Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3170516 Date:11-12-2024

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)**	Explain the importance of flow diagrams in plant design.	**03**
	(b)	Describe the selection criteria for piping materials.	**04**
	(c)	Describe the various types of piping fittings used in industrial applications.	**07**
Q.2	**(a)**	Explain the term: Pump piping support.	**03**
	(b)	Describe the factors influencing pump location in industrial plants.	**04**
	(c)	Explain in detail the NPSH requirement and its significance in pump selection and operation.	**07**
		OR	
	(c)	Enlist different types of valves along with their figures. What are the selection criteria for valves for various systems?	**07**
Q.3	**(a)**	What are the sources of process water in industrial applications?	**03**
	(b)	Describe the concept of steam economy and its importance in industrial processes.	**04**
	(c)	Compare various methods of water treatment with each other.	**07**
		OR	
Q.3	**(a)**	Differentiate between hard and soft water and their relevance in industrial processes.	**03**
	(b)	Discuss the design considerations for efficient steam heating systems.	**04**
	(c)	Explain the concept of waste heat utilization and its applications in industrial processes.	**07**
Q.4	**(a)**	Difference between the air compressor and vacuum pump.	**03**
	(b)	Explain the steam trap process with a diagram.	**04**
	(c)	Enlist all air compressors. Explain the working with the construction of a multi-stage single-acting reciprocating compressor.	**07**
		OR	
Q.4	**(a)**	Enlist different types of pumps.	**03**
	(b)	Explain nitrogen blanketing or padding for the storage tank with a diagram.	**04**
	(c)	Enlist various rotary compressors and explain the working construction of anyone	**07**
Q.5	**(a)**	What is the difference between a chiller and a refrigerator?	**03**
	(b)	Explain the working principle of vacuum pumps and their limitations.	**04**
	(c)	List the advantages and disadvantages of a centrifugal pump and describe the characteristics and curves of a centrifugal pump.	**07**
		OR	
Q.5	**(a)**	List issues involved in utility management.	**03**
	(b)	Write a short note on the oil heating system.	**04**
	(c)	Discuss the vapor compression refrigeration cycle with a diagram.	**07**

****