Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B. TECH END SEMESTER EXAMINATIONS, APRIL 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. What do you understand by the term "corrosion". Explain the following terms associated with corrosion:

a. Medium

b. Electrodes **03**

1B. If neglected, what corrosion leads to? Analyze the consequences of corrosion that hamper the working of plant & equipment and damage environment. **03**

1C. Discuss the characteristics of anodic and cathodic reactions. What role these two reactions play in corrosion process? **04**

2A. Write a neat sketch of a non-spontaneous cell, that requires external power source for its formation. Explain its working principle. **03**

2B. How do you do the selection of suitable material for a specific application? Discuss the various factors that determine the choice of engineering materials. **03**

2C. i. "With increase in temperature corrosion rate will increase". Why? Give appropriate reasons.

ii. "Area ratio is to be critically evaluated in corrosion problems". What is area ratio here? Why it is to be critically evaluated? **04**

3A. What do you mean by activation polarization? With a neat schematic, explain the steps involved in it. **03**

3B. A steel component is provided with a tin coating. Accelerated corrosion occurred after a brief period of its use. Can you identify the cause of it? Which category of corrosion has taken place? Explain how it can be corrected? **03**

3C. Why does the dislodgement of grains take place in inter-granular corrosion? Explain clearly the steps involved in the mechanism of failure due to inter-granular attack. **04**

4A. On the basis of which characteristic features, do you identify stress corrosion cracking (SCC)? Which are the surface defects that leads to crack initiation for SCC to occur? **03**

4B.
i. Generally alloys are more corrosive than pure metals. Why?
ii. Inhibitors are used in aqueous medium only. Why?
iii. Welding is better than riveting in tanks and other containers. Why? **03**

4C. Explain the principle of working of cathodic protection system provided for a buried tank with the help of suitable sketch. **04**

5A. How do you prepare the surface of the specimen for corrosion testing? Does the shape of the specimen surface effect corrosion rate? If yes, how it effects? **03**

5B. Explain clearly the various cleaning methods employed for specimen cleaning after exposure for corrosion testing. **03**

5C. Explain with suitable example, how planned interval test (PIT) is used to analyze the corrosiveness of medium and corrodibility of metal? **04**