Mid-West University

Examinations Management Office

Final Examinations-2079

Bachelor level/ B.Sc/ 3rd Semester — Full Marks : 60
Time: 3 hours — Pass Marks: 30

Subject: Fundamentals of Chemistry-III (CHEM435/335)

Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate full marks.

Inorganic Chemistry

Long answer questions (attempt any two) [2x5=10]

1) Describe the extraction of Aluminium from its ores. What is alum?
2) Write the preparation and structure of fullerene. Write one application.
3) Write short notes on **(any two)**
   a) Liquid ammonia as solvent b) Two electron -3 centered bond c) Preparation and properties thionyl chloride

Very short answer Questions (attempt any five) [5x2=10]

4) Define ionization potential. Write its periodic trends in group.
5) What is inert pair effect? Give an example.
6) Write in brief about cement and its types?
7) Define acid rain and its effect.
8) Define chlorophyll along with its structure.
9) Why iodine is highly electropositive in nature in halogen family?
10) Define the following terms; carbides and borax.

Organic Chemistry

Long answer questions (attempt any two) [2x5=10]

1) Write the postulates of Baeyer strain theory. Write its success and limitation. Which theory supports the stability of larger ring compounds? Explain in brief. [2.5+1+1.5]
2) Benzene does not give positive unsaturation test with Br_2 though it has π bonds. Give reason. What are electrophilic aromatic substitution reactions? Give examples. Outline the general mechanism of these types of reactions with energy profile. [1+1+0.5+2+0.5]
3) Write short notes on:
   a) Aldol condensation (only base catalysed)
   b) Acid catalysed halogenation of carbonyl compounds [2.5+2.5]

Very short answer Questions (attempt any five) [5x2=10]

4) Define cycloalkanes. Suggest a method to synthesize cyclopentane.
5) Draw the possible chair conformations of methyl cyclohexane. Label the axial and equatorial bonds.
6) Enlist the requirements for a compound to be aromatic. Using these characteristics, tell whether cyclopropenyl carbocation is aromatic or not.
7) NO_2 is meta directing group, what does it mean? Draw the possible resonating structures of nitrobenzene.
8) What is Wittig reaction? Give example.
9) Write the isomers of C_3H_6O. Write the chemical reactions of these isomers with I) Tollens' reagent. II) I_2/NaOH
10) A 2^o alkyl halide (X) on dehydrohalogenation gives and alkene(Y). On ozonolysis of (Y), Propanal and Methanal are formed. Identify (X) and (Y).

Physical Chemistry

Long answer questions (attempt any two) [2x5=10]

1) Derive integrated rate law equation for second order kinetics. In the saponification of ethyl acetate by NaOH at 25^oC using equivalent concentration, the reaction was examined by titrating 25ml of the reaction mixture at different time interval against standard acid. From the given data show that saponification of ethyal acetate by NaOH obeys second order kinetics [3+2]

Time (minutes)	0	5	15	25	35
Volume of acid used (ml)	16.00	10.24	6.13	4.32	3.35

2) Draw a well label diagram for showing radiative and non-radiative transition in singlet and triplet states mechanism. How does Florescence, Phosphorescence and photosensitization occur. Explain

[2+3]

3) What is Hittorf's number? Prove that $t_+ + t_- = 1$
The speed ratio of silver and nitrate ions in aqueous solution of silver nitrate is found to be 0.92. Calculate the transport number of Ag+ and NO_3^- ions. [1+3+1]

Very short answer Questions (attempt any five) **[5x2=10]**

4) Define rate law and rate constant.
5) The first order rate constant for decomposition of Nitrogen Pentoxide at 0^oC is $7.87x10^{-7}$ minutes^{-1}. If the energy of activation is 24,7000 cal/mole calculate the rate constant at 25^oC.
6) Write kinetic control mechanism for the oxidation of Hydrogen Bromide.
7) If specific conductance of a saturated solution AgCl is $1.55x10^{-6}$ ohm^{-1} cm^{-1} at 25^oC. The ionic conductance of Ag^+ and Cl^- ions are 61.94 and 76.34ohm^{-1}cm^{2}eqv^{-1}. Calculate the solubility of AgCl in gram per litre. (Neglect the specific conductance of water).
8) Write Michaelis Menton equation for the enzyme catalysis.
9) What is quantum yield? Write the reason for high quantum yield.
10) What is conductometric titration? Draw a titration curve for a mixture of strong and weak acid with a strong base.

THE END