Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B. TECH END SEMESTER EXAMINATIONS, JUNE 2019

SUBJECT: OE 1: CORROSION ENGINEERING [MME 3281]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Draw neat sketches whenever required using pencil only.

1A. Does the term “Corrosion applies to non-metals? If yes, explain with suitable examples of metals & non-metals subjected to corrosion. **03**

1B. Discuss the roles played by a corrosion engineer. How does a corrosion engineer differ from a corrosion scientist? **03**

1C. “Galvanic cell is a spontaneous corrosion cell”. Do you agree? If yes, why it is called a spontaneous cell? Explain with a suitable sketch. **04**

2A. With the help of a line diagram, explain the working principle of a reference electrode having a standard electrode potential of 0 Volts at all temperature conditions. **03**

2B. Explain the role of electrochemistry, metallurgy and thermodynamics in corrosion. Do the above factors affect corrosion rate? Explain. **03**

2C. What are the applications of E-pH Diagrams? Are these diagrams useful to corrosion engineer? What are the deficiencies of these diagrams? Discuss how the various zones of these diagrams help in the analysis of the corrosion problems. **04**

3A. What is meant by concentration polarization? With the help of a neat schematic representation, explain the process of concentration polarization during hydrogen reduction. **03**

3B. A component is subjected to uniform corrosion. Your superior advised you to take corrective measures. What are the possible alternate measures you may take to prevent failure of the component? **03**

3C. Discuss the causes of crevice corrosion. Analyze the factors that are to be accounted for, in crevice corrosion problems. **04**

4A. Explain clearly the mechanism of friction oxidation. Which are the places where friction oxidation leads to failure. **03**

4B.
i. Avoid electrical/physical contact between two dissimilar metals in the assembly. Why?
ii. Passivation is a must for anodic protection of structures. Why?
iii. Stray currents due to cathodic protection provided by two owners of different buried structures placed adjacent, leads to requirement of continuous current increase on both the structures. Why? **03**

4C. What general design rules do you recommend for a design engineer to incorporate the best corrosion resistance to the material during design phase? **04**

5A. What are the objectives achieved by corrosion testing? What precautions do you take during specimen preparation for corrosion testing? **03**

5B. What does aeration means? Is it a desirable phenomenon in corrosion? If not, how its effect is overcome? **03**

5C. What are the corrosion data to be recorded by the corrosionist after testing for the purpose of reporting to superiors or for future use? **04**