



NMAM INSTITUTE OF TECHNOLOGY, NITTE
(An Autonomous Institution affiliated to VTU, Belgaum)

II Sem B.E. (Credit System) Mid Semester Examinations – I, January 2015

14CY110 – ENGINEERING CHEMISTRY

Max. Marks: 20

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

Unit – I

1. a) Derive the Nernst equation for the electrode reaction $Mg^{2+} + 2e^- \rightleftharpoons Mg$ at 298K 3
 - b) For the cell, $Fe | Fe^{2+}(0.015M) || Ag^+(0.13M) | Ag$, write the cell reaction and calculate the emf of the cell at STP, if standard electrode potentials of iron and silver are $-0.44V$ and $0.80V$ respectively. 3
 - c) Explain the construction and applications of lead-acid battery along with the reactions involved during discharging. 4
2. a) Justify the following: 3
 - (i) Calomel electrode potential depends on the concentration of Chloride ions.
 - (ii) Li metal used as anode in modern batteries.
 - b) Mention any two advantages of glass electrode. How is pH of unknown solution determined using glass electrode? 3
 - c) Explain the construction and working of Nickel-metal hydride battery. 4

Unit – II

- a) What is a syndiotactic polymer? Explain the free radical mechanism of addition polymerization taking vinyl chloride as an example. 5
 - b) Explain the following moulding techniques; 5
 - (i) Injection moulding
 - (ii) Extrusion moulding
- a) What is the role of polyvinyl alcohol in suspension polymerization? Explain the factors affecting the glass transition temperature. 4
 - b) Explain the synthesis and applications of the following polymers: 6
 - (i) Polycarbonate;
 - (ii) PMMA and
 - (iii) Butyl rubber

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Sem B.E. (Credit System) Mid Semester Examinations - II, March 2015

14CY110 - ENGINEERING CHEMISTRY

Max. Marks: 20

Duration: 1 Hour

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

Unit - I

1. a) Describe the construction and working of H_2-O_2 fuel cell 4
b) Justify the following
i) Cathodic coating should be continues for total protection against corrosion. 3
ii) Copper utensils should not be fitted with steel rivets. 3
c) Explain the techniques for cathodic protection
2. a) Describe the mechanism of wet corrosion, taking iron as example 4
b) Explain the following factors influencing the rate of corrosion.
(i) Electrode potential (ii) pH 3
c) What is anodization? Explain anodization of aluminium. 3

Unit - II

3. a) Explain the determination of hardness of water by complexometric method. 5
b) Write a note on electrodialysis and reverse osmosis. 5
4. a) Explain the causes and disadvantages of scale formation in boilers. 5
b) 100 ml of a water sample required 5ml of $n/50 H_2SO_4$ for neutralization to phenolphthalein end point. Another 20 ml of the same acid was needed for further titration to methyl orange endpoint. Determine the type and amount of alkalinity. 5
