Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: Atomic structure, bonding, general organic chemistry and aliphatic hydrocarbon

Program: B.Sc.(H) (Phys/Maths/Geology) **Semester : I**

Course Code: CHEM-1007G **Time : 03 hrs.**

Max. Marks : 100

Instructions:

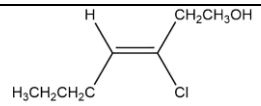
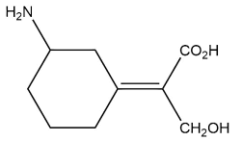
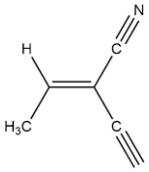
1) Read all the below mentioned instructions carefully and follow them strictly:
2) Mention Roll No. at the top of the question paper.
3) ATTEMPT ALL THE PARTS OF A QUESTION AT ONE PLACE ONLY.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Write the main features of molecular orbital theory.	**4**	**CO2**
Q 2	Discuss Heisenberg's uncertainty principle with example.	**4**	**CO2**
Q 3	What are enantiomers? Explain the general characteristics of enantiomers.	**4**	**CO1**
Q 4	Discuss the different types of reactions with suitable examples.	**4**	**CO1**
Q 5	Write the Corey House synthesis for the preparation of ethane and propane.	**4**	**CO3**

SECTION B
(4Qx10M= 40 Marks)

Q 6	i) What is Born Lande Equation? How it is related to lattice energy? ii) Which is more ionic and why? LiCl or CsCl. Explain the concept for your choice.	**5+5**	**CO1**
Q 7	Based on Valence shell electron pair repulsion theory, comment on the shape of following molecules i) NF_3 ii) H_2O iii) SF_6 i) ICl_3	**10**	**CO3**
Q 8	What is Geometrical isomerism. Give the nomenclature E and Z to the following compounds.	**4+2+2+2**	**CO1**

	A)  B)  C) 		
Q 9	How is ethene formed by the dehydrohalogenation and dehalogenation reaction from alkyl halides. Explain the various oxidation reactions shown by the CH_3-CH=CH-CH_3. **OR** Complete the following reactions: i) $CH_3COOH + NaOH \longrightarrow$ ii) $CH_3MgX + H_2O \longrightarrow$ iii) $RCOONa \xrightarrow{Electrolysis}$ iv) $CH_4 + Cl_2 \longrightarrow$	**10**	**CO2**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Write the short notes on i) Aromatization of alkanes. ii) Hydration of alkynes. iii) Ozonolysis of alkenes. iv) Bromination of ethene with mechanism.	**5+5+5+5**	**CO3**
Q 11	i) Write molecular orbital configuration of the species N_2, N_2^+, N_2^- and N_2^{-2} and calculate their bond order. ii) Elaborate VSEPR (valence shell electron pair repulsion) theory with example. iii) Write general characteristics of ionic compounds. **OR** i) Draw Molecular orbital diagram for C_2^-, Comment on its magnetic behaviour. ii) Draw Lewis dot structure for the following: a) NaCl b) H_2S c) $CaCl_2$ d) NH_3	**8+8+6**	**CO2**

	iii)	Write salient features of Molecular orbital theory. What are Bonding and Antibonding orbitals, how are they formed?		