K23U 2335

Reg. No. : .....

Name : .....

V Semester B.Sc. Degree (C.B.C.S.S.-O.B.E.-Regular/Supplementary/ Improvement) Examination, November 2023
(2019 – 2021 Admissions)
CORE COURSE IN CHEMISTRY/POLYMER CHEMISTRY
5B09CHE/PCH : Physical Chemistry – I

Time : 3 Hours Max. Marks : 40

Instruction : *Answer the questions in* ***English*** *only.*

SECTION – A

Answer **all** questions. **Each** carries **1** mark.

1. Define compressibility factor.
2. What are surfactants ?
3. What is meant by anisotropy ?
4. State Henry's law. **(4×1=4)**

SECTION – B

Answer **any 7** questions out of 10. **Each** carries **2** marks.

5. Define the terms mean free path and collision diameter. How are they related ?
6. State the virial equation of state and explain the terms involved.
7. State and explain principle of Corresponding states.
8. Define the term coefficient of viscosity. What are the SI and CGS units of viscosity ?
9. How is molar refraction of a liquid related to its refractive index and density ?
10. Calculate the number of atoms per unit cell of an element with (a) fcc structure and (b) simple cubic structure.
11. How the diffraction pattern of NaCl and KCl differs ? Why ?

P.T.O.

12. Why Frenkel defects are not found in pure alkali metal halides ?

13. Define ebullioscopic constant.

14. What are azeotropes ? Give two examples. **(7×2=14)**

SECTION – C

Answer **any 4** questions out of 6. **Each** carries **3** marks.

15. Calculate the ratio of root mean square velocities of He and Ne gases at 25°C. Also calculate the ratio of average kinetic energies for these two gases.

16. Define the term parachor. Why it is considered both as an additive and constitutive property ?

17. What are liquid crystals ? How are they classified ? Explain.

18. Silver (atomic mass = 107.9 g/mol) which crystallizes with the fcc lattice has a unit cell edge of 4.08A°. Its density is found to be 10.53 g/cm^3. Calculate the Avogadro number from this data.

19. State Raoult's law of relative lowering of vapour pressure. How the molar mass of a solute is calculated using this ?

20. Differentiate between ideal and non-ideal solutions. **(4×3=12)**

SECTION – D

Answer **any 2** questions out of 4. **Each** carries **5** marks.

21. Derive the relationship between critical constants of a gas and van der Waals constants.

22. Discuss different types of non-stoichiometric defects found in crystals.

23. Define osmotic pressure. Explain its determination using Berkeley and Hartley's method and list out the advantages of this method.

24. a) What are the various factors influencing the solubility of gases in liquids ? Explain.

    b) State and explain the principle of equipartition of energy. **(3+2)**

(2×5=10)

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