

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2024****Subject Code: 3152116****Date: 16-05-2024****Subject Name: Environmental Degradation of Materials****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
<b>Q.1</b>	(a) Using proper examples explain how corrosion can be used as useful process.	<b>03</b>
	(b) Briefly discuss different losses due to corrosion.	<b>04</b>
	(c) Derive Nernst equation for electrode potential.	<b>07</b>
<b>Q.2</b>	(a) Define Corrosion. Discuss effect of anodic area on corrosion.	<b>03</b>
	(b) What is galvanic series? Discuss its uses in corrosion studies.	<b>04</b>
	(c) Describe Faradays' laws of electrolysis and their role in corrosion measurement and prevention.	<b>07</b>
<b>OR</b>		
	(c) Explain electrochemical theory of wet corrosion with suitable example.	<b>07</b>
<b>Q.3</b>	(a) Explain the reason for breakdown of the passive layer in pitting corrosion.	<b>03</b>
	(b) What is differential aeration cell? Discuss With respect to crevice corrosion.	<b>04</b>
	(c) Describe the concentration polarization and activation polarization.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Discuss the factors which increase pitting.	<b>03</b>
	(b) Discuss causes and way of prevention of crevice corrosion.	<b>04</b>
	(c) Discuss the Pourbaix diagram for Fe-H <sub>2</sub> O system.	<b>07</b>
<b>Q.4</b>	(a) Justify the role of material selection in corrosion protection.	<b>03</b>
	(b) Write a note on dezincification.	<b>04</b>
	(c) Discuss causes, mechanism and way of prevention of erosion corrosion.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Justify the role of design aspects in corrosion protection.	<b>03</b>
	(b) Write a short note on alteration of environment for corrosion prevention.	<b>04</b>
	(c) Discuss causes, mechanism and way of prevention of stress corrosion cracking.	<b>07</b>
<b>Q.5</b>	(a) Prior to coating, metal surface needs cleaning. Explain why?	<b>03</b>
	(b) Explain one method for wear rate measurement	<b>04</b>
	(c) Explain impressed current cathodic protection method.	<b>07</b>
<b>OR</b>		
<b>Q.5</b>	(a) Define wear and list types of wear.	<b>03</b>
	(b) Compare cathodic protection method with anodic protection method.	<b>04</b>
	(c) Describe the Tafel's extrapolation method for corrosion rate measurement.	<b>07</b>

\*\*\*\*\*