

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018****Subject Code:2162108****Date:30/11/2018****Subject Name:Material Degradation and Prevention****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.

		MARKS
Q.1	(a) What do you understand by corrosion rate? Describe corrosion rate expression.	03
	(b) Discuss the importance of study the corrosion behavior of metals and alloys.	04
	(c) Justify the role of proper material selection and design aspects in corrosion protection with suitable examples of each.	07
Q.2	(a) Discuss the effect of anodic area and pH on corrosion rate.	03
	(b) With suitable example explain how corrosion can be used as an useful process.	04
	(c) Discuss the thermodynamic principle of corrosion and justify the requirement of reference electrode for corrosion study.	07
	OR	
	(c) What is galvanic series? Discuss it's applicability in corrosion studies. Also give limitations of galvanic series.	07
Q.3	(a) Explain the reason for breakdown of the passive layer in pitting corrosion.	03
	(b) Explain mechanism of inter granular corrosion in stainless steel.	04
	(c) Discuss causes, mechanism and way of prevention of crevice corrosion.	07
	OR	
Q.3	(a) Give the difference between Physical vapor deposition and chemical vapor deposition.	03
	(b) Draw passivity curve(s-curve) for active-passive metal and discuss it.	04
	(c) Write a note on Chemical degradation of non-metallic materials.	07
Q.4	(a) Prior to coating, metal surface needs cleaning. Comment on it.	03
	(b) Explain impressed current cathodic protection method.	04
	(c) What do you mean by Piling-Bedworth ratio? Discuss its importance and applications in corrosion study.	07
	OR	
Q.4	(a) Explain the difference between corrosion protection by noble coating and active coating with suitable examples.	03
	(b) Explain sacrificial anode cathodic protection method.	04
	(c) With the help of proper examples, explain that how the inhibitors are helpful in corrosion control.	07
Q.5	(a) Discuss the role of Plasma in surface engineering.	03
	(b) Explain evaporation Physical vapor deposition technique.	04
	(c) Explain the Pin on disk method used for wear rate measurement using schematic diagram.	07

OR

- Q.5 (a) During electroplating, pH of bath is strictly maintained. Give reason. 03
- (b) Describe Laser cladding technique for corrosion protection. 04
- (c) What do you mean by surface composites? Explain the method of surface modification by Friction stir processing. 07

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