

QP Code: D141821		Total Pages: 2	Name:
			Register No.
SECOND SEMESTER (CUFYUGP) DEGREE EXAMINATION, APRIL 2026			
CHEMISTRY / POLYMER 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	Define surface tension. What is the influence of temperature on surface tension?		
2	What is molal depression constant? How is it related to the latent heat of vaporization ?		
3	Write a note on van't Hoff factor.		
4	List out the applications of liquid crystals.		
5	Write a note on the characteristics of gases.		
6	Show that the mean free path of a gas molecule increases by decrease in pressure.		
7	What do you mean by critical pressure and critical volume of a gas?		
8	Express the van der Waals equation in virial form.		
9	Describe the applications of conductance measurements.		
10	Define specific conductance and equivalent conductance. Give the relationship between them.		
Section B			
All Questions can be answered. Each Question carries 6 marks (Ceiling: 36 Marks)			
11	Analyse the structures and main characteristics of different types of liquid crystals.		
12	Enlist the postulates of the kinetic theory of gases.		
13	Explain i) coefficient of viscosity ii) compressibility factor iii) Boyle temperature.		
14	Discuss briefly about P – V isotherms of a real gas.		
15	Explain the following i) Ostwald's dilution law ii) Kohlrausch's law		
16	Explain the term molal elevation constant. Acetone boils at 56.38°C and a solution of 1.41 grams of an organic solid in 20 grams of acetone boils at 56.88°C. If K_b for acetone per 100 g is 16.7, calculate the mass of one mole of the organic solid.		
17	Calculate the temperatures at which the root mean square velocity, the average velocity and the most probable velocity of oxygen gas are all equal to 1600 m s ⁻¹ .		
18	The critical temperature of hydrogen gas is 33.2°C and its critical pressure is 12.4 atm. Find out the values of 'a' and 'b' for the gas		
Section C			
Answer any ONE. Each Question carries 10 marks (1×10 = 10 Marks)			
19	a) State and explain Raoult's law and Henry's law. b) Distinguish between ideal and nonideal solutions. c) Calculate the vapour pressure lowering caused by the addition of 100 g of sucrose		

	(mol mass = 342) to 1000 g of water if the vapour pressure of pure water at 25°C is 23.8 mm Hg.
20	Explain the following: a) standard hydrogen electrode b) galvanic cells c) $\text{H}_2 - \text{O}_2$ fuel cell.

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 $a = 3.590 \text{ dm}^6 \text{ atm mol}^{-2}$, $b = 0.0427 \text{ dm}^3 \text{ mol}^{-1}$.		
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.