

Mid-West University
Examinations Management Office
Surkhet, Nepal
End Semester Examinations -2078

Bachelor level/ B.Sc / 5th Semester

Time: 3 hrs

Subject : Advanced Chemistry -I (CHE-451)

Full Marks : 100

Pass Marks : 50

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

Group: A

Answer very short questions (Attempt any Seven questions)

[7X2=14]

1. How can you prepare tritium?
2. Write any two applications of deuterium.
3. Give any two properties of covalent hydrides.
4. Draw the structures of the given compounds:
a. XeO_3 b. XeOF_4 .
5. Why is boric acid considered as a monobasic acid?
6. Compare the structure of boron nitride to the graphite.
7. Draw a detailed diagram of a 3C-2e bond in a molecule
8. Write the preparation reactions of silane.
9. Describe the hybridization process in AX type interhalogen compound in brief.

Group: B

Short questions. (Attempt all questions)

10. What are the electrovalent hydrides? Write the preparations and properties of electrovalent hydrides. [2+2+2]
11. Explain the molecular orbital treatment for xenon difluoride. [6]
12. Write short notes on:
(a) controversial structure of xenon hexafluoride,
(b) structure of orthosilicate ion. [3.5+3.5]

OR

What are pseudohalogens? Write the preparations and properties of pseudohalogens.

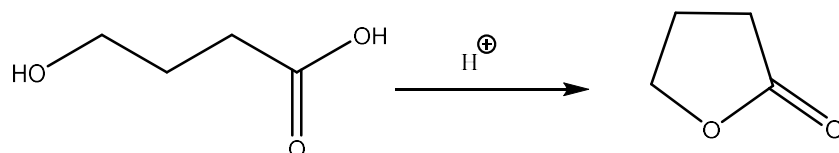
Organic Chemistry

Group: A

Answer very short questions (Attempt any Seven questions)

[7X2=14]

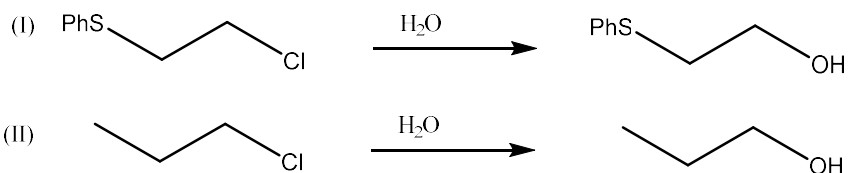
1. What are reactive intermediates? Give example.
- 2.



Applying Baldwin's rule state whether the above reaction FAVORED or DIS-FAVORED?

3. State Hammond postulate. Sketch a diagram to justify this rule for exothermic reactions.
4. State and demonstrate the principle of microscopic reversibility.
5. Differentiate between classical and non-classical carbocations.
6. Write the formulae of methyl free radical and isopropyl free radical. Which one is more stable?

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



One of the above reactions undergoes hydrolysis 600 times faster than the other. Identify that reaction and give the reason.

Group: B

Short questions. (Attempt all questions)

10. Define reaction mechanism. Discuss any two methods used for determining reaction mechanism. [3+3]
11. Write the generation, stability and fate of Carbanions OR Benzyne. [7]
12. Write short notes on:
- Isotopic labelling in determining reaction mechanism
 - Generation and structure of carbene intermediate [3+3]

OR

What are the difference between classical and non-classical carbocation? Discuss the neighbouring group participation by Sigma and Pie bond.

Physical Chemistry

Group: A

Answer very short questions (Attempt any Seven questions)

[7X2=14]

- What is the application of Onsager equation?
- Explain clearly asymmetric and electrophoretic effect as given by Debye and Huckel.
- What do you mean by standard electrode potential?
- Explain the term electrolysis.
- Calculate the ionic strength of 0.1M solution of CaCl_2 .
- What are the difference between physisorption and chemisorptions?
- What are adsorption isotherms?
- What are lyophobic and lyophilic colloids?
- Explain the term gold number.

Group B

Short questions. (Attempt all questions)

- What are colloids? How they are classified? Discuss on electrical property of colloids. [1+2+3=6]
- Outline the main assumptions made to derive Langmuir adsorption isotherm. Derive an expression for Langmuir's adsorption isotherm. [2+4=6]
- Discuss Debye-Huckel onsager equation at what condition, this equation is called Debye –Huckel limiting law. [6+2=8]

OR

What are concentration cell? Derive an expression for EMF of electrolyte concentration cell with transference.

THE END