

USN

ctions: H,I,J,K,L,M&N

NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belgaum)

II Sem B.E. (Credit System) Mid Semester Examinations – II, March 2014

13CY110 – ENGINEERING CHEMISTRY

ation: 1 Hour

Max. Marks. 20

Note: Answer any **One** full question from **each Unit**.

Unit – I

- | | |
|---|---|
| a) Describe the corrosion of iron based on electrochemical theory. | 4 |
| b) Discuss the following factors affecting the rate of corrosion | |
| i) Nature of corrosion product ii) pH | 3 |
| c) Explain the construction and working of $\text{CH}_3\text{OH}-\text{O}_2$ fuel cell. | 3 |
| a) Write a note on waterline corrosion and pitting corrosion. | 4 |
| b) What is metal coating? Explain the process of galvanization. | 3 |
| c) Define polarization. Describe any four factors affecting polarization. | 3 |

Unit – II

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|--|---|
| a) What causes alkalinity in water? During alkalinity determination, 100 ml of water sample required 10.8 ml of N/10 HCl till phenolphthalein end point. Another 5.2 ml of the same acid was further added for neutralization to methyl orange end point. Determine the type and amount of alkalinity. | 5 |
| b) Describe hot lime soda process for softening of boiler feed water. | 5 |
| a) Explain the Winkler's method to determine the dissolved oxygen in water. | 5 |
| b) Write a note on boiler corrosion. | 5 |

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Duration: 1 Hour

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*Note: Answer any **One** full question from **each Unit**.***Unit – I**

1. a) Helmholtz electrical double layer is the cause for origin of single electrode potential. Discuss. 3
- b) A cell is constructed by coupling Zn rod dipped in 0.5M ZnSO₄ and Ni rod dipped in 0.05M NiSO₄ solution. Write the cell representation, cell reaction and calculate the emf of the cell, given that standard reduction potentials of Zn and Ni are -0.76 and -0.25V respectively. 3
- c) What are ion-selective electrodes? Explain the experimental method of determination of pH of a solution using glass electrode. 4
- a) Derive Nernst equation for single electrode potential 3
- b) With a note on construction of calomel electrode, explain how its potential is a function of [Cl⁻]. 3
- c) Describe the construction of Pb-acid battery and give the reactions that occur during discharge. Mention its applications. 4

Unit – II

- a) Discuss the mechanism involved in free radical addition polymerization of styrene 5
- b) What is glass transition temperature? Discuss any four parameters affecting the glass transition temperature 5
- a) Explain the manufacture and applications of the following: (i) Polymethylmethacrylate, (ii) Phenol-formaldehyde 5
- b) Write a note on bead and emulsion polymerization 5

II - Chem.