

Reg. No

Name

22U338

B.Sc. DEGREE END SEMESTER EXAMINATION : OCTOBER 2022

SEMESTER 3 : COMPLEMENTARY CHEMISTRY FOR B Sc PHYSICS

COURSE : 19U3PCHE3.1 : ADVANCED PHYSICAL CHEMISTRY - 1

(For Regular - 2021 Admission and Improvement / Supplementary - 2020 / 2019 Admissions)

Time : Three Hours

Max. Marks: 60

PART A

Answer All (1 mark each)

1. Define triple point.
2. How many mirror planes are present in H₂O?
3. What is critical micelle concentration?
4. State Moore's Law
5. Define coefficient of viscosity
6. Sketch the plane which makes the intercepts $1/2a, 1/2b$ and c .
7. A cubic solid is made of two elements P and Q. Atoms Q are present at the corners of the cube and atoms P are at the body centre. What is the formula of the compound?
8. Give an example of a simple eutectic system.

(1 x 8 = 8)

PART B

Answer any 6 (2 marks each)

9. Show the axis of rotation and mirror planes in water molecule.
10. Write a note on Carbon nanotubes.
11. Give the expression for the Freundlich adsorption isotherm and explain the terms in it.
12. Why is Frenkel defect not found in pure alkali metal halides?
13. What are liquid crystals? Give an example
14. What is meant by space lattice?
15. Explain the term: Miller indices of a plane. How are the Miller indices obtained?
16. Define the term 'number of components' of a system. Illustrate with an example.

(2 x 6 = 12)

PART C

Answer any 4 (5 marks each)

17. Compare the structure and intermolecular forces of liquids with solids and gases.
18. Explain sol gel process for the preparation of nanomaterials?
19. How do you prepare colloids using Bredig's Arc and Peptization methods?
20. Compare and contrast the point groups C_{nv} and D_{nh} with suitable examples.

21. CsCl has a cubic structure of ions in which Cs^+ ion is present at the body centre of a cube made up with Cl^- ions at the corners. Its density is 3.99 g cm^{-3} . Calculate the length of the edge of the unit cell (Atomic masses: Cs=133; Cl=35.5)
22. State Gibbs phase rule and explain the terms number of components and degrees of freedom with suitable examples.

(5 x 4 = 20)

PART D

Answer any 2 (10 marks each)

23. Identify the symmetry elements and assign the point group of the following molecules.
a) H_2O b) BF_3 c) HCl d) Benzene
24. Discuss in detail the procedures involved in a) Sol Gel Process b) CVD process
25. a) Discuss the phase diagram of the lead-silver system.
b) Explain the Pattinson's method of desilverization of lead.
26. a) Derive Bragg's equation.
b) The first order diffraction of a beam of X-rays of wavelength 15.4 nm from the (100) planes of a crystal occurs at an angle of $11^\circ 29'$. Calculate the distance between the (100) planes.

(10 x 2 = 20)