QP Code: **D 123065**	**Total Pages: 2**	**Name:**
		Register No.

SECOND SEMESTER (CUFYUGP) DEGREE EXAMINATION APRIL 2025	
(**CHEMISTRY**)	
CHE2MN102 : LIQUID STATE, GASEOUS STATE AND ELECTROCHEMISTRY	
2024 Admission onwards	

Maximum Time: 2 Hours	**Maximum Marks: 70**

Section A	
All Questions can be answered. Each Question carries 3 marks (Ceiling: 24 Marks)	
1	Explain the term viscosity of a liquid. Discuss the effect of temperature on the viscosity of a liquid.
2	List out the applications of liquid crystals.
3	Why liquid drops assume spherical shape?
4	Write any three postulates of kinetic theory.
5	Explain i) average velocities ii) Collision number iii) Viscosity of gases.
6	Using the expression for the Maxwell distribution of velocities, draw this distribution at three different temperatures.
7	Describe the causes of deviation from ideal behaviour of a real gas.
8	Draw the PV isotherms of CO_2 gas.
9	What is the significance of the critical constants?
10	Calculate the critical constants of CO_2 gas using the van der Waals constants $a = 3.590$ dm^6 atm mo1^{-2}, b = 0.0427 dm^{3}mol^{-1}.

Section B	
All Questions can be answered. Each Question carries 6 marks (Ceiling: 36 Marks)	
11	Justify Raoult's and Henry's laws in terms of the molecular interactions in a mixture.
12	Explain the structures and main characteristics of different types of liquid crystals.
13	Write a note on i) characteristics of liquids ii) characteristics of gases.
14	Explain i) coefficient of viscosity ii) compressibility factor iii) Boyle temperature.
15	Explain how the van der Waals equation accounts for critical behaviour.
16	Discuss $H_2 - O_2$ fuel cell. What are the advantages and applications of $H_2 - O_2$ fuel cell?
17	Explain the terms specific conductance, equivalent conductance and molar conductance as applied to solutions of electrolytes. In which units are these quantities expressed ?

18	At what pressure does the mean free path of argon at 25°C become comparable to the diameter of the atoms themselves? Given the collision cross-section is 0·36 nm^2 .
	Section C
	Answer any ONE. Each Question carries 10 marks (1×10 = 10 Marks)
19	a) What do you mean by colligative properties? Briefly explain relative lowering of vapour pressure and depression in freezing point. With suitable equations show that these two are colligative properties. b) 1.20 g of a non-volatile organic substance was dissolved in 100 g of acetone at 20°C. The vapour pressure of the solution was found to be 182·5 torr. Calculate the molar mass of the substance [vapour pressure of acetone at 20°C is 185·0 torr].
20	a) Write a note on conductometric titrations. b) Explain i) Kohlrausch's law ii) Nernst equation iii) Reference electrodes.