6.

(a) Iron

Duration: Three hours

Reg. No. :			
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Maximum: 100 Marks

CO₃-R

Question Paper Code: 59951

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Open elective

Civil Engineering

15UCH951- CORROSION SCIENCE AND ENGINEERING

(Common to CSE, ECE, EEE, EIE, IT, Mechanical)

(Regulation 2015)

	Answer	ALL Questions						
	PART A - ($10 \times 1 = 10 \text{ Marks}$						
1.	When a buried pipeline is protected from corrosion by connecting two magnesium block, it is called							
	(a) Impressed voltage protection	(b) Sacrificial cathodic pro	otection					
	(c) Sacrificial anodic protection	(d) Any of these						
2.	Metal at the top if electromotive series	is	CO1- U					
	(a) Most stable (b) Least active	e (c) Most Noble	(d) Most Active					
3.	In order to make the surface brighter the nickel plate is covered by a thin co		CO2- R					
	(a) Chromium (b) Zinc	(c) Magnesium	(d) Copper					
4.	coatings provide excellent corn	rosion protection in sea waters	CO2- U					
	(a) Rubber (b) Polymer	(c) Nickel (d) None	of the above					
5.	During galvanic corrosion more noble	metal act as	CO3- R					
	(a) Anode	(b) Cathode						
	(c) Anode as well as cathode	(d) Corroding metal						

(c) Zinc

(d) H+

The rusting of iron is catalysed by which one of the following

(b) Oxygen

	Which of the following elements added to iron to improve its oxidation resistance						CO4- R		
(a)	Zinc			(b)	Magn	esium			
(c)	Chromium and al	luminium		(d)	None	of the abo	ve		
Pass	sivity is due to								CO4- R
(a)	Higher EMF	(b) Lowe	er EMF	(c)	Oxide f	ïlm	(d)	All of the	above
					osion oc	curs with			CO5- U
(a)	Iron	(b) copp	er	(c)	Iron an	d copper	(d)	None of the	he above
The	rusting of iron is c	catalysed b	y which	one of	the foll	owing			CO5- U
(a)	Iron	(b) Oxyg	gen	(c)	Zinc		(d)	H+	
		PAR	T - B (5	x 2= 1	0Marks)			
A co	opper equipment sl	nould not	possess a	a steel c	compone	ent. Why?			CO1- U
Mer	ntion the conditions	s of mater	ial select	tion for	the offs	hore indu	stry.		CO2- U
Def	ine halogen corrosi	ion.							CO3- U
Def	ine cathodic protec	ction							CO4- U
Wha	at is corrosion? Wh	nat is rust							CO5- U
		PA	ART – C	(5 x 16	= 80Ma	rks)			
(a)	Discuss briefly the examples	ne various		corros	ion with	suitable		CO1- U	(16)
(b)			troplatin	g with	suitable	example.		CO1- U	(16)
(a)	_			coating	g by	alloying	and	CO2- U	(16)
(b)	•		ods of e	electro	painting	g and pov	wder	CO2- U	(16)
(a)	-			coating	g by	alloying	and	CO3- U	(16)
	oxide (a) (c) Pass (a) In a the (a) The (a) A compared to the	oxidation resistance (a) Zinc (c) Chromium and all Passivity is due to (a) Higher EMF In acidic environment the replacement of H+ (a) Iron The rusting of iron is consistent of the restriction of the conditions. Define halogen corross. Define cathodic protect what is corrosion?	oxidation resistance (a) Zinc (c) Chromium and aluminium Passivity is due to (a) Higher EMF (b) Lowe In acidic environment the electrothe replacement of H+ ions by the (a) Iron (b) copper The rusting of iron is catalysed by the catalysed by the copper of the rusting of iron is catalysed by the catalysed by the cathodic protection Mention the conditions of material Define halogen corrosion. Define cathodic protection What is corrosion? What is rust PA (a) Discuss briefly the various examples (b) Explain the process of electrodection when the uses of electrodection the uses of electrodection when the uses of electrodection the uses of electrodection when the uses of electrodection when the uses of electrodection when the uses of electrodection with suitable examples.	oxidation resistance (a) Zinc (c) Chromium and aluminium Passivity is due to (a) Higher EMF (b) Lower EMF In acidic environment the electrochemicate replacement of H+ ions by the metal, (a) Iron (b) copper The rusting of iron is catalysed by which (a) Iron (b) Oxygen PART – B (5) A copper equipment should not possess at Mention the conditions of material select Define halogen corrosion. Define cathodic protection What is corrosion? What is rust PART – C (a) Discuss briefly the various forms of examples Or (b) Explain the process of electroplating Mention the uses of electroplating (a) Explain the method of zinc electrophoretic coatings. Or (b) Discuss briefly the methods of ecoatings with suitable example.	oxidation resistance (a) Zinc (b) (c) Chromium and aluminium (d) Passivity is due to (a) Higher EMF (b) Lower EMF (c) In acidic environment the electrochemical correction the replacement of H+ ions by the metal, (a) Iron (b) copper (c) The rusting of iron is catalysed by which one of (a) Iron (b) Oxygen (c) PART – B (5 x 2 = 1) A copper equipment should not possess a steel of Mention the conditions of material selection for Define halogen corrosion. Define cathodic protection What is corrosion? What is rust PART – C (5 x 16) (a) Discuss briefly the various forms of corrose examples Or (b) Explain the process of electroplating with some Mention the uses of electroplating (a) Explain the method of zinc coating electrophoretic coatings with suitable example. (a) Explain the method of zinc coating electrophoretic coatings with suitable example.	oxidation resistance (a) Zinc (b) Magnetic (c) Chromium and aluminium (d) None Passivity is due to (a) Higher EMF (b) Lower EMF (c) Oxide for In acidic environment the electrochemical corrosion octive replacement of H+ ions by the metal, (a) Iron (b) copper (c) Iron and The rusting of iron is catalysed by which one of the following (a) Iron (b) Oxygen (c) Zinc PART – B (5 x 2= 10Marks). A copper equipment should not possess a steel component Mention the conditions of material selection for the offs. Define halogen corrosion. Define cathodic protection What is corrosion? What is rust PART – C (5 x 16= 80Marks). PART – C (5 x 16= 80Marks). Or (b) Explain the process of electroplating with suitable Mention the uses of electroplating. Or (b) Discuss briefly the method of zinc coating by electrophoretic coatings. Or (c) Oxide for the original corrosion oction and the corrosion of the following in the method of zinc coating by electrophoretic coatings. Or (d) Discuss briefly the methods of electro painting coatings with suitable example.	oxidation resistance (a) Zinc (b) Magnesium (c) Chromium and aluminium (d) None of the abo Passivity is due to (a) Higher EMF (b) Lower EMF (c) Oxide film In acidic environment the electrochemical corrosion occurs with the replacement of H+ ions by the metal, (a) Iron (b) copper (c) Iron and copper The rusting of iron is catalysed by which one of the following (a) Iron (b) Oxygen (c) Zinc PART – B (5 x 2= 10Marks) A copper equipment should not possess a steel component. Why? Mention the conditions of material selection for the offshore indu Define halogen corrosion. Define cathodic protection What is corrosion? What is rust PART – C (5 x 16= 80Marks) (a) Discuss briefly the various forms of corrosion with suitable examples Or (b) Explain the process of electroplating with suitable example. Mention the uses of electroplating (a) Explain the method of zinc coating by alloying electrophoretic coatings. Or (b) Discuss briefly the methods of electro painting and portional coatings with suitable example. (a) Explain the method of zinc coating by alloying electrophoretic coatings.	oxidation resistance (a) Zinc (b) Magnesium (c) Chromium and aluminium (d) None of the above Passivity is due to (a) Higher EMF (b) Lower EMF (c) Oxide film (d) In acidic environment the electrochemical corrosion occurs with the replacement of H+ ions by the metal, (a) Iron (b) copper (c) Iron and copper (d) The rusting of iron is catalysed by which one of the following (a) Iron (b) Oxygen (c) Zinc (d) PART – B (5 x 2= 10Marks) A copper equipment should not possess a steel component. Why? Mention the conditions of material selection for the offshore industry. Define halogen corrosion. Define cathodic protection What is corrosion? What is rust PART – C (5 x 16= 80Marks) (a) Discuss briefly the various forms of corrosion with suitable examples Or (b) Explain the process of electroplating with suitable example. Mention the uses of electroplating (a) Explain the method of zinc coating by alloying and electrophoretic coatings. Or (b) Discuss briefly the methods of electro painting and powder coatings with suitable example.	oxidation resistance (a) Zinc (b) Magnesium (c) Chromium and aluminium (d) None of the above Passivity is due to (a) Higher EMF (b) Lower EMF (c) Oxide film (d) All of the In acidic environment the electrochemical corrosion occurs with the replacement of H+ ions by the metal, (a) Iron (b) copper (c) Iron and copper (d) None of the Intervention of the Iron acidic environment the electrochemical corrosion occurs with the replacement of H+ ions by the metal, (a) Iron (b) copper (c) Iron and copper (d) None of the Iron acidic environment is catalysed by which one of the following (a) Iron (b) Oxygen (c) Zinc (d) H+ PART - B (5 x 2= 10Marks) A copper equipment should not possess a steel component. Why? Mention the conditions of material selection for the offshore industry. Define halogen corrosion. Define cathodic protection What is corrosion? What is rust PART - C (5 x 16= 80Marks) (a) Discuss briefly the various forms of corrosion with suitable example. Or (b) Explain the process of electroplating with suitable example. Mention the uses of electroplating (a) Explain the method of zinc coating by alloying and CO2- U coatings with suitable example. (b) Discuss briefly the methods of electro painting and powder CO2- U coatings with suitable example.

- (b) Discuss briefly the methods of electro painting and powder CO3-U (16) coatings with suitable example.
- 19. (a) Explain briefly about the corrosion and prevention in concrete. CO4- U (16) Or
 - (b) Discuss briefly the corrosion damage and protection in marine CO4- U (16) environment,
- 20. (a) Explain briefly about the corrosion protection management in CO5-U various industries. (16)

Or

(b) Explain in detail the process maintenance procedures under CO5-U (16) corrosion environments.