

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII EXAMINATION – WINTER 2025

**Subject Code: 3172117**

**Date: 20-11-2025**

**Subject Name: Industrial Corrosion, Testing, Prevention and Control**

**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     |
|------------|-------------------------------------------------------------------------------------------------------|-----------|
| <b>Q.1</b> | (a) List preventive methods for corrosion.                                                            | <b>03</b> |
|            | (b) Briefly explain corrosion and its types.                                                          | <b>04</b> |
|            | (c) Justify with suitable example the need for corrosion study and prevention in detail.              | <b>07</b> |
| <b>Q.2</b> | (a) Predict possible form of corrosion in boiler of thermal power plant.                              | <b>03</b> |
|            | (b) List materials & characteristics required for thermal power plant boiler.                         | <b>04</b> |
|            | (c) Suggest preventive methods for thermal power plant boiler corrosion and briefly discuss.          | <b>07</b> |
| <b>OR</b>  |                                                                                                       |           |
|            | (c) Discuss the factors affecting boiler corrosion in thermal power plant.                            | <b>07</b> |
| <b>Q.3</b> | (a) Predict corrosion rate of mild steel window grill used in Surat and Gandhinagar.                  | <b>03</b> |
|            | (b) Briefly explain effect of pH and temperature on corrosion behavior of metallic material.          | <b>04</b> |
|            | (c) Write detailed note on corrosion behavior of marine structure.                                    | <b>07</b> |
| <b>OR</b>  |                                                                                                       |           |
| <b>Q.3</b> | (a) Explain briefly material exposure/service condition in fertilizer industry.                       | <b>03</b> |
|            | (b) What should be possible form of corrosion in fertilizer industry?                                 | <b>04</b> |
|            | (c) Discuss preventive methods to limit corrosion in fertilizer industry.                             | <b>07</b> |
| <b>Q.4</b> | (a) Predict possible form of corrosion in underground pipeline carrying oil and gas.                  | <b>03</b> |
|            | (b) Discuss effect of oxygen content of soil on corrosion behavior of underground pipeline.           | <b>04</b> |
|            | (c) Write short note on use of sacrificial anode for corrosion of prevention of underground pipeline. | <b>07</b> |
| <b>OR</b>  |                                                                                                       |           |
| <b>Q.4</b> | (a) Explain sensitization of 18-8 austenitic stainless steel.                                         | <b>03</b> |
|            | (b) Suggest preventive measure for 18-8 austenitic stainless steel corrosion in fabrication.          | <b>04</b> |
|            | (c) What is stabilized stainless steel? Briefly explain knife line attack.                            | <b>07</b> |
| <b>Q.5</b> | (a) Predict possible form of corrosion of car body.                                                   | <b>03</b> |
|            | (b) Discuss mechanism of automobile battery working.                                                  | <b>04</b> |
|            | (c) Explain role of material selection and coating on car body corrosion.                             | <b>07</b> |
| <b>OR</b>  |                                                                                                       |           |
| <b>Q.5</b> | (a) Predict possible causes of Morbi hanging bridge collapse.                                         | <b>03</b> |
|            | (b) Suggest possible means to avoid such type of disaster Q5(a) above.                                | <b>04</b> |
|            | (c) Write detailed note on impressed current cathodic protection.                                     | <b>07</b> |