

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VII EXAMINATION – SUMMER 2026

Subject Code:3170516

Date:05-06-2026

Subject Name:Process Auxiliaries and utilities

Time:02:30 PM TO 05:00 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) What is the purpose of preparing a process flow diagram? What should be included in a process flow diagram?	03
	(b) In designing a industrial pipe line, what are the important factors to be considered?	04
	(c) Highlight key design points for steam distribution piping.	07
Q.2	(a) Name and discuss different types of pipe joints.	03
	(b) Explain the selection criteria of valves.	04
	(c) What are the different types of valves and where are they used? What are the selection criteria for control valves?	07
	OR	
	(c) Differentiate between NPSH available and NPSH required. What will happen if NPSH available is less than NPSH required?	07
Q.3	(a) List the different kinds of chemical process utilities used in industry.	03
	(b) Suggest various methods of softening hard water. Discuss any one detail.	04
	(c) What are the factors that affect the efficiency of a cooling tower? Discuss in detail.	07
	OR	
Q.3	(a) How does resin remove water hardness?	03
	(b) What is a boiler feed water treatment system and How does it work?	04
	(c) Discuss types and working of industrial cooling towers.	07
Q.4	(a) What is thermal fluid heating system?	03
	(b) Why does ethylene glycol mix with water while used as a coolant?	04
	(c) Discuss important criteria for the selection of steam traps. What are the main three types of steam traps?	07
	OR	
Q.4	(a) How is air compressed?	03
	(b) What is flash steam? What are the benefits of condensate recovery?	04
	(c) What is the most common cause of air compressor failure? List safety measures those are required for air compressor.	07
Q.5	(a) What is the design point (duty point) of a centrifugal pump?	03
	(b) Discuss most common pipe insulation materials.	04
	(c) Highlight important features of inert nitrogen gas systems for chemical plants	07
	OR	
Q.5	(a) What is Evaporative Cooling? Discuss the concept with help of example.	03
	(b) Discuss working principle and main parts of ejector.	04
	(c) Difference between Vapour compression and Absorption Refrigeration System.	07
