Mid-West University

Examinations Management Office

End Semester Examination 2081

Bachelor level/ B. Sc. /5th Semester — Full Marks: 60

Time: 3 hours — Pass Marks:30

Subject: Advanced Chemistry-II (CHE453)

Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate full marks. Use separate answer sheet for Inorganic, Organic and Physical parts.

Inorganic Chemistry

Group-A

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

1. Define metalocene? Write the mechanism for the polymerization of alkene by using Ziegler-Natta catalyst.
2. Why liquid NH_3 behaves as better solvent? Write the reaction for
   a) Acid – base reaction b) Precipitation reaction c) Complex formation
3. Write short note on (*Any Two*):
   a) Chain polymerization b) Metal alkyl of group I c) Grignard reagent

Group-B

Short answer questions (attempt *any five*) **[5x2 = 10]**

4. Classify the inorganic solvent on the basis of polarity with suitable example.
5. Differentiate between Homo and Co-polymers.
6. Give important characteristic of sulphur dioxide as solvent.
7. What is Wilkinson catalyst? Write its uses.
8. Write the IUPAC name of the following compounds
   a) $Fe(C_5H_5)_2$ b) $(CO)_3Co(CO)_2Co(CO)_3$
9. Write the general properties of inorganic polymers.

OR

Write one uses of silicones and borazines.

Organic Chemistry

Group-A

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

1. a) What happen when pyridine react with nitrogen mixture? (2)
   b) Discuss nucleophilic substitution reaction in Pyridine. (3)
2. Elaborate the principle of NMR spectroscopy. Mention its applications. (4+1)
3. Write short note on: (1+2+2)
   a) Chemical shift
   b) Spin-spin coupling and coupling constant.
   c) Features of ^{13}C Spectroscopy.

Group-B

Short answer questions (attempt *any five*) **[5x2 = 10]**

4. What are heterocyclic aromatic compounds? Draw the structure of Pyrrole, Thiophene, and Furan.
5. Give any two methods for the preparation of Pyrrole.
6. Predict the relative basicity of Pyrrole and Pyridine.
7. Define the terms:
   a) Base peak
   b) Molecular ion
   c) Auxochrome
   d) Chromophore.
8. Justify the statement that "Mass spectrometry is not written as mass spectroscopy".
9. Why TMS is used as reference standard in NMR spectroscopy?

Physical Chemistry

Group A

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

1. Define degree of freedom in a phase. Explain a simple eutectic Pb-Ag system with a well-label diagram.
2. Explain the feature of Phenol water partially miscible mixture.
3. Illustrate $FeCl_3$-H_2O formation as:
   a) Seven phases two components condensed system.
   b) Monovariant system.
   c) System with Congruent Melting point.
   d) Verities of simple Eutectic points.

OR

What is defect in crystal? Explain Frenkel and Schottky defect.

Group B

Short answer questions (attempt *any five*) **[5x2 = 10]**

4. Draw simple phase equilibria of Sulphur system and calculate the degree of freedom.
5. What is ideal solution? Write ideal solution equation.
6. Define Azeotropes. Write a distinguish feature of Maximum Boiling Azeotropes and Minimum Boiling Azeotropes.
7. What is Fractional distillation? How can you separate ethanol from water?
8. Draw the crystallographic structure of CsCl.
9. What is F-center? Give example.

The End