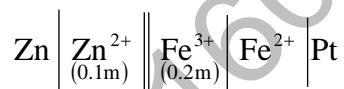


FACULTY OF ENGINEERING**B.E. I-Year (Suppl.) Examination, November / December 2016****Subject : Engineering Chemistry****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.**

- 1 Represent Quinhydrone electrode and write the electrodic reaction for reduction process. 2
- 2 Explain the principle involved in conductometric titrations? How it is better than volumetric titrations. 3
- 3 Explain Galvanic corrosion. 3
- 4 What are specifications of potable water? 2
- 5 Define i) a polymer and ii) degree of polymerization. 2
- 6 Explain the mechanism of conduction in polyacetylene. 3
- 7 Classify fuels with suitable examples. 3
- 8 Write the characteristics of good propellant. 2
- 9 Define acid value of a lubricant. What is its significance? 2
- 10 Explain hydrodynamic mechanism of lubrication. 3

PART – B (50 Marks)

- 11 a) Write the cell reaction and calculate the e.m.f of the cell at 250°C. 5



$$\left(E_{\text{Zn}^{2+}/\text{Zn}}^0 = -0.76\text{V} \right) \text{ and } \left(E_{\text{Fe}^{3+}/\text{Fe}^{2+}}^0 = +0.77\text{V} \right)$$

Is the cell reaction spontaneous.

- b) Write a note on Methanol-oxygen fuel cell. 5
- 12 a) What is a sacrificial anode? Mention its role in corrosion control? 4
- b) Calculate temporary and permanent hardness in the following 6
- Water sample containing $\text{Ca}(\text{HCO}_3)_2 = 10.5 \text{ ppm}$; $\text{Mg}(\text{HCO}_3)_2 = 12.5 \text{ ppm}$,
 $\text{CaSO}_4 = 7.5 \text{ ppm}$; $\text{CaCl}_2 = 8.2 \text{ ppm}$; $\text{MgSO}_4 = 2.6 \text{ ppm}$.
- 13 a) What do you understand by vulcanization of rubber? What are the advantages and disadvantages? 5
- b) What are composites? Explain the properties of composites. 5

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- 14 a) What is LPG? Give the typical composition, calorific value and industrial uses of LPG. 4
b) How do you determine the calorific value of a gaseous fuel by Junkers Calorimeter? Explain. 6
- 15 a) Classify liquid crystals and discuss their applications. 5
b) Discuss the phase diagram of Pb-Ag system and explain its application. 5
- 16 a) Derive Nernst equation and mention its importance. 5
b) Explain the Ion-exchange method of softening the hard water. 5
- 17 a) List the differences between addition and condensation polymerization. 4
b) A samples of coal was found to have the following percentage composition 6
C = 75% ; H = 5.2% ; O = 12.1% ; N = 3.2% and ash = 4.5%.
i) Calculate the minimum air required for complete combustion of 1 kg of coal.
ii) Also calculate the HCV and LCV of coal sample.
(Gross C.V. in K.cal/kg : C = 8,080 ; H = 34,500 ; S = 2,240)

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