Please check that question paper contains 9 questions and 3 printed pages within first ten minutes

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

Uni. Roll No..... Program/Course: B. Tech. SemI/II

Name of the Subject: Chemistry MORNING

Subject Code: BSC-105 08 MAY 2019

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.

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 calgon conditioning? Why it is used?

c) A solution shows a transmittance of 20% when taken in a cell of thickness 2.5m. calculate its concentration if molar extinction coefficient is 12000 L /mol/cm.

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

e) What is metastable equilibrium? Discuss with help of an example.

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

CH2=C (CH3)-CH=CH-C(CH3) =CH2

Part-B **[Marks: 04 each]**

Q2. Discuss crystal field energy level diagram for a d^6,weak field, octahedral complex.

Q3. Name the type of isomerism shown by following:

CH_3-CO-CH_2-CO-CH_3 ↔ CH_3-CO-CH=C(OH)-CH_3

Also differentiate these two on basis of NMR .

Q4. What is disinfection of water? Discuss the process of chlorination of water for its disinfection, in detail.

Q5. Discuss the critical temperature and supercritical fluids.

Q6. Draw a well labelled diagram of Pb-Ag system and discuss the eutectic.

Q7. Assign R and S configuration to the following :

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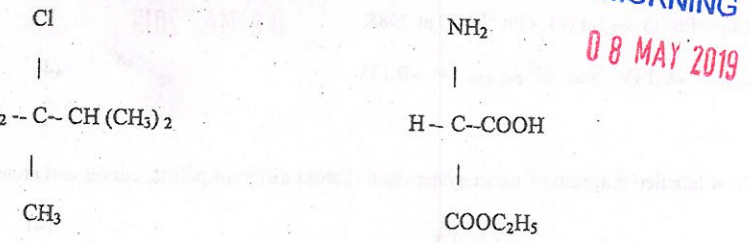

Part-C **[Marks: 12each]**

Q8. a) A sample of water has following impurities (in ppm) per litre of water. Calculate the amount of lime(90% pure) and soda(85% pure), required to make this water soft: Ca^{2+} =80,Mg^{2+}=36, K^+=39,$HCO3^-$ =244 and FeSO4.7H2O=69.5 (4)

b) Define the following and list the reasons in each case: Bathochromic shift, Hypsochromic shift , Hyperchromic shift, Hypochromic shift. (4)

c) Write a note on vibrations shown by molecules on absorption of IR energy, with help of diagram. (4)

OR

8 a) what is ion exchange resin? How this can be used for softening of water? List any two major advantages of its use. (4)

b) Explain and draw high resolution NMR of: CH_2Cl - $CHCl_2$ (4)

c) Differentiate the following in the basis of (a) UV-VIS spectroscopy and (b) IR spectroscopy : $(CH_3)_2$-C=CH-CO-CH_3 ↔ CH_2=C (CH_3)-CH_2-CO-CH_3 (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)

c) Calculate equilibrium constant for the reaction:

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Sn^{2+} (aq) +Pb (s) ↔ Sn (s) +Pb^{2+} (aq) at 298K.

$E^0_{Sn\,2+/Sn}$ = -0.14V and $E^0_{Pb2+/Pb}$ = -0.13V (4)

OR

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

b) Discuss mechanism of elimination reaction. (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

Also calculate the ΔG of this cell. (4)

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