Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

I SEMESTER B.TECH END SEMESTER EXAMINATIONS, DEC 2016/JAN 2017

SUBJECT: ENGINEERING CHEMISTRY [CHM 1001]

REVISED CREDIT SYSTEM

(31/12/2016)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Draw diagrams and write equations wherever necessary

1A Give reason for the following
(i) Thermosetting polymers cannot be reused and reshaped
(ii) Type II super conductor performs well at high magnetic field.

1B Write the principle and steps of calculation involved in the determination of GCV and NCV of solid fuel.

1C Define decomposition potential of an electrolyte. Explain the experimental determination of decomposition potential.

[2+3+5]

2A Justify the following statements:
(i) Boiler feed water should not be alkaline.
(ii) According to electrochemical theory of corrosion, more than one reduction reaction is feasible.

2B The EMF of the cell: $Cd \mid CdCl_2.\ 2.5\ H_2O$ (saturated) $\mid\mid$ AgCl $\mid Ag$ is 0.6753 V and 0.6915 V at 298 K and 273 K respectively. Calculate enthalpy change, free energy change and entropy change at 298 K.

2C State and explain any two requirements of secondary batteries. Explain the construction and working of Lechlanche dry cell.

[2+3+5]

3A Justify the following statements:

(i) Liquid crystals find application in display units and in thermometers.

(ii) Precursors used in chemical vapor deposition technique for the preparation of thin films have certain limitations.

3B Zinc and Copper electrodes are immersed in 0.001M $ZnSO_4$ solution and 0.1M $CuSO_4$ solution respectively. Write the cell representation,electrode reactions and calculate E.M.F of the cell at 298 K (Standard electrode potentials of Zn and Cu are − 0.76V and + 0.34V respectively)

3C Write a note on bimetallic corrosion and pitting corrosion. Explain in detail, with appropriate examples role of inhibitors in corrosion control.

[2+3+5]

4A Give reason for the following

(i) Activation polarization cannot be eliminated

(ii) Optimum current density is required for good electrodeposition

4B Define octane number. Explain any two types of reactions taking place during reforming.

4C What is the working principle of glass electrode? Derive an expression for glass electrode potential and explain the experimental determination of pH of given solution.

[2+3+5]

5A Give reason for the following:

(i) EMF series is not much useful in predicting the corrosion tendency of metals.

(ii) Metallic implants should be biocompatible

5B Find the poly dispersity index from the following data.

Number of Molecules	1	1	5	2	1
Mass of each Molecule	500	800	850	250	150

5C Define proximate and ultimate analysis of coal. Explain the manufacture of water gas.

[2+3+5]

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