

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII EXAMINATION – WINTER 2025

Subject Code:3170516

Date:28-11-2025

Subject Name:Process Auxiliaries and utilities

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) List out the different types of pipe testing techniques.	03
	(b) Discuss the different kinds of flow diagrams used in the chemical industry.	04
	(c) What are pipe joints? What are the different types of pipe joints used in the chemical industry?	07
Q.2	(a) Enlist the different types of valves used in the chemical industry.	03
	(b) What are the selection criteria for valves in various systems?	04
	(c) Discuss NPSH requirements in detail.	07
	OR	
	(c) List the types of pumps used in the chemical industry and discuss them in detail.	07
Q.3	(a) Discuss the different types of wastewater treatment systems used in the chemical industry.	03
	(b) Define the term hard water and list the effects of hard water on industrial processes.	04
	(c) What are the requisites of industrial water? How is it different from domestic water?	07
	OR	
Q.3	(a) Write the different uses of water for cooling purposes.	03
	(b) Define the term soft water. How is it different from hard water?	04
	(c) What is the demineralization of water? How is it done in the chemical industry?	07
Q.4	(a) Explain the ejector system in detail.	03
	(b) What are the advantages and disadvantages of using a centrifugal compressor?	04
	(c) Define the steam traps and write down their characteristics, selection criteria, and application.	07
	OR	
Q.4	(a) List out the different types of compressors.	03
	(b) What are the different types of ejectors used in a chemical industry?	04
	(c) What are boilers? What are the different types of boilers used in a chemical process plant?	07
Q.5	(a) What are the different types of lubricants used in compressors and pumps?	03
	(b) What are the factors that affect the performance of a compressor?	04
	(c) Discuss vapor compression refrigeration cycle with a diagram.	07

OR

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| Q.5 | (a) | Discuss the design considerations for selecting a compressor. | 03 |
| | (b) | What are the different types of compressors and pump seals used in a chemical process plant? | 04 |
| | (c) | Discuss the vacuum pumps and explain the different types used in a chemical process plant. | 07 |
