

Chapter - 1 [Solid State]

- Q1:- Why is Fe_3O_4 becomes paramagnetic at 850K.
- 2:- Define F-centre.
- 3:- What is the co-ordination number of an octahedral void.
- 4:- What is Frenkel defect.
- 5:- Why does Frenkel defect not change the density of AgCl crystal.
- 6:- Mention one property which is caused due to the presence of F-centre in a solid.
- 7:- Why does presence of excess of lithium makes LiCl crystals pink.
- 8:- Define dislocation in crystal.
- 9:- What are non-stoichiometric defects.
- 10:- What is the number of atoms in a body centred cubic unit cell of crystal.
- 11:- Define Schottky defect.
- 12:- What are n-type & p-type semiconductors.
- 13:- Explain doping in semiconductors.
- 14:- What is the number of atoms in a face-centred cubic unit cell.
- 15:- Define forbidden zone of an insulator.
- 16:- Conductivity of silicon increases on doping it with phosphorus. Explain.
- 17:- Crystalline solids are anisotropic in nature. Explain.
- 18:- Explain ferrimagnetism with examples.
- 19:- Define unit cell.
- 20:- Schottky defect lowers the density of a solid. Explain.

[2 marks' Quer.]

- 1:- Explain the packing efficiency.
 - * Body centred unit cell
 - * Face centred unit cell
 - * Simple unit cell
- 2:- What are semiconductors Explain different type of semiconductors.
- 3:- Explain metal excess defect due to an extra cation occupying interstitial site.
- 4:- What do you mean by Schottky defect, in what type of compounds are these defect found.
- 5:- How does the electrical conductivity of metallic conductors vary with temperature.
- 6:- What are pseudosolids. Give examples.
- 7:- What type of stoichiometric defect is shown by: (i) ZnS (ii) $AgBr$.
- 8:- Distinguish between face-centred & end-centred unit cell.
- 9:- Distinguish between h.c.p & c.c.p.
- 10:- Explain: (i) Ionic solids are hard & brittle. (ii) The basis of similarities & difference between metallic & ionic crystal.

Numericals

11. A body-centred cubic element of density 10.3 g cm^{-3} has a cell edge of 354 pm . Calculate the atomic mass of the element. $[N_A = 6.022 \times 10^{23} \text{ mol}^{-1}]$

12. Analysis show that nickeloxide has formula $\text{Ni}_{0.98}\text{O}_{1.00}$. What fraction of nickel exist as Ni^{2+} & Ni^{3+} ions.

13. Au [Atomic radius = 0.144 nm] crystallises in a face centred unit cell. What is the length of a side of a cell.

14. If NaCl is doped with 10^{-3} mole% of SrCl_2 . What is the concentration of cation vacancies.

15. An element with molar mass $2.7 \times 10^{-2} \text{ kg mol}^{-1}$ forms a cubic unit cell with edge length 405 pm. If its density is $2.7 \times 10^3 \text{ kg m}^{-3}$. What is the nature of the cubic unit cell.

16. Aluminium crystallises in c.c.p. st. Its metallic radius is 125 pm.

(a) What is the length of the side of the unit cell?

(b) How many unit cells are there in 1.00 cm^3 of aluminium?

Chapter - 2 [Solution]

[mark Ques]

- Q1. Define molarity, Molality, mole fraction.
2. What are super saturated solutions.
3. Give the applications of Henry's law.
4. Define ideal & non-ideal solutions.
5. Explain
(a) Raoult's law for a volatile solute
(b) Raoult's law for a non-volatile solute.
6. Colligative properties.
7. Raoult's law is the special case of Henry's law. Explain.
8. Explain that relative lowering in vapour pressure is a colligative property.
9. What is the sum of mole fractions of a solution containing 3 components.
10. What is the value of Van't Hoff factor for
(a) association
(b) dissociation.
11. Define Osmotic pressure, isotonic solution, Hypotonic solution, Hypertonic solution.
12. Draw the graph of elevation in boiling pt.
13. Graph of depression in freezing point.
14. What are azeotropic mixture.
15. Explain different types of azeotropes.

16. What is Osmosis
17. What is the cause of osmosis.
18. Give the relationship between van't Hoff factor & degree of dissociation
19. Give the relation between van't Hoff factor & degree of association.
20. What are isotonic solutions
21. Hypotonic solutions
22. Hypertonic solutions.
23. Semipermeable membrane.
24. Antifreeze solutions
25. Calculate the molality of water in pure water.
26. Why does NaCl solution freeze at a lower temperature than water.

[2 marks Ques]

1. A 4% solution of sucrose ($C_{12}H_{22}O_{11}$) is isotonic with 3% solution of an unknown solute. Calculate the molecular mass of the unknown solute.

2. Calculate the amount of KCl which must be added to 1 kg of water so that its freezing point is depressed by 2K.

[Kf for water = $1.86 \text{ K Kg mol}^{-1}$
Atomic mass K = 39; Cl = 35.5]

3. Define Osmotic pressure. "The osmotic pressure observed when benzoic acid is dissolved in benzene is less than the expected value." Comment.

4. Mixture of $CHCl_3$ + CH_3COCH_3 (Acetone) shows a negative deviation from Raoult's law. Explain.

5. Show graphically that the freezing point of a liquid will be depressed when a non-volatile solute is dissolved in it.

6. Define freezing point. Why is freezing point depression of 0.1M NaCl solution nearly twice that of 0.1M glucose solution.