# FACULTY OF ENGINEERING

### B.E. II – Semester (Main) Examination, June 2017

### Subject: Engineering Chemistry – II

**Time: 3 Hours** **Max.Marks: 70**

**Note: Answer all questions from Part A. Answer any five questions from Part B.**

### PART – A (20 Marks)

1  Explain why the specific conductance of an electrolyte decreases and equivalent conductance increases with dilution.

2  Represent quinhydrone electrode and write the electrodic reaction for reduction process and mention its S.R.P. value.

3  Differentiate primary and secondary battery.

4  Write the characteristics of fuel cells.

5  Corrosion of water filled steel tank occurs below the waterline. Give reason.

6  A copper equipment should not possess a small steel bolt. Why?

7  Define the terms:
   i)  HCV and
   ii) LCV

8  Define:
   i)  Octane and
   ii) Cetane numbers

9  Write any two applications of liquid crystals.

10 Explain the constituents of composites.

### PART – B (5x10 = 50 Marks)

11 a) Electrolytic conductance of a 0.01 N solution of acetic acid was found to be 0.000163 S.cm$^{-1}$ at 298 K. Calculate the degree of dissociation of the acid.

$$\left( \wedge^{\infty}_{(Acetic\ acid)} = 390.7\ s.cm^2.greq^{-1} at\ 298\ K \right).$$

   b) Explain various types of potentiometric titrations and draw the suitable graphs.

12 a) Explain lead-acid battery with suitable reactions.

   b) What are lithium ion batteries? Explain their advantages and applications.

13 a) Galvanization of iron articles is preferred to tinning. Give reason.

   b) What is corrosion of metals? Describe the mechanism of electrochemical corrosion by
   i) Hydrogen evolution and
   ii) Oxygen absorption

14 a) A sample of coal was found to have the following percentage composition.
   C = 75%, H = 5.2%, 0 = 12.1%, N = 3.2% and ash = 4.5%. Calculate the minimum air required for complete combustion of 1 kg of coal.

   b) Explain proximate analysis of coal and write its significance.

15 a) Discuss the advantages and applications of composites.
   b) Explain the principles of green chemistry.

16 a) Calculate the e.m.f. of the following cell at $25^{o}C$

   $$Zn \,|\, ZnSO_4 \,\|\, CdSO_4 \,|\, Cd$$
   $$\quad (0.1M) \quad (0.01M)$$

   The standard reduction potential of Zn and Cd electrodes at 298 K are -0.76 V and -0.40 V respectively.

   b) Write a note on Photovoltaic cells.

17 a) What is a paint? What are its constituents and explain their functions?
   b) Explain the different methods used in preparing the biodiesel and discuss its applications.

**\*\*\*\***