

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022****Subject Code:3170516****Date:07-01-2023****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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Discuss the characteristics of the vacuum pump.	<b>03</b>
	(b) Interpret the importance of steam distribution systems in chemical plants.	<b>04</b>
	(c) Judge why pipe insulation is needed and discuss the type of pipe insulation.	<b>07</b>
<b>Q.2</b>	(a) Interpret the meaning of hard water and soft water.	<b>03</b>
	(b) Defend for gate valve why do selection criteria have an important role?	<b>04</b>
	(c) Discuss in detail the different types of ejectors.	<b>07</b>
	<b>OR</b>	
	(c) Explain air receiver systems.	<b>07</b>
<b>Q.3</b>	(a) List all utility energy considerations for industrial application.	<b>03</b>
	(b) Enlist the all materials used for the fabrication of the pipe and explain alloy steel.	<b>04</b>
	(c) Enlist all air compressors. Explain the working with the construction of a multi-stage single-acting reciprocating compressor.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Where the nitrogen system is used as a utility?	<b>03</b>
	(b) Explain the need for a P & ID diagram with an example.	<b>04</b>
	(c) Enlist various rotary compressors. And explain the working construction of anyone.	<b>07</b>
<b>Q.4</b>	(a) Argue why refrigeration system is required in the chemical industry.	<b>03</b>
	(b) Explain the steam economy.	<b>04</b>
	(c) Distinguish the terms “reuse” and “conservation” and explain with respect to the need for water in industry.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Support with an example of the need for the chilling system.	<b>03</b>
	(b) Explain the steam trap process with a diagram.	<b>04</b>
	(c) Compare various methods of water treatment with each other.	<b>07</b>
<b>Q.5</b>	(a) What is an air dryer?	<b>03</b>
	(b) Brief on oil heating system.	<b>04</b>
	(c) Discuss the types of pumps.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Difference between the air compressor and vacuum pump.	<b>03</b>
	(b) List issues involved in utility management.	<b>04</b>
	(c) Explain with an equation and diagram for the positive suction head and negative suction head.	<b>07</b>