

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020****Subject Code:3152110****Date:29/01/2021****Subject Name:Environmental Degradation of Materials****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any **FOUR** questions out of **EIGHT** questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Explain why small anodic area results in intense corrosion.	03
	(b) Define corrosion. Discuss the importance of corrosion study.	04
	(c) Explain electrochemical theory of wet corrosion using suitable examples.	07
Q.2	(a) With suitable examples explain how corrosion can be used as useful process.	03
	(b) Discuss effect of temperature and velocity on corrosion rate.	04
	(c) Derive Nernst equation for electrode potential. Discuss applications and limitations of Nernst's equation in corrosion study.	07
Q.3	(a) Any reduction in wear can result in considerable savings. Justify the statement.	03
	(b) Write a short note on the Ag-AgCl reference electrode.	04
	(c) Explain about exchange current density. How it is related to Faraday's Law? Also describe factors affecting exchange current density.	07
Q.4	(a) Define wear and list types of wear.	03
	(b) Corrosion is reverse of extractive metallurgy. Describe the statement.	04
	(c) Define polarization and enlist different types. Describe activation polarization.	07
Q.5	(a) Define pitting corrosion. Describe reasons for breakdown of the passive layer in pitting corrosion.	03
	(b) Discuss causes and methods of protection in uniform corrosion.	04
	(c) Discuss causes, mechanism and possible way of prevention of crevice corrosion.	07
Q.6	(a) Discuss mechanism of stress corrosion cracking.	03
	(b) Write a short note on dezincification.	04
	(c) Explain inter granular corrosion in stainless steel. Describe methods to prevent it in stainless steel.	07
Q.7	(a) Justify the role of material selection in corrosion protection.	03
	(b) Differentiate between organic and anodic inhibitors.	04
	(c) Explain sacrificial anode cathodic protection method.	07
Q.8	(a) Describe advantage & application of Galvanizing.	03
	(b) What is electroplating? Discuss important steps involved in electroplating.	04
	(c) What do you mean by Tafel plot? Explain the corrosion rate measurement using Tafel plot.	07
