

FACULTY OF ENGINEERING**B.E. I-Year (Main) Examination, April 2016****Subject : Engineering Chemistry****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

- 1 Represent Quinhydrone electrode and write the electrodic reaction for reduction process. 2
- 2 Draw the e.m.f. vs volume of titrant plot for i) strong acid vs strong base
ii) Fe^{2+} vs KMnO_4 . 3
- 3 Explain the mechanism of electrochemical corrosion. 3
- 4 What is break-point chlorination? Explain briefly. 2
- 5 Define addition and condensation polymers with suitable examples. 3
- 6 Explain the mechanism of conduction in polyacetylene. 2
- 7 What are the requirements of a good fuel? 2
- 8 What is trans esterification? Explain. 3
- 9 Define saponification number and mention its significance. 2
- 10 Write the principles of Green chemistry. 3

PART – B (50 Marks)

- 11 a) Calculate the e.m.f. of the following cell at 25°C . 5



$$\left(E^0_{\text{Zn}^{2+}/\text{Zn}} = -0.76\text{V}, E^0_{\text{Cu}^{2+}/\text{Cu}} = +0.34\text{V} \right)$$

- b) Explain the construction, working and applications of Lithium-ion batteries. 5
- 12 a) Discuss the factors that affecting the rate of corrosion. 6
- b) What are paints? Explain the constituents of a paint and mention their functions. 4
- 13 a) Explain the preparation, properties and applications of Bakelite. 6
- b) What are fibre reinforced composites? What are the advantages of such materials? 4
- 14 a) What are gross and net calorific value of a fuel? How would you express them in the case of gaseous fuel? 5
- b) How do you determine the calorific value of gaseous fuels by Junkers calorimeter? Explain. 5

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- 15 a) Classify liquid crystals and explain their applications. 5
b) Discuss the phase diagram of water system. 5
- 16 a) Define the term single electrode potential and derive the Nernst equation. 5
b) How do you determine the temporary and permanent hardness of water by EDTA method? Explain. 5
- 17 a) Write the differences between thermoplastics and thermosetting resins. 4
b) A sample of coal was found to contain the following constituents : C = 81% ; O = 8% ; S = 1% ; H = 5% ; N = 1% ; ash = 4%. Calculate the minimum amount of air required for the complete combustion of 1 kg of coal. Also calculate the percentage composition by weight of the dry products of combustion. Oxygen in air is 23% by weight. 6

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