| Seat No.: | Enrolment No |
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GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER II EXAMINATION – SUMMER 2017

| Subject Code: 2723014 | Date:30/05/2017 |
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| | Date.30/03/2017 |

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.

| Q.1 | (a) | Discuss selection and determination of pipe size for process steam piping. | 07 |
|-----|------------------|--|-------|
| | (b) | Enlist different types of valves and discuss selection criteria of valves for various systems. | 07 |
| Q.2 | (a) | Discuss the basic parts of centrifugal pumps stating their functions. Draw and explain the characteristic curves of centrifugal pumps and explain its advantages and disadvantages | 07 |
| | (b) | Discuss types of material and its characteristics for piping design. | 07 |
| | (b) [*] | Enlist different types of vacuum pumps with salient features of the major types. | 07 |
| Q.3 | (a) | Differentiate between hard and soft water. Explain various treatment methods for water softening. | 07 |
| | (b) | Write short note on water reuse and conservation of water. OR | 07 |
| Q.3 | (a) | Explain the lubrication requirement in different types of compressors. | 07 |
| | (b) | Discuss major types of insulation materials and its properties. | 07 |
| Q.4 | (a) | Write a brief note on condensate utilization. | 07 |
| | (b) | State and explain various types of steam traps and its application OR | 07 · |
| Q.4 | (a) | Discuss steam generation, distribution and utilization in industries. | 07 |
| | (b) | Discuss various pressure relief devises used in chemical process industries. | 07 |
| | | A pressure–relief valve has a pressure setting of 140 bar. Compute the KW loss across this valve if it returns all the flow back to the tank from a $0.0016 \text{ m}^3\text{/s}$ pump. | |
| Q.5 | (a) | What is the purpose of nitrogen blanketing? Explain the methods of nitrogen blanketing in a chemical reactor with schematic diagram. | 07 |
| | (b) | Discuss causes and prevention techniques for corrosion problem in cooling water treatment. | 07 |
| | | OR | 52023 |
| Q.5 | (a) | Discuss various types of Flow diagrams with examples. Take any chemical and draw its process flow diagram with conventional notations and symbols. | |
| | (b) | Write a short note on Vapor compression refrigeration | 07 |