[Total No of Questions: 09]   [Total No of pages: 03]

Uni. Roll No...........

Program: B.Tech. (Batch 2018 onward)

Semester: I

Name of the Subject: Chemistry

Subject Code: BSC-105

Paper ID:15933

**Time Allowed:03 Hours**   **Max. Marks: 60**

NOTE:

1) Part A and Part B are compulsory

2) Part-C has Two Questions Q8 and Q9. Both are Compulsory, but with internal choice.

3) Any missing data may be assumed appropriately.

4) Scientific Calculator is allowed.

Part-A   [Marks: 02 each]

Q1.

a) List any two reasons for less crystal field splitting in tetrahedral complexes than in octahedral complexes

b) What is caustic embrittlement? Suggest any one method for its prevention.

c) Define Chemical shift and Coupling constant.

d) Define erythro and threo isomers. Quote one example also

e) What is conjugate acid base pair?

f) Using Woodward-Fieser rule , calculate the value of wavelength maxima for:

$(CH_3)_2$ -C=CH-CO-CH$_3$
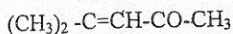
Part-B   [Marks: 04 each]

Q2. Write a short note on following type of intermolecular forces :(a) Induced dipole - Induced dipole and (b) ion-dipole .

P.T.O

(4)

b) Explain and draw high resolution NMR of: $CH_3 - CH_2Cl$

c) (i) Calculate the transmittance, absorbance and molar extinction coefficient of a 0.25 M solution which absorbs 90% of an incident radiation passing through 1cm cell.

(ii) The wave no for C=O in $HCHO, CH_3CHO$ and CH_3COCH_3 is not same but is 1750,1745 and 1715 cm^{-1} respectively. Explain. (4)

Q9. a) Discuss Markownikov's rule with help of an example. What is the exception to this rule? (4)

b) Discuss the change in potential energy during rotation about C_2-C_3 single bond in n-butane. (4)

(4)

c)(i) Calculate equilibrium constant for the reaction:

$Cu(s) + 2Ag^+ (aq) \leftrightarrow Cu^{2+} (aq) + 2Ag(s)$; $(E^0 cell = 0.46V)$

(ii) The solubility of $Mg(OH)_2$ is 1.518 X 10^{-4} M at 285K. Calculate its solubility product.

OR

9a) Draw labelled diagram of water system and discuss different points, curves and areas.(4)

b) Discuss (i) mechanism of electrophilic monosubstitution in benzene. (ii) Saytzeff rule. (4)

c) Write down the cell reaction of following cell:

$Zn | Zn^{2+} (0.1M) || Cu^{2+} (0.175M) | Cu(s)$ at 25^0 C.

$E^0_{Zn 2+/ Zn} = -0.76V$ and $E^0_{Cu 2+ / Cu} = 0.34V$

(4)

Also calculate the ΔG of this cell.

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