

Name: Enrolment No:		
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES Endsem Examination, December 2021 Course: Chemistry Semester: I Program: B.Tech (FT, BT, FT-MBA & BT-MBA) Time: 3 Hrs Course Code: CHEM 1103 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. What happens when heterolysis takes place in an organic compound? 3. Define carbocation? 4. Give the condition to act as a nucleophile and give examples 5. How do you define functional group of organic compound? 6. Benzyl carbocation is more stable than ethyl carbocation. Explain 7. Why order of a reaction more than 3 is not possible. 8. Give the wavelength range of near, middle and far infra red region 9. Symmetric molecules do not absorb infrared radiation. Why? 10. Mention the type of colligative properties of a non-volatile solute? 11. Write the name of monomers used in the manufacturing of (i) bakelite (ii) Teflon 12. Explain how an isotherm will be used to describe adsorption. 13. Differentiate catalytic promoter and catalytic poisoning 14. Discuss briefly why polychromatic radiation can not be used in the analysis of compounds using spectrometer. 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? 19. $\text{pH} + \text{pOH} =$ 	CO

	20. Give any two major applications of nmr spectroscopy	
SECTION – B 4 x 5 = 20 Marks		
1. Each question will carry 5 marks 2. Instruction: Write short / brief notes		
Q 1	A: Differentiate between physisorption and chemisorption B: Discuss inductive 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: Classify polymers based on thermal stability B: Discuss how an electronic transition occur 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 <p style="text-align: center;">OR</p> 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 SN¹ reaction and give the various parameters that influence the rate of reaction B. Discuss the mechanism of nitration of benzene 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</p> <p>Instruction: Write long answer.</p>	<p>2 x 10 = 20 Marks</p>
Q1	<p>A. Discuss various theories of acids and bases</p> <p>B. How do you prepare acidic buffer solution</p>	CO1
Q2	<p>A. Explain how a catalyst will function in any chemical reaction and give some examples of catalysts</p> <p>B. Write notes on “shape selective catalysts” by giving examples</p>	CO2