Mid-West University
Examinations Management Office
End Semester Examinations 2081

Bachelor level/ B. Sc. / 5th Semester
Time: 3 hours
Subject: Advanced Chemistry-II (CHE453)

Full Marks: 60
Pass Marks: 30

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

Attempt any TWO questions [2x5=10]

1. Explain Monsanto acetic acid formation process.
2. Describe the different chemical reaction of liquid NH_3 as solvent.
3. What is Wilkinson Catalyst? Explain hydrogenation of alkene with Wilkinson catalyst.

Attempt any FIVE questions [5x2=10]

4. List out the criteria to determine the utility of solvent
5. Write the acid base reaction in liquid SO_2 as solvent.
6. Give an example of organometallic compounds which obey 16 and 18 electron rules.
7. Write the IUPAC name of
   a. $Fe(CO)_3(C_4H_6)$
   b. $Co(CO)_3(\pi\text{-}C_3H_5)$
8. Define condensation polymerization with the help of Boron nitride.
9. What is EAN rule?
10. Define ferrocene. Write its one method of preparation.

Organic Chemistry

Attempt any TWO questions [2x5=10]

1. Discuss the electrophilic substitution of furan. What happens when furan reacts with:
   a) Halogen
   b) Sulfuric acid
2. Explain rate theory in detail.
3. How can you separate different compounds through TLC methods? Discuss its operation as well its handling precaution.

Attempt any FIVE questions [5x2=10]

4. How can you say that furan is heterocyclic aromatic compound?
5. Give any one preparation of furan and thiophene.
6. Discuss selectivity factor and capacity factor.
7. Which packing of column is best in column chromatography and why?
8. Identify basic nature of aliphatic amines or pyrrole with its justification.
9. What are roles of mobile phase and stationary phase?

Physical Chemistry

Attempt any TWO questions [2x5=10]

1. Explain phase equilibria of one component system-sulphur.
2. Give brief working principle of fractionating column with diagram for distillation.
3. Derive Bragg's equation. Illustrate the 100, 110, and 111 planes within a simple cubic lattice, accompanied by diagrams.

Attempt any FIVE questions [5x2=10]

4. State how many components and degrees are present in each of the following systems

a) $H_2(g) + N_2(g)$
b) A solution of $Ca(NO_3)_2$ in water
c) Ice in equilibrium with its vapour
d) Triple point of water system

5. Differentiate between congruent melting point and incongruent melting point.
6. Define azeotrope with example.
7. Define critical solution temperature.
8. State Nernst distribution law.
9. Give difference between Frenkel and Schottky defects.

The End