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NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

II Sem B.E. (Credit System) Mid Semester Examinations - II, March 2017

16CY110 - ENGINEERING CHEMISTRY

Max. Marks: 20

Duration: 1 Hour

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

		Unit - I		Marks	BT*
1.	a)	Describe the construction and working of Li - ion battery.		4	L*2
	b)	Explain the following factors influencing the rate of the corrosion:		3	L4
		i) Electrode potential; ii) pH		3	L2
	c)	Explain the techniques of cathodic protection			
2.	a)	Explain the electrochemical theory of corrosion taking rusting of iron as an example.		5	L2
	b)	What is anodization? Explain anodization of aluminum.		3	L2
	c)	Give reason:			
		i) Zinc corrodes faster than aluminum although it is below aluminum in the electrochemical series.			
		ii) Pin holes or scratches on zinc-coated iron articles are less harmful to iron than those over tin-coated iron ones.		2	L5
		Unit - II			
3.	a)	Describe the determination of temporary and permanent hardness of water by complexometric method.		5	L2
	b)	Write a note on electrodialysis and reverse osmosis.		5	L2
4.	a)	Explain the hot-lime soda process for softening of hard water.		5	L2
	b)	Define BOD and COD. 25 mL of an industrial effluent sample requires 8.3 mL of 0.001M $K_2Cr_2O_7$ for complete oxidation. Calculate the COD of the sample.		5	L4

BT* Bloom's Taxonomy, L* Level



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NMAM INSTITUTE OF TECHNOLOGY, NITTE*(An Autonomous Institution affiliated to VTU, Belagavi)***II Sem B.E. (Credit System) Mid Semester Examinations - I, February 2017****16CY110 – ENGINEERING CHEMISTRY**

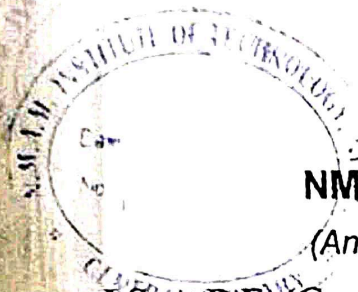
Duration: 1 Hour

Max. Marks: 20

Note: Answer any One full question from each Unit.

Unit – I		Marks	BT*
1.	a) Give the free-radical mechanism of addition polymerization taking styrene as an example.	5	L*3
	b) Give the synthesis and applications of the following polymers. i) Phenol-formaldehyde resin ii) Silicone rubber	3+2	L4
2.	a) Define glass transition temperature. Explain any four factors influencing glass transition temperature.	5	L3
	b) List any five deficiencies of natural rubber and give the synthesis and applications of epoxy resin.	5	L3
Unit – II			
3.	a) Derive the Nernst equation for a single electrode potential.	3	L
	b) What are reference electrodes? Compute the cell potential of the Ag^+/Ag couple with respect to Ni^{2+}/Ni , if the concentration of Ag^+ and Ni^{2+} are $5.1 \times 10^{-6} \text{ M}$ and $2.3 \times 10^{-3} \text{ M}$ respectively. $E^0_{\text{Ag}^+/\text{Ag}} = 0.80 \text{ V}$, $E^0_{\text{Ni}^{2+}/\text{Ni}} = -0.23 \text{ V}$	3	L
	c) Give the construction, working and any two applications of Pb-acid Battery.	4	
4.	a) i) Nickel spatula cannot be used in CuSO_4 solution. Why? ii) Calomel electrode is reversible with respect to the chloride ion concentration. Justify.	2	
	b) What are ion-selective electrodes? Explain the determination of pH of a solution using glass electrode.	4	
	c) Explain construction working and application of dry cell.	4	

T* Bloom's Taxonomy, L* Level



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NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

I.Sem B.E. (Credit System) Mid Semester Examinations - II, October 2017

17CY110 – ENGINEERING CHEMISTRY

Duration: 1 Hour

Max. Marks: 20

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

Unit – I

Marks BT*

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|----|--|---|-----|
| 1. | a) Explain the electrochemical theory of corrosion taking iron as an example. | 4 | L*3 |
| | b) Write a note on (i) Sacrificial Anode Method
(ii) Pitting Corrosion | 4 | L2 |
| | c) Cathodic metal coating must be continuous in order to prevent corrosion of base metal. Justify. | 2 | L5 |
| 2. | a) Elaborate on the role of corrosion inhibitors in corrosion prevention. | 4 | L2 |
| | b) How the following factors affect rate of corrosion?
(i) Nature of corrosion product (ii) pH | 3 | L4 |
| | c) Describe the construction and working of H ₂ -O ₂ fuel cell. Mention its one application. | 3 | L1 |

Unit – II

- | | | | |
|----|---|---|----|
| 3. | a) Explain the hot lime soda process for softening of hard water. | 5 | L1 |
| | b) Explain the conduction mechanism in polyacetylene. | 5 | L2 |
| 4. | a) Describe the Winkler's method to determine Dissolved Oxygen in water. | 5 | L2 |
| | b) Explain the Reverse Osmosis and Electrodialysis methods of desalination. | 5 | L2 |

BT* Bloom's Taxonomy, L* Level
