CY-101/1844

B.Tech. (Semester-I) Examination–2018

Chemistry

Time: Three Hours

Maximum Marks: **100**

Note: Attempt questions from all the sections.

Section-A

(Short Answer Type Questions)

Note: Attempt any ten questions. Each question carries 4 marks. **(4x10=40)**

1. What are hydrogen bonds? How they affect the physical properties of organic compounds?

2. What are liquid crystals? Briefly describe the application of liquid crystal in electronic industry.

3. N_2O_4 decomposer into NO_2 as

$$N_2O_4(g) \rightleftharpoons 2NO_2(g)$$

If the pressure of N_2O_4 falls from 0.46 atm to 0 28 atm in 30 mts. What is the rate appearance of NO_2?

- invariant system.

4. What do you understand by hyperconjugation? Explain with examples.

5. Comment on:-
   (a) Concentration cells
   (b) Fuel cells

6. What is corrosion? Give theory of rusting of Iran.

7. Write short notes on:-
   (a) Carbocation
   (b) Free radicals

8. Explain the mechanism of nucleophilic substitution reaction.

9. What is essential condition for optical isomerism? Explain with examples.

10. Briefly describe the E-Z nomenclature.

11. What do you understand by Elastomegs and synthetic fibres? Explain with suitable examples.

12. What are polymers? Why are they called macromolecules?

13. Write notes on mesomeric effect.

14. Define Bragg's equation for diffraction of X-ray by crystals.

15. Explain the red-shift & blue-shift.

16. Disuses briefly the application of IR-Spectroscopy in organic chemistry

Section-B

(Long Answer Type Questions)

Note: Attempt any three questions. Each question carries 20 marks. **(20x3=60)**

1. Explain the term phase, component and degree of freedom. Draw the phase diagram of water system and describe it.

2. Explain the mechanism of the following:-
   (a) Hoffmann rearrangement
   (b) Aldol condensation
   (c) Beckmann rearrangement

3. (a) Explain the construction of Galvanic cell.

   (b) What is normal hydrogen electrode? Explain

4. What type of information is obtained from UV, IR, and NMR Spectra for elucidating the structure of an organic compound?

5. (a) Give brief description of natural and synthetic rubbers?

   (b) What is Vulcanization? How it improves the properties of natural and synthetic rubbers?

6. (a) Why NH_3-NH_4Cl butter solution is added in determination of hardness of water by EDTA method?

   (b) Explain Zeolite method for softening of the hard water.

CY-1858

B.Tech.(Semester-II) Exam-2018

Engineering Chemistry

Time: Three Hours

Maximum Marks: **100**

Note: Attempt questions from all the sections.

Section–A
(Short Answer Type Questions)

Note: Attempt any ten questions. Each question carries 4 marks. **(4x10=40)**

1. Explain 1 eqiv. of $Al_2(SO_4)_3$ required 1 eqiv. of $Ca(OH)_2$ for softening purposes.

2. 100ml of water sample has a hardness equivalent to 12.5ml of 0.08N $MgSO_4$. What is the hardness in ppm?

3. What do you mean by proximate analysis of coal? Why is it so called?

4. What is an invariant system? Give an example of invariant system.

Explain the terms eutectic point and a eutectic mixture.

6 Predict whether the reaction:
$2Ag_{(s)} + Zn^{2+}_{(aq)} \rightarrow 2Ag^{+}_{(aq)} + Zn_{(s)}$ is feasible or not.

7. Why KHF_2 exists but $KHCl_2$ does not?

8. Aluminum forms a face-centered cubic lattice whose unit cell edge length is 404pm. Calculate the density of aluminum.

9. Discuss Fullerenes and their applications.

10. Calculate the possible number of fundamental bonds in Co_2 molecule.

11. What is meant by the term chemical shift?

12. How is the half life period of a first order reaction related to its rate constant?

13. What are the different types of organic reactions? Explain them with one example each.

14. Explain optical isomerism of chiral organic compounds.

15. Describe the mechanism of Beckmann rearrangement.

Section –B
(Long Answer Type Questions)

Note: Attempt any three questions. Each question carries 20 marks. (20x3=60)

1. Calculate the amount of lime(92%pure) and soda(98% pure) required for treatment of 30,000 litres of water whose analysis is as follow. $Ca(HCO_3)_2$=40.5ppm, $Mg(HCO_3)_2$=36.5ppm, $MgSO_4$=30.0ppm, $CaSO_4$=34.0ppm, $CaCl_2$=27.75ppm, NaCl=10.0ppm.

2. Describe the construction of a simple electrochemical cell. Indicate the positive and negative electrode. What are the reaction taking place at these electrodes? Give the overall reaction and cell diagram.

What is Stereoisomerism? Explain with example. Describe the optical isomerism of an organic molecule having two asymmetric carbon atoms.

What is II order reaction? What are its main characteristics? Explain the kinetic of II order reaction.

Determine the concentration of cd^{2+} ions in the following electrochemical cell.

$$\frac{Zn}{Zn^{2+}_{(0.1m)}} // cd^{2+}_{(xm)} / cd$$

Given $\frac{E^0_{Zn^{2+}}}{Zn} = -0.76v$

$E^0_{cd^{2+}}/cd = -0.40v$

$E_{cell} = 0.3305\ v$ at 298 k.

(a) Describe the Radius Ratio rule.

(b) Draw the MO's diagram for Nitric Oxide and Hydrogen Fluoride molecule. Give its bond order.