


Name: Enrolment No:		
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES Endsem Examination, December 2022 Course: Chemistry Semester: I Program: B.Tech (FT, BT and BME) Time: 3 Hrs Course Code: CHEM 1013 Max. Marks: 100		
SECTION - A 20 x 1.5 = 30 Marks 1. Each Question will carry 1.5 Marks		
	<ol style="list-style-type: none"> 1. Explain briefly why electrons are easily available to the attacking reagents in π-bonds? 2. Explain what happens when heterolysis takes place in an organic compound? 3. Define carbocation? 4. Give the condition for a molecule to act as a nucleophile and give example 5. Briefly discuss Huckel rule? 6. Primary carbanion is more stable than tertiary carbanion. Explain 7. Define order of a reaction? 8. Give the wavelength range of visible radiation. 9. Asymmetric molecules absorb infrared radiation. Justify? 10. Mention the type of polymers based on their end-use? 11. Write the name of monomers used in the manufacturing of (i) PMMA (ii) PE 12. Differentiate adsorbent and adsorbate with example. 13. What do you mean by catalytic promoter. Give one example. 14. Polychromatic radiation can not be used in the analysis of compounds using spectrometer. Why? 15. Briefly explain Beer's law and give formula. 16. Give the name of bending vibrations when a molecule absorbs infrared radiation 17. What do you mean by activation energy of a reaction. 18. Define buffer capacity of a buffer solution? 	CO1 CO1 CO1 CO1 CO1 CO2 CO3 CO3 CO2 CO2 CO2 CO2 CO3 CO3 CO3 CO2 CO2

	19. $\text{pH} + \text{pOH} =$ 20. Give any two major applications of Infrared spectroscopy	CO3
SECTION – B 4 x 5 = 20 Marks		
1. Each question will carry 5 marks 2. Instruction: Write short / brief notes		
Q 1	A: Discuss the major features of adsorption process B: Discuss resonance effect with appropriate example(s)	CO1
Q 2	A. Discuss how Freundlich isotherm will be used to describe the extent of adsorption. Use appropriate formulas and illustrations. B. Which type of polymer can be recycled. Give any two examples with their applications.	CO1
Q 3	A: Discuss the significance of biopolymers B: Discuss what happens when an atom is excited by ultraviolet radiation. Give their types and use illustrations if necessary	CO3
Q 4	A. Draw neat sketch of UV-Visible spectrophotometer and name the components in that. Mention the source of UV & Visible radiation. B. Discuss the various applications of uv-vis spectroscopy in Food Technology/Biotechnology OR Explain the various principles of nuclear magnetic resonance spectroscopy and how it will be used to deduce structure of organic compound	CO2
Section – C 2 x 15 = 30 Marks		
1. Instruction: Write long answer.		
Q 1	A. Discuss the mechanism of SN^2 reaction and give the various parameters that influence the rate of reaction B. Discuss the mechanism of halogenation by giving the reagent used in the reaction along with resonance structures.	CO3

Q 2	<p>Complete the following:</p> <p>a. $(CH_3)_2COH - CH_2 - CH_3 \xrightarrow{conc. H_2SO_4} A + B$</p> <p>b. $CH_3 - C \equiv CH \xrightarrow{CH_3MgBr}$</p> <p>c. $CH_3 - CHBr - CH_3 + Na \xrightarrow{ether}$</p> <p>d. $CH_3 - CHBr - CH_2Br \xrightarrow{alcoholic KOH}$</p> <p>e. $CH_3 - C \equiv C - CH_3 \xrightarrow{Na/liquid NH_3}$</p>	
	<p>Section – D 2 x 10 = 20 Marks</p> <p>Instruction: Write long answer.</p>	
Q1	<p>A. Discuss Lewis theory of acids and bases with few examples.</p> <p>B. How do you classify buffer solution and give example for each.</p>	CO1
Q2	<p>A. Explain how a catalyst will function in any chemical reaction using energy profile diagram.</p> <p>B. Write notes on “shape selective catalysts” by giving examples</p>	CO2