



## I B.Tech I Sem Regular Examination, December 2019

**CHEMISTRY**  
 (EEE, CSE & IT)

Time: 3 Hours.

Max. Marks: 70

Note: 1. This question paper contains two parts A and B.

2. Part- A is Compulsory. Answer all Questions which carries 20 marks.

3. Part – B consists 5 units. Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

**PART- A****(10 x 2 Marks = 20 Marks)**

1. a) Define LCAO (Linear combination of Atomic orbital) 2 M
- b) Explain the effect of doping on conductance. 2 M
- c) Calculate the hardness of a sample of water having the following composition  $\text{Ca}(\text{HCO}_3)_2=243$  mg/litre,  $\text{MgSO}_4=240$  mg/litre, mol.wt 162 and 120 respectively. 2 M
- d) Illustrate the characteristics of potable water. 2 M
- e) Define the terms Single electrode potential and Standard electrode potential. 2 M
- f) What is galvanic and pitting corrosion? 2 M
- g) Explain Enantiomers and Diastereomers with an example each. 2 M
- h) Predict the products  
 1.  $\text{CH}_3\text{-CH=CH}_2 + \text{HBr} \rightarrow$  2 M  
 2.  $\text{CH}_3\text{-CH=CH}_2 + \text{HBr/R-O-O-R} \rightarrow$
- i) Write the selection rules of Vibrational rotational spectra. 2 M
- j) What causes a chemical shift in NMR Spectroscopy? 2 M

**PART - B****(5 x 10 Marks = 50 Marks)**

- 2 a) Explain in detail Molecular orbital energy level diagram of  $\text{N}_2$  molecule. 5 M
- b) Write the salient features of Crystal Field Theory. 5 M

**OR**

- 3 a) Explain the  $\pi$  molecular orbital of benzene. 5 M
- b) Write a detailed note on Band structure of solids. 5 M

- 4 a) Explain the principle involved in the determination of hardness of water by complexometric method. 5 M  
b) Describe briefly the desalination of water by Reverse Osmosis method. 5 M

**OR**

- 5 a) Discuss briefly the softening of hard water by Ion exchange process. 5 M  
b) Write a note on Calgon and Colloidal conditioning. 5 M

- 6 a) The emf of the cell, Pt Hg, Hg<sub>2</sub>Cl<sub>2</sub>(s) / Cl<sup>-</sup>(sat) // H<sup>+</sup>(Unknown) / Q, QH<sub>2</sub> is 0.12V at 298K. Calculate the pH value of the solution given that E<sub>SCE</sub> is 0.2415 and E<sup>0</sup>QH<sub>2</sub> is 0.699V 5 M  
b) What is Cathodic protection? Explain briefly about sacrificial anodic method. 5 M

**OR**

- 7 a) Explain the reactions occurring during discharging and charging in Lead-acid storage battery. 5 M  
b) Discuss the various factors affecting rate of corrosion. 5 M

- 8 a) Explain the mechanism of SN<sup>1</sup> and SN<sup>2</sup> reaction with suitable examples. 10 M

**OR**

- 9 a) Write the structure, synthesis and pharmaceutical applications of paracetamol 5 M  
b) Write a note on Hydroboration of Olefins. 5 M

- 10 a) Write the selection rules & applications of Vibrational rotational spectra in detail. 10 M

**OR**

- 11 a) Write the applications of NMR spectroscopy. 5 M  
b) Explain about MRI (Magnetic Resonance Imaging) 5 M

---oo0oo---