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MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (OE I) END SEMESTER EXAMINATIONS,

JUNE 2017

SUBJECT: CORROSION ENGINEERING [MME 3281]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Draw neat sketches wherever applicable

- 1A.** How are the following engineering aspects affected by corrosion? **3**
a. Physical properties c. Dimensional Integrity
b. Impermeability
- 1B.** Justify the importance of corrosion study. **3**
- 1C.** Explain the use of a pourbaix diagram. List its limitations. Draw a pourbaix diagram for Fe- H₂O system and explain the different zones it. **4**
- 2A.** What are the various ways in which corrosion rate can be expressed? What are the qualities of a good corrosion rate expression? **3**
- 2B.** Discuss the role of following three inhibitors with example in controlling/ suppressing rate of corrosion. **3**
a. Hydrogen evolution poison c. Anodic inhibitors
b. Scavengers
- 2C.** Compare hydrogen electrode with a standard calomel electrode with reference to their construction and working. **4**
- 3A.** Compare the three different forms of Hydrogen damage. **3**
- 3B.** List and explain any six design rules to be followed to resist corrosion. **3**
- 3C.** List down the causes for crevice corrosion. Discuss any four factors that affect crevice corrosion? List any eight techniques that can be used to prevent such corrosion. **4**
- 4A.** Discuss the three types of barrier coatings used in controlling corrosion. **3**
- 4B.** What are the factors affecting fretting corrosion? **3**
- 4C.** List any eight characteristics of SCC. **4**

- 5A.** Discuss the precautions to be taken during surface preparation and weighing of the specimen in corrosion testing. **3**
- 5B.** Cathodic protection with external power supply was used to protect an underground steel tank. A pipe in close proximity to the steel tank corroded in few months' time. Identify the possible cause for corrosion. Suggest suitable measure to overcome such problem. **3**
- 5C.** List down the guidelines to be followed while recording corrosion test data **4**