

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V EXAMINATION – WINTER 2025

Subject Code:3152116

Date:17-11-2025

Subject Name:Environmental Degradation of Materials

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) Define corrosion. Explain need to prevent corrosion.	03
	(b) Define anode and cathode. Write anodic and cathodic reaction when iron is dipped in hydrochloric acid.	04
	(c) With neat sketch explain passivity.	07
Q.2	(a) Define wear. Mention methods and materials to improve wear.	03
	(b) Briefly explain polarization and its types.	04
	(c) With neat sketch explain Pourbaix diagram for metal water system.	07
OR		
Q.3	(a) Write detailed note on pitting corrosion.	07
	(b) With suitable example explain the effect of area ratio in galvanic corrosion.	03
	(c) Explain cavitation damage with neat sketch.	04
Q.3	(a) What is stress corrosion cracking? Discuss in detail.	07
	OR	
	(a) What is sensitization in 18-8 type of Austenitic Stainless Steel (ASS)? Explain.	03
Q.3	(b) Suggest ways to overcome sensitization. Also explain stabilization of ASS.	04
	(c) Write note on different type of reference electrodes.	07
	Q.4	(a) Explain term current density and half cell potential.
(b) Briefly explain erosion corrosion.		04
(c) Differentiate between e.m.f. and galvanic series.		07
OR		
Q.4	(a) What is dealloying? List material that shows dealloying.	03
	(b) Explain beneficial effects of galvanic corrosion.	04
	(c) Write note on hydrogen damage.	07
Q.5	(a) What is inhibitor in corrosion prevention? Mention types.	03
	(b) With suitable example explain role of coating and change of environment for corrosion protection.	04
	(c) Write detailed note on cathodic prevention.	07
OR		
Q.5	(a) Explain term corrosion rate. List methods to measure.	03
	(b) With suitable example explain role of material selection and design for corrosion protection.	04
	(c) Write detailed note on anodic prevention.	07