
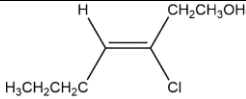
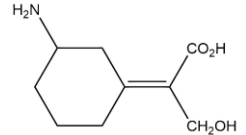
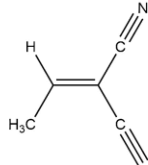


Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, December 2022</b>			
Course: Atomic structure, bonding, general organic chemistry and aliphatic hydrocarbon		Semester : I	
Program: B.Sc.(H) (Phys/Maths/Geology)		Time : 03 hrs.	
Course Code: CHEM-1007G		Max. Marks : 100	
<b>Instructions:</b>			
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.			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
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
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
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 <sub>3</sub> ii) H <sub>2</sub> O iii) SF <sub>6</sub> i) ICl <sub>3</sub>	10	CO3
Q 8	What is Geometrical isomerism. Give the nomenclature E and Z to the following compounds.	4+2+2+2	CO1

	<p>A) </p> <p>B) </p> <p>C) </p>		
Q 9	<p>How is ethene formed by the dehydrohalogenation and dehalogenation reaction from alkyl halides. Explain the various oxidation reactions shown by the <math>\text{CH}_3\text{-CH=CH-CH}_3</math>.</p> <p style="text-align: center;"><b>OR</b></p> <p>Complete the following reactions:</p> <p>i) <math>\text{CH}_3\text{COOH} + \text{NaOH} \longrightarrow</math></p> <p>ii) <math>\text{CH}_3\text{MgX} + \text{H}_2\text{O} \longrightarrow</math></p> <p>iii) <math>\text{RCOONa} \xrightarrow{\text{Electrolysis}}</math></p> <p>iv) <math>\text{CH}_4 + \text{Cl}_2 \longrightarrow</math></p>	<b>10</b>	<b>CO2</b>
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	<p>Write the short notes on</p> <p>i) Aromatization of alkanes.</p> <p>ii) Hydration of alkynes.</p> <p>iii) Ozonolysis of alkenes.</p> <p>iv) Bromination of ethene with mechanism.</p>	<b>5+5+5+5</b>	<b>CO3</b>
Q 11	<p>i) Write molecular orbital configuration of the species <math>\text{N}_2</math>, <math>\text{N}_2^+</math>, <math>\text{N}_2^-</math> and <math>\text{N}_2^{-2}</math> and calculate their bond order.</p> <p>ii) Elaborate VSEPR (valence shell electron pair repulsion) theory with example.</p> <p>iii) Write general characteristics of ionic compounds.</p> <p style="text-align: center;"><b>OR</b></p> <p>i) Draw Molecular orbital diagram for <math>\text{C}_2^-</math>, Comment on its magnetic behaviour.</p> <p>ii) Draw Lewis dot structure for the following: a) <math>\text{NaCl}</math> b) <math>\text{H}_2\text{S}</math> c) <math>\text{CaCl}_2</math> d) <math>\text{NH}_3</math></p>	<b>8+8+6</b>	<b>CO2</b>

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