QP Code: U25B040

Reg. No : .....
Name : .....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

II SEMESTER (FYUGP) DEGREE EXAMINATION, MARCH 2025
B.A/B.Sc/B.Com/BSW
CHE2MN100 : PHYSICAL CHEMISTRY I STATES OF MATTER
2024 Admission Onwards
(Credits: 4)

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

Section A

*Answer **all**. Each question carries **3** Marks* ***(Ceiling: 24 Marks)***

1. Define Compressibility factor. [BTL1]
2. Calculate most probable velocity of N_2 molecule at 15^oC. [BTL3]
3. What is vapour pressure? [BTL1]
4. Examine the dipole dipole interaction between HCl molecule. [BTL3]
5. Explain any four basic crystal systems. [BTL2]
6. The Weiss indices of a lattice plane are (3, 3, 2). Calculate its miller indices. [BTL3]
7. What are solid solutions? Give example. [BTL1]
8. Explain the term molarity. [BTL2]
9. Knowing that elevation in boiling point is a colligative property, examine the relationship between boiling point and molality of a solution. [BTL3]
10. Compare dispersed phase and dispersion medium. [BTL4]

Section B

*Answer **all**. Each question carries **6** Marks* ***(Ceiling: 36 Marks)***

11. Discuss superctitical CO_2 and its applications. [BTL2]
12. Examine the virial equation of state. [BTL3]
13. Define [BTL1]
    (i) hydrophilicity and superhydrophilicity
    (ii) hydrophobicity and superhydrophobicity.
14. Compare intramolecular and intermolecular hydrogen bonding with example. [BTL4]

Turn Over

15. Discuss polymeric forms of titanium dioxide. [BTL2]

16. The first order Bragg's reflection from the (100) plane of a cubic crystal with $d1_{00}$ = 4.5 A^0 occurs at a glancing angle of 19°. Calculate the wavelength of X-ray used. [BTL3]

17. Discuss [BTL1]
    (i) osmosis
    (ii) osmotic pressure
    (iii) semipermeable membrane.

18. Illustrate the determination of molecular mass of solutes using colligative properties. [BTL4]

Section C

*Answer **any one**. Each question carries **10** Marks* ***(1x10=10 Marks)***

19. Demonstrate the principle, method and basic instrumentation of the technique of nephlometry. [BTL3]

20. Evaluate the structure of NaCl using rotating crystal method. [BTL5]

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