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Question Paper Code: AHSB03



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech I Semester End Examinations (Regular) - November, 2018

Regulation: IARE – R18

## ENGINEERING CHEMISTRY

Time: 3 Hours

(Common to CSE | IT | EEE)

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) Write a detailed note on electrochemical series. [7M]  
(b) Describe the construction and working of Lead acid battery with reactions occurring during charging and discharging [7M]
2. (a) Distinguish galvanic corrosion and pitting corrosion. Explain its mechanism. Why we need to prepare both nut and bolt in same metal? [7M]  
(b) Explain how cathodic protection is useful in controlling corrosion? [7M]

### UNIT – II

3. (a) Define the term hardness of water? Differentiate between temporary and permanent hardness of water. Define the various units of hardness and write the relation between them. [7M]  
(b) Write a detailed note on internal treatment methods of softening of water by Calgon method and phosphate condition. [7M]
4. (a) Explain ion exchange process used to soften water? Why is it considered as the best method to soften hard water? [7M]  
(b) Explain the term reverse osmosis? How can be it used to obtain fresh water from sea water? [7M]

### UNIT – III

5. (a) What is doping? Explain in detail how does doping effect on conductance? [7M]  
(b) Draw the molecular orbital energy level diagram of  $O_2$  and NO molecules and calculate its bond order? [7M]
6. (a) Explain in detail about  $N_2$  and CO molecules with neat sketches of energy diagrams. [7M]  
(b) Write the salient features of CFT Explain the transition metal ion d-orbitals splitting in square planar geometries. [7M]

#### UNIT – IV

7. (a) What is nucleophilic substitution reaction? Write the mechanism of  $SN_1$  and  $SN_2$  reactions. [7M]  
(b) Explain Markownikoff and anti Markownikoff's addition rule with suitable example. [7M]
8. (a) Explain the structure, synthesis and applications of Paracetamol. [7M]  
(b) What is Saytzeffs rule? Explain the rule with suitable examples. [7M]

#### UNIT – V

9. (a) How the ultimate analysis of coal is carried out and write its significance [7M]  
(b) Write a short note on [7M]  
i. Cetane number  
ii. Applications of CNG
10. (a) Define octane number. Explain the composition, properties and application of LPG. [7M]  
(b) The percentage composition of a sample of bituminous coal was found to be as under: C = 75.4%; H = 5.3%; O = 12.6%; N = 3.2%; S = 1.3% and Ash = rest. Calculate the minimum weight of air necessary for complete combustion of 1 Kg of coal. Oxygen in air is 23% by weight. [7M]

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