Hall Ticket No | | | | | | | | | | | Question Paper Code: AHS005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech I Semester End Examinations (Supplementary) - January, 2017

Regulation: IARE–R16

ENGINEERING CHEMISTRY

(Common to all branches)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) What is a galvanic cell? Explain the construction and working of galvanic cell with a suitable example. **[7M]**

   (b) A conductance cell containing 0.01 N KCl solution at 25^{o}C gave a resistance of 1250 ohms. If the specific conductivity of the solution is 0.0014087 ohm^{-1} cm^{-1} and the distance between the electrodes is 1.2 cm. Calculate **[7M]**

   i. cell constant and

   ii. equivalent conductance.

2. (a) Derive the Nernst equation for a single electrode potential. **[7M]**

   (b) What is a reference electrode? Give the construction and working of calomel electrode with reactions. **[7M]**

UNIT – II

3. (a) Explain the mechanism of corrosion by electrochemical theory. **[7M]**

   (b) Write a note on anodic and cathodic metal coatings. **[7M]**

4. (a) Write a brief note on Chemical corrosion (Oxidation corrosion). **[7M]**

   (b) What is cathodic metal coating? Describe tinning process of protecting iron sheet from corrosion. Why are tin coated iron sheets used in making containers used for storing food stuffs? **[7M]**

UNIT – III

5. (a) Describe the determination of dissolved oxygen by Winkler's method. **[7M]**

   (b) 50 ml of hard water sample required 18.5 ml of M/50 EDTA solution at the end point using EBT as indicator. The same volume of water after boiling and filtering, the filtered water required 12.3 ml of the same EDTA at the end point with the same indicator. Calculate the total, permanent, and temporary hardness of water. **[7M]**

6. (a) What is potable water? Discuss the principle and the process involved in the purification of water by reverse osmosis method. **[7M]**

   (b) Write a brief note on zeolite process .Why is calgon conditioning is better than phosphate conditioning? **[7M]**

UNIT – IV

7. (a) Write the synthesis, properties and applications of PVC and Teflon. **[7M]**

   (b) Define the term vulcanization of rubber. Mention its significance. **[7M]**

8. (a) Write a note on compounding of plastics and their functions. **[7M]**

   (b) Give preparation method and uses of the following polymers: **[7M]**

      i. Nylon (6,6)

      ii. Bakelite

UNIT – V

9. (a) What is cracking? Explain the process of fixed bed catalytic cracking of petroleum. **[7M]**

   (b) Explain Ultimate analysis of coal along with its significance. **[7M]**

10. (a) What is knocking? Explain the mechanism of knocking with relevant equations. **[7M]**

    (b) A sample of coal was found to have the following composition: C = 75%, H = 5.2 %. O = 12.1 %. N = 3.2 %, and ash = 4.5%. Calculate the amount of oxygen required for complete combustion of coal. **[7M]**