

QP CODE: D2BCH2401	(Pages: 2)	Reg. No :
		Name :
SECOND SEMESTER FYUGP EXAMINATION, APRIL 2025		
MAJOR COURSE		
CHE2CJ101 : Physical Chemistry - I : States of Matter		
(Credits: 4)		
Time: 2 Hours	Maximum Marks: 70	
Section A		
Answer the following questions. Each carries 3 marks (Ceiling: 24 marks)		
1. Define critical temperature of a gas.	BL1	CO1
2. How does the strength of intermolecular forces affect the boiling point of a liquid	BL1	CO1, CO3
3. Differentiate between crystalline and amorphous solids.	BL1	CO4
4. At what temperature will a 0.2 molal solution of sucrose boil if K_b of water is $0.52 \text{ K kg mol}^{-1}$. [Boiling point of water = 373 K].	BL2	CO6
5. How does viscosity depend upon the cohesive forces in a liquid? How does viscosity of liquid vary with temperature?	BL1	CO3
6. Calculate the average velocity of CO molecules at STP.	BL2	CO1
7. Mention any three limitations of Henry's law.	BL2	CO6
8. Discuss the powder diffraction pattern of CsCl crystals.	BL2	CO5
9. Briefly explain two important applications of reverse osmosis.	BL1	CO6
10. Calculate the average translational KE of an ideal gas per mole at 25 degree celsius. What will be the average KE per molecule?	BL3	CO1
Section B		
Answer the following questions. Each carries 6 marks (Ceiling: 36 Marks)		
11. Calculate the collision frequency and mean free path of a gas at 298 K and 0.7895 atm, given its collision diameter = 36.1 nm.	BL2	CO1
12. Discuss the importance of hydrogen bonding in biological systems.	BL1	CO3
(PTO)		

13.	What is packing fraction? Compute the packing fraction in bcc crystal lattice.	BL1	CO4
14.	A solution prepared by dissolving 0.25 g of a non-volatile solute in 50 mL of an organic solvent (molecular mass = 154; density = 1.58 g/mL) at 303 K is found to have a vapour pressure of 141.9 mm of Hg. If the vapour pressure of the pure solvent at 303 K is 143 mm of Hg, calculate the molar mass of the solute.	BL2	CO6
15.	The vapour pressure of pure benzene at 303 K is 119.6 mm of Hg. Calculate the vapour pressure of a 0.5 molal solution of a non-volatile solute in benzene at 303 K.	BL2	CO6
16.	Distinguish between superhydrophilic and superhydrophobic surfaces	BL1	CO3
17.	Copper crystallizes in a face-centered cubic (FCC) lattice with a cell dimension of 361 pm. Calculate the interplanar distance between the (200) planes.	BL3	CO4
18.	How the interplanar distance ratio can be used to identify the lattice type in crystals?	BL2	CO4

Section C

Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)

19.	Discuss Andrew's experiments on the isotherms of CO ₂ and bring out the idea of continuity of states.	BL2	CO1
20.	Briefly explain the principle, method, and basic instrumentation of the technique nephelometry.	BL2	CO6

CO : Course Outcome

BL : Bloom's Taxonomy Levels (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)