Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY

V SEMESTER B.TECH (MECHANICAL/I&P ENGG.) END SEMESTER MAKE-UP EXAMINATIONS, DECEMBER 2017

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

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitably assumed.
- 1A. Does temperature of the medium play a vital role in material corrosion? 03 Explain. "Contamination of the product" is one of the damages caused due to corrosion. Which industries get affected by it and explain how?
- 1B. List some of the important environments that lead to the corrosion of 03 materials. Also, explain the role played by these environments in corrosion reactions.
- 1C. Distinguish between anode and cathode of a corrosion cell. Discuss the 04 role played by anode in a corrosion cell.
- 2A. What is a reference electrode? Why Hydrogen electrode is theoretically 03 the most important reference electrode in use in aqueous solution? What are its limitations from practical application point of view?
- 2B. "Corrosion product formed on the surface always increases corrosion in materials" Is this statement true? Discuss. What are the requirements of a good corrosion rate expression?
- 2C. What are the primary causes of Uniform corrosion in materials? Explain 04 briefly the mechanism of uniform corrosion along with the anodic and cathodic reactions.
- 3A. Distinguish clearly between pitting and crevice corrosion. List the causes 03 and factors affecting crevice corrosion in materials.
- 3B. Explain the steps involved in the mechanism of intergranular corrosion 03 of austenitic steels. Explain the role played by chromium in the intergranular corrosion of steels.

- 3C. With a neat plot of potential v/s current, explain the term Polarization. 04
 Explain the concentration polarization during hydrogen reduction process.
- 4A. List down the characteristics and preventive measures used for 03 corrosion fatigue.
- **4B.** Discuss the following from corrosion prevention point of view: **03**
 - Metals and alloys
 - Purified metal
 - Non-metals
- **4C.** With a neat sketch, explain the application of Cathodic protection for **04** corrosion protection.
- 5A. List the various types of corrosion tests and briefly explain any three of 03 them.
- 5B. Write a short note on "Cleaning the specimen after exposure to the 03 medium".
- **5C.** With the help of a schematic representation, explain how Planned **04** interval tests are used for corrosion rate measurement.