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Question Paper Code: AHS005



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

Four Year B.Tech I Semester End Examinations(Supplementary) - July, 2018

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) Define electrode potential. Derive Nernst equation for electrode potential. [7M]
(b) What are reference electrodes? Explain construction & working of calomel electrode with a neat diagram. [7M]
2. (a) Define battery. Explain the construction, working and applications of Ni-Cd cell. [7M]
(b) A cell is formed by dipping Nickel rod in 0.01M Ni^{2+} solution and lead rod in 0.5M Pb^{2+} solution. The standard electrode potentials of Ni and Pb are -0.24V and -0.13V respectively. Write the cell representation, cell reactions and calculate any of the cell [7M]

UNIT – II

3. (a) Explain the electrochemical corrosion mechanism of resting in Iron. [7M]
(b) What is corrosion? Explain waterline corrosion and crevice corrosion. [7M]
4. (a) What is cathodic protection? Explain corrosion control by impressed current cathodic protection. [7M]
(b) Define metallic coating. Explain the method of tinning with a neat diagram. [7M]

UNIT – III

5. (a) Define temporary & permanent hardness of water. Calculate the temporary hardness & permanent hardness of a sample of water collected from a pond which contains 16.2mg of $Ca(HCO_3)_2$, 29.2mg of $Mg(HCO_3)_2$, 33.3mg of $CaSO_4$, 18.0mg of $MgSO_4$ and 55.0mg of NaCl per liter of water. [7M]
(b) Define priming and foaming. Explain the formation of scales & sludger in boilers. [7M]
6. (a) Describe the method of softening of water by zeolite process. Mention its advantages and disadvantages. [7M]
(b) What is potable water? Explain sterilization of water by chlorination and ozonation. [7M]

UNIT – IV

7. (a) What are polymers? Explain preparation, properties and applications of poly vinyl chloride and Teflon. [7M]
- (b) Define polymerization. Explain addition, condensation and co-polymerization with examples. [7M]
8. (a) What are elastomers? Explain synthesis, properties and applications of Buna-s and Thiokol rubber. [7M]
- (b) Define these terms: Cement, lubricant, viscosity, flash point, fire point, cloud point and pour point [7M]

UNIT – V

9. (a) What is a fuel? Explain proximate analysis of coal and give the significance of proximate analysis. [7M]
- (b) Define cracking. Explain fixed bed catalytic cracking with neat diagram. [7M]
10. (a) What is knocking? Explain octane number and cetane number. [7M]
- (b) What is calorific value. Distinguish between gross calorific value and net calorific value. Explain their relation. [7M]