

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Online End Semester Examination, Jan 2021

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

Semester: I

Program: B.Sc. (H) Physics, Mathematics & Geology (Elective)

Time 03 hrs.

Course Code: CHEM 1007

Max. Marks: 100



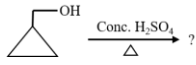
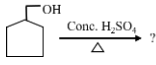
SECTION A

Instructions:

- 1. Each question carries 5 marks.**
- 2. Complete the statement/ Select the correct answer.**

S. No.	Question	Marks	CO
Q 1	True or False? a. Homolysis results in the formation of free radicals. b. Pairs of optical isomers, which are mirror image of each other are known as diastereoisomers. c. Staggered conformers are more stable than eclipsed conformers. d. Carbocations are trigonal planar in shape. e. Hydrolysis of calcium carbide forms ethylene.	5	CO1
Q 2	Fill in the blanks: a. C-M bond will undergo fission generating as reactive intermediate. b. Alkenes undergo isomerism. c. Hyperconjugation is also named as d. Meso isomers are optically in nature.	5	CO1
Q 3	Select the correct option: a. Propyne can be obtained from on treatment with phosphorus pentachloride, followed by reaction with alc. KOH: i. Acetaldehyde ii. Acetone iii. Acetal iv. All of above b. Choose the correct statement: i. Geometrical isomers have different physical and chemical properties. ii. Geometrical isomers have same physical and chemical properties. iii. Geometrical isomers have same physical but different chemical properties. iv. Geometrical isomers have different physical but same chemical properties.	5	CO3
Q 4	Answer in one word: a. Name the carbon, which has all the valencies satisfied with different groups or atoms. b. Geometrical isomer, where groups of higher priority are placed on same side.	5	CO1

	<p>c. Number of pi-electrons in non-aromatic compounds.</p> <p>d. Reaction between two molecules of alkyl halides in the presence of sodium metal.</p> <p>e. Mixture of dextro- and leavo-isomers.</p>		
Q 5	<p>Fill in the blanks:</p> <p>a. The most electronegative element in the periodic table is -----.</p> <p>b. The attraction exerted by an atom on the electron pair bonding it to another atom by covalent bond is called-----.</p> <p>c. The values of electronegativity -----as we move from left to right in a period.</p> <p>d. If the value of azimuthal quantum number is 2, there will be -----values for magnetic quantum number.</p> <p>e. After filling the 4p-orbital, an electron will enter in -----.</p>	5	CO2
Q 6	<p>Choose the correct option:</p> <p>a. In the spectrum of hydrogen atom, the series which falls in ultraviolet region is</p> <p>i. Lyman series</p> <p>ii. Balmer series</p> <p>iii. Paschen Series</p> <p>iv. Brackett series</p> <p>b. The ratio of radii of second and first orbit of hydrogen atom according to Bohr's model is</p> <p>i. 2:1</p> <p>ii. 1:2</p> <p>iii. 4:1</p> <p>iv. 1:4</p>	5	CO1
SECTION B			
Instructions:			
<p>1. Each question carries 10 marks.</p> <p>2. Short answers</p>			
Q 1	What do you understand by successive ionization enthalpies. Discuss the factors affecting ionization enthalpy.	10	CO2
Q 2	An organic compound 'A' with molecular formula C ₅ H ₈ , on treatment with sodium in liquid ammonia, followed by treatment with n-propyl iodide gives 'B', C ₈ H ₁₄ . On treatment with dilute sulfuric acid containing mercuric sulfate, 'A' gives a ketone 'C', C ₅ H ₁₀ O. on oxidation with alkaline potassium permanganate, 'B' gives two isomeric acids, 'D' and 'E', C ₄ H ₈ O ₂ . Analyze the compounds 'A-E', and write the relevant reactions.	10	CO3
Q 3	<p>a. Draw the conformers of cyclohexane and discuss.</p> <p>b. Assign E/Z designation to following compounds:</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> $\begin{array}{c} \text{CH}_3 \quad \text{Cl} \\ \diagdown \quad / \\ \text{C} = \text{C} \\ / \quad \diagdown \\ \text{C}_2\text{H}_5 \quad \text{COOH} \end{array}$ </div> <div style="margin: 0 20px;">and</div> <div style="text-align: center;"> $\begin{array}{c} \text{CH}_3 \quad \text{C}_2\text{H}_5 \\ \diagdown \quad / \\ \text{C} = \text{C} \\ / \quad \diagdown \\ \text{H} \quad \text{CH}(\text{CH}_3)_2 \end{array}$ </div> </div>	10	CO1
Q 4	a. Draw all the stereoisomers of tartaric acid, and give the relationship of each to the others.	10	CO1

	<p>b. Discuss the following compounds as aromatic, anti-aromatic or non-aromatic:</p> <div style="text-align: center;">  and  </div>		
Q 5	<p>a. Calculate Z^* for a 6s electron in Platinum. $(1s^2)(2s^2, 2p^6)(3s^2, 3p^6)(3d^{10})(4s^2, 4p^6)(4d^{10})(4f^{14})(5s^2, 5p^6)(5d^8)(6s^2)$</p>	10	CO2
SECTION-C			
<p>Instructions:</p> <p>1. Question carries 20 marks.</p> <p>2. Short/ long answers</p>			
Q 1	<p>a. How many isomeric products will be obtained on monochlorination of:</p> <ol style="list-style-type: none"> i. n-pentane ii. Isopentane iii. Neo-pentane <p>Draw their structures also.</p> <p>b. Write short notes on following:</p> <ol style="list-style-type: none"> i. Cracking ii. Isomerization 	20	CO3
	<p style="text-align: center;">OR</p> <p>a. Complete the following reactions:</p> <div style="text-align: center;">  and  </div> <p>Also discuss, products of which reaction will be more stable and why?</p> <p>b. Write short notes on following:</p> <ol style="list-style-type: none"> i. Polymerization of alkenes ii. Hydration of alkynes 	20	