

Mid-West University
Examinations Management Office
End Semester Examinations 2081

Bachelor level/ B. Sc. / 5th Semester

Time: 3 hours

Subject: Advanced Chemistry-I (CHE451)

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

Group A

Long answer questions (attempt *any two*).

[2x5 = 10]

1. Explain the molecular orbital treatment for xenon difluoride.
2. What are interhalogen compounds? Write the bonding and structures of AX type and AX₃ type interhalogen compounds.
3. What are pseudo halogens? Write the preparations and properties of pseudo halogens.

Group B

Short answer questions (attempt *any five*).

[5x2 = 10]

4. What is tritium? Write its uses.
5. Write any two methods of preparation of electrovalent hydrides.
6. Draw the two controversial structures of xenon hexafluoride.
7. Define banana bond. Draw the structure of diborane.
8. Why is boric acid considered as monobasic acid?
9. How can we prepare silicates? Write the examples of silicates.

Organic Chemistry

Group A

Long answer questions (attempt *any two*).

[2x5 = 10]

1. Enlist the different methods of determination of reaction mechanism. Discuss any two methods used for determining reaction mechanism.
2. What are reactive intermediates? Write the generation, stability and fate of Carbenes or Carbocations.
3. Write short notes on:
 - a) Neighbouring group participation (NGP)
 - b) Aromaticity and anti-aromaticity

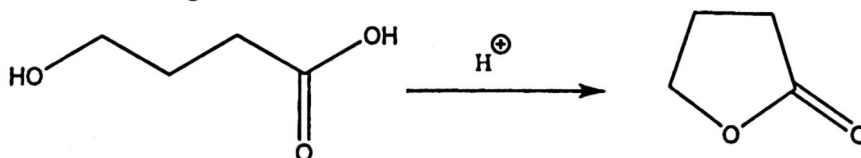
[3+2]

Group B

Short answer questions (attempt *any five*).

[5x2 = 10]

4. Write the meaning of all the three terms used in Baldwin's rule '3-exo-tet'.



Predict whether the above reaction FAVORED or DIS-FAVORED.

5. State Hammond postulate. Describe this rule for exothermic reactions.
6. What are classical and non-classical Carbocations?
7. Define free radicals. Give an example of a 1° and a 2° free radicals.

8. Distinguish the aromatic and anti-aromatic species from these; Cyclopentadienyl anion, Cycloheptatrienyl anion, Cyclobutadiene, Toluene.
9. What are the criteria to obtain kinetic product and thermodynamic product?

Physical Chemistry

Group A

Long answer questions (attempt *any two*).

[2x5 = 10]

1. Define mean activity coefficient. Explain Debye-Huckel's theory of activity coefficient.
Calculate the mean activity coefficient of 0.1M solution of NaCl at 25°C. (Where, $A = 0.51$).
2. Explain the condensation methods for the preparation of lyophilic colloids with examples.
3. Illustrate the principle and working mechanism of concentration cell with transference.

Group B

Short answer questions (attempt *any five*).

[5x2 = 10]

4. How does dielectric constant affect the conductivity?
5. What is gas electrode? Write cell notation of gas electrode.
6. Write BET equation. Mention its significance.
7. What is adsorption Isotherm? Draw adsorption isotherm.
8. What is Zeta potential? How does it originate?
9. Write any two methods for protection of colloidal solution.

The End