TEST-B

SOLVED

Time: 1 hr. **Max. Marks: 30**

SECTION-A

Tick the correct option:

1. Solid A is a very hard electical insulator in solid as well as in molten state and melts at extremely high temperature. What type of solid is it? **[1]**

   (i) Ionic solid (ii) Metallic solid

   (iii) Molecular solid with hydrogen bonding (iv) Covalent network solid

2. Potassium cyanide crystallises in the same structure as sodium chloride with a cell edge of 546 pm. The inter ionic distnace in potassium cyanide is **[1]**

   (i) 386 pm (ii) 473 pm (iii) 273 pm (iv) 630 pm

3. Which of the following doping results in n-type semiconducotr? **[1]**

   (i) Silicon doped with indium (ii) Germanium doped with phosphorus

   (iii) Boron is added to silicon (iv) Germanium doped with boron

Assertion-Reason type Questions:

(i) If assertion and reason both are correct and reason is the correct explanation of assertion.

(ii) If assertion and reason both are correct and reason is not the correct explanation of assertion

(iii) If assertion is correct and reason is wrong.

(iv) If assertion is wrong and reason is correct.

4. Assertion: NaCl is diamagnetic in the solid state but weakly paramagnetic in the molten state.

   Reason: NaCl is a high melting ionic solid which exist as face centred cubic lattice. **[1]**

5. Assertion: Tetrahedral voids can be located along the body diagonal in a cubic close structure.

   Reason: Number of tetrahedral voids is equal to the number of octahedral voids in cubic close structure. **[1]**

One word /One Sentence type Questions.

6. What is the ratio of the number of lattice points to the number of particles per unit cell in a face-centred cubic unit cell? **[1]**

7. Arrange the following in order of increasing melting point.

   Na_2O, MgO, Al_2O_3 **[1]**

SECTION-B

8. Niobium crystallizes in body-centred cubic structure. If density is 8.55 g/cm^3. Calculate the atomic radius of niobium. (At. mass = 93). $N_A = 6.02 \times 10^{23}$ mol^{-1} **[2]**

9. Calculate the packing efficiency in a solid with a packing pattern of layers as AAAA ..... Also, predict the coordination number of an atom in this packing. **[2]**

10. Distinguish between Schottky and Frenkel defect on the basis of **[2]**

    (i) Density (ii) Coordination number

11. Give reason: **[3]**

    (i) Ionic solids are hard and brittle.

    (ii) The excess of potassium in potassium chloride makes the crystal appear violet.

    (iii) Pure silicon is an insulator, but conductivity increases on addition of indium as an impurity.

12. Aluminium (molar mass = 27 g/mol) crystallizes in a cubic close-packed structure. Its metallic radius is 125 pm. **[3]**

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

    (ii) What is the density of aluminium? ($N_A = 6.02 \times 10^{23}$ mol^{-1})

13. Show the Schematic alignment of magnetic moments in **[3]**

    (i) Ferromagnetic (ii) Antiferromagnetic (iii) Ferrimagnetic

    Also, give one example of each.

14. (i) In a cubic solid, atoms A are present at the corners and atoms B are at the centre of each face. What is the simple formula of the solid if one A is missing form the corner and two B are missing form the opposite faces? **[3]**

    (ii) Explain the term 'end-centred' cubic unit cell.

15. (i) Why glass objects from the ancient monuments appears milky? **[1×5]**

    (ii) Which type of semiconductor is obtained when boron is doped with silicon.?

    (iii) What is the reason for the enhanced electrical conductivity of the non-stoichiometric zinc oxide?

    (iv) In a cubic solid, oxide ions are in ccp arrangement. Cation A occupy 1/8 of the tetrahe dral voids and cation B occupy 1/2 of the octahedral voids. What is the simple formula of the oxide?

    (v) State any one feature of metallic solids which is not shown by ionic solids.

