Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – WINTER • 2014

Subject Code: 162105 Date: 03-12-2014

Subject Name: Electrometallurgy and Corrosion

Time: 02:30 pm - 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 the role of sacrificial anode in corrosion protection. Explain sacrificial anode cathodic protection method.	**07**
	(b)	What is electroplating? Give applications. Mention important steps involved in electroplating.	**07**
Q.2	**(a)**	Explain Anodizing as a method of corrosion prevention. Give the role of barrier oxides in aluminum anodizing.	**07**
	(b)	Define corrosion. Discuss the importance of study the corrosion behavior of metals and alloys.	**07**
		OR	
	(b)	Explain mechanism of inter granular corrosion. Describe methods to prevent it in stainless steel.	**07**
Q.3	**(a)**	Define and explain exchange current density. How it is related to Faraday's Law? Also mention factors affecting exchange current density.	**07**
	(b)	Discuss the thermodynamic principle of corrosion and justify the requirement of reference electrode for corrosion study.	**07**
		OR	
Q.3	**(a)**	Define polarization. Enlist different types of polarization. Discuss about activation polarization.	**07**
	(b)	Discuss the Pourbaix diagram for Fe-H_2O system and show that how it is useful in corrosion study.	**07**
Q.4	**(a)**	What is stress corrosion cracking? Discuss causes, mechanism and way of prevention of stress corrosion cracking.	**07**
	(b)	Explain the Piling-Bedworth ratio. Discuss its importance and applications in corrosion study.	**07**
		OR	
Q.4	**(a)**	Define crevice corrosion. Discuss causes and mechanism of crevice corrosion. Suggest the possible protection methods.	**07**
	(b)	Discuss the effect of temperature, velocity, anodic area and pH on corrosion rate.	**07**
Q.5	**(a)**	With the help of suitable examples explain on thermodynamic basis, how the proper material selection is helpful in corrosion control.	**07**
	(b)	What do you mean by Tafel plot? Explain the use of Tafel plot in corrosion rate measurement.	**07**
		OR	
Q.5	**(a)**	Define inhibitors. With the help of proper examples, explain the role of inhibitors in corrosion control.	**07**

(b) Explain how material selection is helpful to combat corrosion in high temperature conditions. **07**

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