

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (2009-2010 Batches) (Sem.-1,2)

ENGINEERING CHEMISTRY

Subject Code : CH-101

Paper ID : [A0110]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION-B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION-B & C.

SECTION-A

1. Write briefly :

- a) Explain temporary and permanent hardness of water.
- b) Describe reason for cracking
- c) What is partition chromatography?
- d) What is the difference electrode potential and cell e. m. f.?
- e) Explain photosensitization.
- f) Write the definition of Eutectic point.
- g) In IR spectroscopy why the region below 1500 cm^{-1} is called as fingerprint region?
- h) Explain the selection rules of UV-vis Spectroscopy.
- i) What is metastable state?
- j) Which of the following will absorb at higher wave number for C=O stretching?

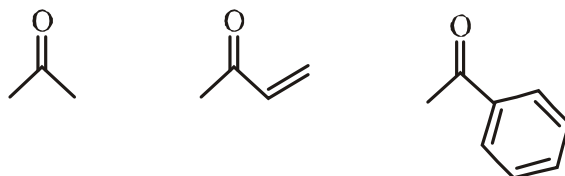


Fig.

SECTION-B

2.
 - a) Describe the methods for 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 : $\text{Ca}(\text{HCO}_3)_2 = 162 \text{ mg}$, $\text{CaSO}_4 = 136 \text{ mg}$ and $\text{NaCl} = 56.1 \text{ mg}$. Purity of lime is 92 % and soda is 99%.
3.
 - a) Explain the electrochemical mechanism of rusting of iron in humid atmosphere.
 - b) Discuss protective measure for controlling corrosion.
4.
 - a) Explain the need of chromatogram. Discuss various methods used for development and visualization of chromatogram.
 - b) What is the significance of R_f ? How it can be calculated experimentally?
5.
 - a) What is over voltage? Discuss the factors affecting the overvoltage value.
 - b) Discuss the conductometric titration involving a HCl and a KOH.

SECTION-C

6. Draw a well labeled Jablonski diagram and explain.
 - a) Intersystem crossing
 - b) Phosphorescence
7.
 - a) Explain Principles of UV-Vis Spectroscopy.
 - b) On the basis of IR spectroscopy, how can you distinguish between the following :
 - (i) Alkane, alkene and alkyne
 - (ii) Aldehyde and ketone
8.
 - a) Discuss spin-spin relaxation in NMR spectroscopy
 - b) Draw and explain the splitting pattern observed in the ^1H NMR of $\text{CHCl}_2\text{CH}_2\text{Cl}$
9. State and explain phase rule, Describe phase diagram of :
 - a) Potassium iodide-water system
 - b) Nicotine-water system