Mid-West University

Examinations Management Office

Final Examinations -2081

Level: Bachelor level/B.Sc./4th Semester — F. M: 60

Time: 3hrs. — P. M: 30

Subject: Fundamental of Chemistry-IV (CHE345/445)

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

Organic Chemistry

Group-A

Short Answer Questions (Attempt any FIVE) **[5x2=10]**

1. Following reaction is called Hell-Volhard-Zelinski reaction. Predict the major product (A) and draw the mechanism of this reaction.

$$CH_3COOH \xrightarrow{Cl_2/P_4} (A)$$

2. What is Dow's process of manufacture of phenol?
3. Carboxylic acids and phenols both are 'OH' group containing organic compounds. Write a chemical method to distinguish them.
4. Give an example of (i) 2,4-DNP test (ii) Diazo Coupling reaction
5. Write a reaction for the preparation of benzoic acid. Suggest a chemical test to distinguish Benzaldehyde and Benzoic acid.
6. What is esterification? Write its analytical importance.
7. Starting from Nitrobenzene how would you synthesize, meta-bromophenol?

Group-B

Long Answer Questions (ANY TWO) **[2x5=10]**

8. Diethyl malonate (DEM) also known as malonic ester. What features of this compound make it special for various syntheses? How would you synthesize 2-Methylbutanoic acid by using DEM? **[2+3]**
9. Give one example of 1°,2° and 3° amines. How do these amines react with nitrous acid? **[1.5+3.5]**
10. Write short notes on:
    a) Reimer-Tiemann reaction **[2.5]**
    b) Role of Phenolic compounds as antioxidants. **[2.5]**

Inorganic Chemistry

Group-A

Short Answer Questions (Attempt ANY FIVE) **[5x2=10]**

1. Define d-block element? Why they are also known as transition element?
2. Why d-block elements form colored compounds?
3. Write two differences between 3d series and 4d series element?
4. Write in short about two types of isomerism found in coordination compound?
5. Write properties and uses of $K_2Cr_2O_7$?
6. Give some bioorganic importance of iron?

Group-B

Long Answer Question (ANY TWO) **[2x5=10]**

7. Write the postulates about the Werner coordination theory? Write the IUPAC name of $Cu[(NH_3)_4Cl]SO_4$
8. Write in short about the general trends of 3d series element?

   I) Electronic configuration II) Atomic radii

   III) Electron affinity IV) Ionization potential

   V) Oxidation states

Or

Write short notes on

I. Magnetic property of 3d elements
II. Complex formation of 3d elements

Physical Chemistry
Group A

Short Answer Questions (Attempt ANY FIVE) **[5x2=10]**

1. What is single electrode potential?
2. Differentiate between primary and secondary electrodes.
3. What is cell reaction and ΔG^0 of the given cell at 298K?

   Zn (s) / Zn^{+2} (aq, 1M) // Pb^{+2} (aq,1M) / Pb (s)

   Given that $E^0_{Zn^{+2}/Zn}$ = -0.76V and $E^0_{Pb^{+2}/Pb}$=-0.126V
4. What is the relation between C_p and C_v ?
5. Give any two statements of second law of thermodynamics.
6. Define entropy.

Group B

Long Answer questions (Attempt ANY TWO) **[2x5=10]**

7. Explain potentiometric titration.
8. Derive, $\eta = \frac{T_1 - T_2}{T_1}$ from Carnot cycle and interpret it.
9. Dicuss about criteria of spontaneity and equilibrium in terms of entropy and Gibbs free energy.

THE END