

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI(NEW) – EXAMINATION – SUMMER 2019****Subject Code:2162108****Date:18/05/2019****Subject Name:Material Degradation and Prevention****Time:10:30 AM TO 01:00 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) List different reference electrodes used. 03  
(b) Brief about component of electrolytic cell. 04  
(c) Compare e.m.f. and galvanic series with their advantages and limitations. 07
- Q.2** (a) What are different ways of corrosion rate measurement? Briefly explain. 03  
(b) Explain faraday's law of electrolysis. 04  
(c) What are causes and preventive measures of pitting and crevice corrosion? Discuss mechanism of crevice corrosion. 07
- OR**
- (c) With example explain distance, area and environment effect in galvanic corrosion and briefly explain ways to combat galvanic corrosion and its beneficial effects. 07
- Q.3** (a) Explain pilling-bedworth ratio. 03  
(b) Briefly explain ways to combat high temperature corrosion. 04  
(c) What is polarization? Write in detail about different type of polarization. 07
- OR**
- Q.3** (a) List ways to prevent intergranular corrosion in 18-8 stainless steel. 03  
(b) Briefly explain selective leaching mechanism. 04  
(c) With suitable example discuss cathodic protection method. 07
- Q.4** (a) What is wear? List analytical methods to determine wear. 03  
(b) Explain with example how inhibitors can provide protection against corrosion? 04  
(c) Discuss any one method for wear measurement in detail. 07
- OR**
- Q.4** (a) Draw passivity curve and mention different region with corrosion rate. Also explain current density. 03  
(b) Briefly explain principle of corrosion occurring at pipe bend carrying water. 04  
(c) Write detail about anodizing process. 07
- Q.5** (a) What are different surface modification methods? List their advantages. 03  
(b) Discuss in very brief about principle for surface composite by friction stir processing and its advantages. 04  
(c) Write in detail about Physical Vapor Deposition. 07
- OR**
- Q.5** (a) Explain principle of sputtering for surface modification. 03  
(b) Briefly discuss use of plasma in surface modification. 04  
(c) Write in detail about Chemical Vapor Deposition. 07

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