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

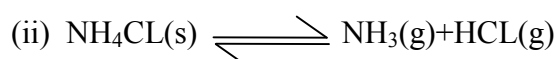
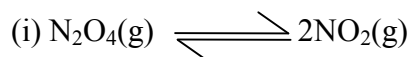
B.Tech (Sem.-1st & 2nd)
ENGINEERING CHEMISTRY
Subject Code: CH-101
Paper ID: [A0110]

Time: 3 Hrs.

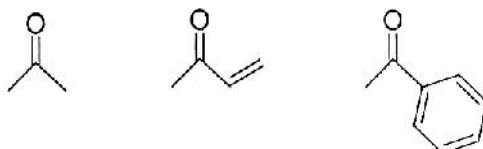
Max. Marks: 60

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:-**

- (a) Why does the $Mg(HCO_3)_2$ require double amount of lime for softening.
- (b) Describe reason for cracking
- (c) With reference to chromatography explain (a) retention time (b) retention factor
- (d) What is the difference electrode potential and cell e.m.f
- (e) Differentiate between singlet and triplet state
- (f) Define isotactic polymers
- (g) Explain Beer-Lambert Law
- (h) Explain the selection rule of UV-vis Spectroscopy
- (i) Determine the number of components, number of phase and degree of freedom on the following equilibria

When $P(NH_3) = P(HCl)$

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

**PART -A**

- Q.2.**
- (a) Describe the methods of the treatment of municipal water.
 - (b) Calculate the amount of lime and soda required for softening 90,000 liters of water containing the following salts per liter: $Ca(HCO_3)_2 = 162mg$, $CaSO_4 = 136mg$ and $NaCl = 56.1mg$. 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) CH_3OCH_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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