

Roll No.

Total No. of Pages: 02  
Total No. of Questions: 09

B.Tech (Sem.-1<sup>st</sup> & 2<sup>nd</sup>)  
**ENGINEERING CHEMISTRY**  
Subject Code: CH-101  
Paper ID: [A0110]

Time: 3 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATE:**

(i) Question no. 1 is compulsory.

(ii) Attempt five question from part A and part B with at least two questions each from part A and part B

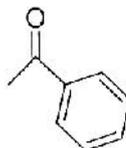
**Q.1. Short Answer Questions:-**

- Why does the  $\text{Mg}(\text{HCO}_3)_2$  require double amount of lime for softening.
- Describe reason for cracking
- With reference to chromatography explain (a) retention time (b) retention factor
- What is the difference electrode potential and cell e.m.f
- Differentiate between singlet and triplet state
- Define isotactic polymers
- Explain Beer-Lambert Law
- Explain the selection rule of UV-vis Spectroscopy
- Determine the number of components, number of phase and degree of freedom on the following equilibria



When  $P(\text{NH}_3) = P(\text{HCl})$

- (J) Which of the following will absorb at higher wave number for C=O stretching



**PART -A**

**Q.2.**

- Describe the methods of the treatment of municipal water.
- Calculate the amount of lime and soda required for softening 90,000 liters of water containing the following salts per liter:  $\text{Ca}(\text{HCO}_3)_2 = 162\text{mg}$ ,  $\text{CaSO}_4 = 136\text{mg}$  and  $\text{NaCl} = 56.1\text{mg}$ . purity of lime is 92% and soda is 99%

- Q.3. Explain the electrochemical mechanism of rusting of iron in humid atmosphere. Discuss any four that affect the rate of corrosion.
- Q.4. Compare the working of HPLC with column chromatography
- Q.5. Explain the construction and working of (a) dry cell (b) lead storage battery (c) hydrogen-Oxygen fuel cell

**PART -B**

- Q.6. Draw a well labelled Jablonski diagram and explain (a) Intersystem crossing (b) Phosphorescence
- Q.7. (a) Explain principles of NMR Spectroscopy (b) Butadiene shows absorption at higher wavelength than ethene. why?
- Q.8. Discuss the NMR Spectra of the following compounds (a)  $\text{CH}_3\text{COOCH}_3$  (b)  $\text{CH}_3\text{CH}_2\text{CH}_3$  (c)  $\text{CH}_3\text{OCH}_3$  (d)  $\text{CH}_3\text{COOCH}(\text{CH}_3)_2$
- Q.9. State and explain phase rule, Describe phase diagram of potassium, iodine-water system nicotine-water system

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