

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH (MECHANICAL/IP ENGG.) END SEMESTER EXAMINATIONS, NOVEMBER 2019

SUBJECT: PE – 1 CORROSION SCIENCE & ENGG. [MME 4015]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

✤ Answer ALL the questions.

- 1A. "Corrosion rate increases with increase in temperature of the medium" Is the 03 statement correct? If yes, justify. "Loss of product" is one of the consequences caused by corrosion. Which industries get affected by it and explain how?
- 1B. What are the environments that lead to the corrosion of materials? Explain how 03 corrosion initiates and progresses in these environments.
- 1C. Distinguish clearly between anodic and cathodic reactions. Discuss the roles played 04 by cathode and electrolyte in a corrosion cell.
- 2A. What are the basic elements of a corrosion cell? Explain the significance of each of 03 these elements.
- 2B. "Thin film of corrosion products formed on the surface always protects the substrate 03 from further corrosion in materials" Is this statement true? Discuss. What are the requirements of a good corrosion rate expression?
- 2C. Why General corrosion is termed as the corrosion having least importance from 04 engineering point of view? Explain the mechanism of general corrosion. What measures you will recommend to prevent this corrosion?
- 3A. How do you distinguish between pitting and contact corrosion. List the causes and 03 factors affecting contact corrosion in materials.
- 3B. What is the role played by sensitization temperature in intergranular corrosion? List 03 down the steps involved in the mechanism of intergranular corrosion of austenitic

steels. What does weld decay means? In which welding process it is more pronounced & why?

- 3C. Explain the term Polarization with help of a plot of potential (E) verses current (i). 04Distinguish between activation and concentration polarization with schematic representations.
- 4A. Explain the mechanism of Fretting corrosion with a suitable sketch. List down the 03 preventive measures employed to overcome fretting corrosion.
- **4B.** Discuss the following types of inhibitors used for corrosion prevention: **03**
 - Adsorption type inhibitors.
 - Scavengers.
 - Vapour phase inhibitors.
- 4C. Cathodic protection is employed by refineries for protecting their underground/ 04 buried pipelines. With a neat sketch, explain how it is used for corrosion protection of buried pipelines.
- 5A. What are the various types of corrosion tests employed by industries? Briefly explain 03 the highlighting features of these corrosion tests.
- **5B.** Write a short note on:
 - i. Specimen preparation for corrosion testing.
 - ii. Surface preparation prior to testing.
 - iii. Measuring and weighing the specimen.
- 5C. What is the significance of data recording in corrosion testing? What are the most 04 important data recorded during corrosion tests?

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