Reg. No ..... Name **24U347**

B.Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2024

SEMESTER 3 : COMPLEMENTARY CHEMISTRY FOR PHYSICS

COURSE : **19U3CPCHE3.1 : ADVANCED PHYSICAL CHEMISTRY - 1**

(For Regular 2023 Admission and Improvement/Supplementary 2022/2021/2020/2019 Admissions)

Time : Three Hours Max. Marks: 60

PART A

Answer All (1 mark each)

1. Define triple point.
2. What are the possible molecular formulas of fullerenes?
3. The point group of a molecule containing symmetry elements, identity and only one mirror plane is …….
4. Give one example for a rhombohedral crystal.
5. What are the Miller indices of a plane which makes intercepts of 2a,3b and 2c?
6. The reciprocal of viscosity is called
7. State Moore's Law.
8. A compound formed by elements A and B crystallises in the cubic arrangement in which A atoms are at the corners of a cube and B atoms are at the face centres. What is the simplest formula of the compound?

(1 x 8 = 8)

PART B

Answer any 6 (2 marks each)

9. Plot the Freundlich adsorption isotherm and explain the terms involved in it.
10. What are liquid crystals? Give an example.
11. Presence of excess sodium makes NaCl crystal coloured. Explain on the basis of crystal defects.
12. What is the sol-gel method for the synthesis of nanoparticles.
13. Some samples of iron pyrites mineral shine like gold. Account for this.
14. Compare surfactants and micelles.
15. What is meant by 'doping'? Explain the different consequences of doping with regard to semiconductors.
16. State and explain the law of symmetry with regard to crystals.

(2 x 6 = 12)

PART C

Answer any 4 (5 marks each)

17. Compare smectic, nematic and cholesteric liquid crystals.
18. Derive an expression relating the density of a known crystal and its unit cell edge-length.
19. State the laws of crystallography.
20. How do you prepare colloids using Bredig's Arc and Peptization methods?
21. Compare and contrast the molecular symmetry of ammonia and boron trifluoride.
22. State Gibbs phase rule and explain the terms number of components and degrees of frredom with suitable examples.

(5 x 4 = 20)

PART D
Answer any 2 (10 marks each)

23. Give a brief account of symmetry elements; axis of rotation and plane of symmetry.

24. Discuss in detail the procedures involved in a) Sol Gel Process b) Chemical reduction method.

25. Derive the Bragg's law and discuss its applications.

26. a) State and explain Nernst distribution law.
    b) Applying Nernst distribution law prove that multiple extraction is more effective than single step extraction in a solvent extraction process.

(10 x 2 = 20)