

Enrolment No:



Course: CHEM-1007G (Chemistry)

(End Semester Examination Dec 2021)

Programme: B.Sc (H) Geology/Mathematics

Semester: I

Course Name: Atomic structure, bonding, General Organic chemistry & aliphatic hydrocarbons

Time: 03 hrs.


Max. Marks:100

Instructions: Read all the below mentioned instructions carefully and follow them strictly:

- 1) Write your enrolment number on the top left of the question paper
- 2) Do not write anything on the question paper except your enrolment number
- 3) Attempt all part of a question at one place only

Section - A

1. Each Question will carry 4 Marks
2. Answer should be short
3. You have to very careful to write the answer.

1.	Discuss Enantiomers and Diastereomers	[4]	CO1
2.	Assign R and S for the following compound 	[4]	CO1
3.	Explain Saytzeff's and Markovnikov's rule	[4]	CO1
4.	Write the main features of molecular orbital theory	[4]	CO2
5.	What do you mean by dual character of matter and discuss it with De Broglie's equation	[4]	CO1

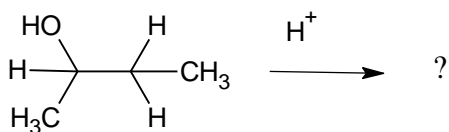
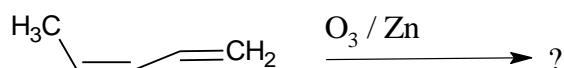
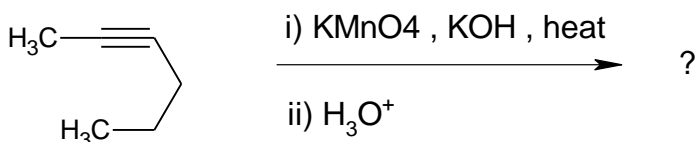
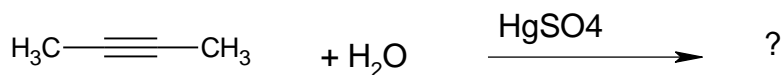
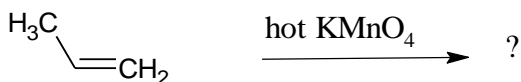
SECTION-B

Instructions:

1. Each question will carry 10 marks
2. Write short/brief notes of 1-2 page answer.
3. Internal Choice is given in question 4

1	Explain the different conformations of butane. How will you account for difference in their relative stability	[10]	CO3
2	Complete the reaction	[5+5]	CO3

	<p>i) $\text{H}_3\text{C}-\text{CH}=\text{CH}_2 \xrightarrow{\text{BH}_3} \text{A} \xrightarrow{\text{H}_2\text{O}_2/\text{KOH}} \text{B}$</p> <p>ii) $\text{H}_3\text{C}-\text{CH}=\text{CH}-\text{CH}_3 \xrightarrow{\text{Br}_2/\text{CCl}_4} ?$</p>		
3	Elaborate the molecular orbital theory for CO molecules using appropriate illustration and also calculate the bond order	[10]	CO2
4	<p>Complete the reaction with justification</p> <p>i) $\text{H}_3\text{C}-\text{C}\equiv\text{C}-\text{CH}_3 + \text{H}_2\text{O} \xrightarrow{\text{HgSO}_4} ?$</p> <p>ii) $\text{H}_3\text{C}-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_3 + \text{HBr} \xrightarrow{\text{Peroxide}} ?$</p> <p style="text-align: center;">OR</p>	[5+5]	CO3
	<p>i) Complete the reaction with justification</p> <p>$\text{H}_3\text{C}-\text{C}\equiv\text{C}-\text{CH}_3 \xrightarrow{\text{Pd-BaSO}_4/\text{H}_2} ?$</p> <p style="margin-left: 100px;">Birch's Reduction</p> <p style="margin-left: 100px;">?</p> <p>ii) $\text{H}_3\text{C}-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_2 \xrightarrow{\text{HBr}} \text{A} + \text{B}$</p>		
SECTION - C			
<p>Instructions:</p> <p>1. Each Question is of 20 marks</p> <p>2. Internal choices is given in question 2</p>			
1.	i) Write the product of following reactions with explanation	[12+4+4]	CO3



ii) Explain pinacole-pinacolone rearrangement with example

iii) Mention CIP rule for assigning priority to atoms

2.

- Using VSEPR theory, predict and draw the shapes of the following molecules
BF₃, PCl₅, SF₄ and NH₃
- Write molecular orbital configuration of the species O₂, O₂⁺, O₂⁻ and O₂⁻² and calculate their bond order
- Give the sequence in which the energy levels in an atom are filled with electrons and give electronic configuration for the elements having atomic number 11 and 17

OR

- Elaborate VSEPR (valence shell electron pair repulsion) theory with example
- Outline a Born-Haber cycle for the formation of an ionic compound by taking example of sodium chloride
- Explain the paramagnetic character of oxygen with the help of molecular orbital theory

[8+8+4]

CO2