Dr. Rila Mausuzy

Domse

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National Institute of Technology-Hamirpur End Term Examination, November 2022 B. Tech. 7th Semester MS-412: Corrosion Science and Engineering

Note	
	• This question paper consists of 8 questions
	• Attempt all questions
	• Wherever necessary, the diagram drawn should be neat and properly labelled
1.	Choose the correct answer: (5)
i.	Which of the following is also known as under-film corrosion? (a) Crevice corrosion (b) Filiform corrosion
	(c) Galvanic corrosion (d) Pitting corrosion
11.	which of the following corrosion form is/are autocatalytic?
	(a) Pitting and crevice corrosion (b) Crevice corrosion only (c) Pitting correction only (d) Pitting and intergraphics correction
iii.	Which of the following areas is/are corroded due to the intergranular corrosion of stainless steel?
	(a) Grain(b) Grain boundary(c) Both grain and grain boundary(d) Chromium depleted zone near the grain boundary
iv.	In which of the following environments that stainless steel will undergo stress- corrosion cracking?
v.	 (a) Chlorides (b) Caustics (c) Ammonia (d) Chlorides and caustics Which of the following form of corrosion is more destructive and insidious? (a) Uniform corrosion (b) Intergranular corrosion
	(c) Pitting corrosion (d) Galvanic corrosion
2.	Answer the followings: (5)
	a) What is the change in Gibb's free energy of a Cu-Zn system with a cell potentia
	of 1.10V? (1)
	b) Iron is corroding at a current density of 1.69×10^{-4} amp/cm ² . What would be the
	corrosion rate in MPY? (density of iron = 7.875 g/cm^3) (2)
	c) $Zn/Zn^{+2}(0.1M)//Ag^{+1}(1M)/Ag$ is the cell notation of zinc dissolution in silver.
	Then, what is the electrode potential of the cell formed? ($T = 298$ K, $F = 96500$,
	$R = 8.314 \text{ J/Kg} \times \text{K}) (E^{o}_{Ag} = 0.80 \text{V}, E^{o}_{Zn} = -0.763 \text{V}) $ (2)
	전 같은 그렇는 정말 관계 전 가슴 전 집 밖에 집에 앉아야 해요. 그는 것은 것이라고 있는 것이라. 그는 것이라는 것이 같이 가지 않는 것이라. 그는 것이 같이 있는 것이라. 이렇게 많은 것이라.

3.	Write short notes on following (with possible scher	natics, wherever needed) (15)
•	a) Types of dezincification failure	(1.5)
	b) Cavitation damage steps	(1.5)
	c) Butler-Volmer and Stern Grey equations	(3)
	d) Season Cracking and Caustic Embrittlement	(3)
	e) Fretting corrosion mechanism	(3)
	f) Limiting diffusion current density	(3)
4.	How do the corrosion filaments form and interact dur	ring the corrosion? What is the

	riew do the corrosion manents form and interact during the corrosion? what is the		
	possible remedy to prevent filament growth?	(5)	
5.	What is the difference between weld decay and knife-line attack? What are the		
	possible preventive actions needed to avoid these failures?	(5)	
6.	How the different environmental factors affect the erosion-corrosion?	(5)	
7.	What is the mechanism of pitting corrosion? How to evaluate the pitting corrosion		
	damage?	(5)	
8.	What is the mechanism of corrosion fatigue? How do the different environmental		
	factors influence corrosion fatigue behaviour? How can it be prevented?	(5)	
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