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Question Paper Code: AHS005



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.Tech I Semester End Examinations (Regular) - December, 2017

Regulation: IARE – R16

ENGINEERING CHEMISTRY
(Common for 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) I. Define the following terms and mention their SI units: [9M]
 - i. Molar conductance
 - ii. Equivalent conductanceII. Explain the construction and working of lead storage battery.
- (b) Define cell constant. A conductivity cell has two parallel plates of 1.3 cm^2 area placed at 11.50 cm apart, when filled with a solution of an electrolyte, the resistance was found to be 3.0×10^3 ohms. Calculate [5M]
 - i. Cell constant
 - ii. Specific conductance.
2. (a) I. Define secondary reference electrode? Give the construction and working of calomel electrode with reactions. [10M]
II. Derive the Nernst equation for redox reaction of the type: $M^{n+} + ne^- \rightarrow M$
- (b) How a battery is different from a cell? Mention the classification of batteries with example. [4M]

UNIT – II

3. (a) Explain the following factors on rate of corrosion [7M]
 - i. Nature of corrosion product
 - ii. pH of the medium.
- (b) Give reason [7M]
 - i. Iron mesh corrodes faster at the joints
 - ii. Rate of corrosion is less in dry atmosphere than in wet atmosphere.
4. (a) What is Corrosion? Explain the mechanism of electro-chemical theory of corrosion. [7M]
- (b) What is electro plating? Explain the process of electro plating of copper. [7M]

UNIT – III

5. (a) I. Describe the softening of water by ion-exchange process. [9M]
II. What is caustic embrittlement? Write its prevention.
- (b) 100 ml of hard water sample required 22.5 ml of M/100 EDTA solution at the end point using EBT as indicator. The same volume of water after boiling and filtering, the filtered water required 14.5 ml of the same EDTA at the end point with the same indicator. Calculate the total, permanent, and temporary hardness of water in ppm. [5M]
6. (a) What is the difference between hard water and soft water? Mention the salts responsible for permanent and temporary hardness. [7M]
- (b) Give reason [7M]
- Sodium salt of EDTA is preferred over EDTA in the determination of total hardness.
 - Estimate the total hardness of water by EDTA method

UNIT – IV

7. (a) Define polymerization. Distinguish between addition and condensation polymerization with examples. [7M]
- (b) Explain the synthesis of Teflon. Mention its applications. [7M]
8. (a) What are refractories? Mention their characteristics and classification. [7M]
- (b) Discuss the synthesis and applications of Buna-S. [7M]

UNIT – V

9. (a) I. What is a fuel? Classify them with suitable examples. [10M]
II. What is cracking? Discuss the fixed bed catalytic cracking method to obtain gasoline.
- (b) Define calorific value of a fuel. Distinguish gross and net calorific value. [4M]
10. (a) I. What is knocking? Explain the mechanism of knocking with relevant equations. [7M] II. Write the applications of CNG and LPG.
- (b) A sample of coal was found to have the following percentage composition: C = 75%; H = 5.2%; O = 12.1%; N = 3.2% and ash = 4.5%. Calculate [7M]
- The minimum air required for complete combustion of 1 kg of coal
 - GCV and NCV of coal sample.

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