

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V • EXAMINATION – WINTER • 2014****Subject Code: 152105****Date: 08-12-2014****Subject Name: Industrial Corrosion and its Prevention****Time: 10.30 am - 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) Define corrosion. Explain electrochemical theory of wet corrosion with example of zinc in hydrochloric acid solution. **07**
- (b) Discuss causes, mechanism and way of prevention of galvanic corrosion. **07**
- Q.2** (a) Discuss the significance of high temperature corrosion study. Write Pilling-Bedworth ratio and its applications. **07**
- (b) Discuss causes of Inter granular corrosion in stainless steel. Explain mechanism and methods to prevent it in stainless steel. **07**
- OR**
- (b) What is selective leaching? Discuss its causes and possible remedial measures. **07**
- Q.3** (a) Discuss the effect of water quality on corrosion in industries, with the help of suitable examples. **07**
- (b) Explain the need of corrosion testing. Describe the ASTM G 48 test for pitting corrosion testing. **07**
- OR**
- Q.3** (a) Discuss the mechanism of corrosion prevention by the use of inhibitors. Differentiate between cathodic and anodic inhibitors. **07**
- (b) What do you understand by corrosion rate? Explain Wet loss method for corrosion rate measurement. **07**
- Q.4** (a) What is e.m.f. series? Compare it with galvanic series for its applicability and limitations in corrosion studies. **07**
- (b) Describe the concentration polarization. Differentiate between concentration polarization and activation polarization. **07**
- OR**
- Q.4** (a) Derive Nernst equation for electrode potential. Mention applications and limitations of Nernst's equation in corrosion study. **07**
- (b) What do you mean by Tafel plot? Explain the use of Tafel plot in corrosion rate measurement. **07**
- Q.5** (a) Define Galvanizing. Explain Galvanizing Process. Give advantage & application of Galvanizing. **07**
- (b) Differentiate between sacrificial anode cathodic protection method and impressed current cathodic protection method. **07**
- OR**
- Q.5** (a) Define Metallic coating. Explain the mechanism of corrosion protection by noble coating and active coating with suitable examples of each. **07**
- (b) Justify the role of proper material selection and design aspects for corrosion protection with suitable examples of each. **07**

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