



23127037

QP CODE: 23127037

Reg No :

Name :

**B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE
EXAMINATIONS, OCTOBER 2023**

Third Semester

COMPLEMENTARY COURSE - CH3CMT03 - CHEMISTRY- PHYSICAL CHEMISTRY-I

Common to B.Sc Geology Model I, B.Sc Physics Model I & B.Sc Geology and Water Management
Model III

2017 Admission Onwards

EE8A068D

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Why is it said that crystalline solids are anisotropic?
2. Define coordination number. What is the coordination number of Cs⁺ ion in CsCl structure?
3. What are vertical planes of symmetry?
4. What are crystal planes?
5. How does the strength of intermolecular forces affect the boiling point of a liquid?
6. What are the applications of Henry's Law?
7. What is meant by reverse osmosis?
8. Calculate the kinetic energy of two moles of N₂ at 27°C. ($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)
9. Define ideal gas.
10. Give the Freundlich adsorption isotherm and specify the terms.
11. Define true solution.
12. What is a eutectic?

(10×1=10)

Part B

*Answer any **six** questions.*





Each question carries 5 marks.

13. Differentiate between permanent and temporary magnets.
14. The Weiss indices of a lattice plane are 3, 3 and 2. Calculate its Miller indices.
15. The diffraction of a crystal with X-rays of wavelength 2.9×10^{-10} m gives a first order diffraction at $27^{\circ}8'$. What is the distance between the lattice planes?
16. What is surface tension? Why rain drops are spherical?
17. Discuss the thermographic behaviour of solids.
18. At what temperature would ethane molecules have the same RMS velocity as methane molecules at 27°C .
19. One mole of water vapour is confined to a 20 litre flask at 27°C . Calculate its pressure using van der Waals equation and ideal gas equation.
20. Discuss the origin of charge on colloids. What is meant by electrical double layer?
21. Calculate the degree of freedom of the system at the triple point of water.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Discuss band theory of solids
23. (a) What do you understand by depression of freezing point? Derive an expression relating the freezing point depression of a solution with the mole fraction of the dissolved solute.
(b) 1.250 g of naphthalene was dissolved in 60 cm³ of benzene and freezing point of the solution was found to be 277.515 K, while that of benzene 278.495 K. Calculate the molecular mass of naphthalene. (Given, density of benzene 0.880 g cm^{-3} $K_f = 5.1 \text{ K per } 1000 \text{ g of benzene}$).
24. Write a short notes on :
(a) Electrophoresis and its applications.
(b) Tyndall effect and Brownian movement.
25. Two components A and B are completely miscible in the liquid phase and yields a simple eutectic with a composition of 66.67% A at 410°C . Given A has a higher melting point than B, draw a qualitative phase diagram of the system and label all regions.

(2×10=20)

