Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Course: CHEMISTRY **Semester : I**

Program: B.Tech. (Biotech./Food Tech/Biomedical Eng.) **Duration : 3 Hours**

Course Code: CHEM 1001 **Max. Marks: 100**

Instructions:

1. Attempt all part of a question at one place only.
2. Attempt all questions.
3. Calculators and graph papers are not required.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Which of the following is a weak acid? a) HCl, b) H_2SO_4, c) CH_3COOH, d) HNO_3	1.5	CO1
Q 2	A solution with a pH greater than 7 is: a) Neutral, b) Acidic, c) Basic, d) Amphoteric	1.5	CO1
Q 3	Write an electronic configuration of chromium.	1.5	CO1
Q 4	Recall the formula for calculation of molality.	1.5	CO1
Q 5	State the relationship between pH and pOH at 25°C?	1.5	CO1
Q 6	Write any three commonly used Absorbents?	1.5	CO1
Q 7	Define adsorption and absorption?	1.5	CO1
Q 8	The suffix for ester in IUPAC nomenclature is: (a) -oate (b) -ide (c) -al (d) -alkoxy	1.5	CO1
Q 9	State the correct stability order for carbanion is: (a) $3^0>2^0>1^0$ (b) $1^0>2^0>3^0$ (c) $2^0>1^0>3^0$ (d) None	1.5	CO1
Q 10	Which of the following hybridization is present in carbocation? (a) sp^2 (b) sp (c) sp^3 (d) sp^3d	1.5	CO1
Q 11	A buffer solution resists changes in: a) pH b) Temperature c) Volume d) Concentration	1.5	CO1
Q 12	Define hypsochromic shift.	1.5	CO1
Q 13	Define heterolytic cleavage with an example.	1.5	CO1

Q 14	Write any two substitution reactions.	**1.5**	**CO1**
Q 15	Define diastereomer with an example.	**1.5**	**CO1**
Q 16	Which of the following is not an inert gas? a) Argon b) Neon c) Sodium **d)** Helium	**1.5**	**CO1**
Q 17	Define vulcanized rubber?	**1.5**	**CO1**
Q 18	Define polymer with suitable examples.	**1.5**	**CO1**
Q 19	Write three examples of biopolymers.	**1.5**	**CO1**
Q 20	Write the full form of PMMA and HDPE.	**1.5**	**CO1**
	Section B **(4Qx5M=20 Marks)**		
Q 1	Explain bulk polymerization. Write its advantages and disadvantages.	**5**	**CO2**
Q 2	How many grams of H_2SO_4 (molar mass = 98 g/mol) are required to make 250 mL of a 0.5 N solution of sulfuric acid?	**5**	**CO2**
Q 3	Explain optical isomerism in detail with suitable examples.	**5**	**CO2**
Q 4	Explain electronic transition in UV spectrum with a suitable diagram.	**5**	**CO2**
	Section C **(2Qx15M=30 Marks)**		
Q 1	(a) Discuss **any two** colligative properties in detail with appropriate equations and graphs. (b) Demonstrate Lewis theory of acid-base with suitable examples.	**10+5=15**	**CO3**
Q 2	(a) Differentiate the detailed mechanism of E1 and E2 reaction with suitable examples. (b) Differentiate electrophile and nucleophile in tabular form.	**10+5=15**	**CO4**
	Section D **(2Qx10M=20 Marks)**		
Q 1	Explain the classification of polymers based on their **origin**, **structure**, and **mode of action** with suitable examples.	**3+3+4=10**	**CO3**
Q 2	Demonstrate the factors affecting physisorption and chemisorption in detail.	**5+5=10**	**CO3**