl 3 =2.0 mg and NaCl =4.7 mg.	5	CO1	K2
3.a.	Classify the Boiler according to its different constructional design.	5	CO2	K3
b.	Illustrate with suitable diagram and constructional design discuss about Cochran Boiler.	5	CO3	K4
	(OR)			
c.	Elaborate the Key Terms Concerning Steam Boilers.	5	CO3	K3
d.	Illustrate with suitable diagram and constructional design discuss about Lancashire Boiler.	5	CO2	K4
4.a.	What are the different types of air compressors according to different design and principle of operation?	5	CO3	K2
b.	Draw p-V diagram of a two stage reciprocating air compressor.	5	CO4	K3
	(OR)			
c.	Analyse the centrifugal and rotary type air compressor under Isentropic and Isothermal Compression.	5	CO4	K4
d.	Explain the process of air compression in centrifugal compressors. Discuss velocity and pressure changes through impeller and diffuser.	5	CO4	K2
5.a.	What is Hazard? Classify the Hazard according to its risk involvement. Enumerate about each categories of Hazards according to its potential to cause	5	CO5	K2

	injury and damage.			
b.	Explain in detail the hazards due to fire, explosions, toxicity, and radiation along with their causes and control measures.	5	CO5	K3
	(OR)			
c.	What are steps of controlling the risk in process plants?	5	CO6	K2
d.	How will you do the risk assessment in process plant? Also write its advantages and disadvantages.	5	CO6	K3
6.a.	Analyse the 4 E'S principle of Industrial safety.	5	CO6	K4
b.	Discuss the role of safety training and education in reducing industrial accidents and promoting safety awareness.	5	CO6	K3
	(OR)			
c.	Discuss the common unsafe conditions and unsafe acts found in factories. How can they be prevented?	5	CO6	K3
d.	Explain the steps involved in a basic industrial safety programme.	5	CO6	K2

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