Sessional 2

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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

Duration: 1 Hour

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;
   (i) Calomel electrode potential depends on the concentration of Chloride ions.
   (ii) Li metal used as anode in modern batteries. — 3
   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

3. 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;
   (i) Injection moulding (ii) Extrusion moulding — 5

4. 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:
   (i) Polycarbonate; (ii) PMMA and (iii) Butyl rubber — 6

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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.

      ii) Copper utensils should not be fitted with steel rivets. — 3

   c) Explain the techniques for cathodic protection — 3

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

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