Solid State

FT Self Evaluation Test -5

- 1. Particles of quartz are packed by
 - (a) Electrical attraction forces
 - (b) Vander Waal's forces
 - (c) Covalent bond forces
 - (d) Strong electrostatic attraction forces
- 2. Crystals of covalent compounds always have[BHU 1984]
 - (a) Atoms as their structural units
 - (b) Molecules as structural units
 - (c) Ions held together by electrostatic forces
 - (d) High melting points
- 3. Wax is an example of
 - (a) Ionic crystal
- (b) Covalent crystal
- (c) Metallic crystal
- (d) Molecular crystal
- **4.** Among the following which crystal will be soft and have low melting point
 - (a) Covalent
- (b) Ionic
- (c) Metallic
- (d) Molecular
- 5. In zinc blende structure, zinc atom fill up
 - (a) All octahedral holes
 - (b) All tetrahedral holes
 - (c) Half number of octahedral holes
 - (d) Half number of tetrahedral holes
- **6.** Which ion has the lowest radius from the following ions

[Kurukshetra CEE 1998]

- (a) Na⁺
- (b) Mg^{2+}
- (c) Al^{3+}
- (d) Si⁴⁺

- 7. The second order Bragg's diffraction of X-rays with $\lambda = 1$ \mathring{A} from a set of parallel planes in a metal occurs at an angle of 60 o . The distance between the scattering planes in the crystal is [CBSE PMT]
 - (a) 0.575 Å
- (b) 1.00 Å
- (c) 2.00 Å
- (d) 1.15 Å
- 8. The edge length of the unit cell of *NaCl* crystal lattice is 552 *pm*. If ionic radius of sodium ion is 95 *pm*, what is the ionic radius of chloride ion[KCET 1998]
 - (a) 190 pm
- (b) 368 pm
- (c) 181 pm
- (d) 276 pm
- **9.** The ionic radii of Rb^+ and I^- are 1.46 Å and 2.16Å. the most probable type of structure exhibited by it is

[UPSEAT 2004]

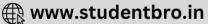
- (a) CsCl type
- (b) ZnS type
- (c) NaCl type
- (d) CaF₂ type
- **10.** The coordination number of a cation occupying a tetrahedral hole is
 - (a) 6

(b) 8

(c) 12

- (d) 4
- **11.** If a electron is present in place of anion in a crystal lattice, then it is called
 - (a) Frenkel defect
 - (b) Schottky defect
 - (c) Interstitial defects
 - (d) F centre





Answers and Solutions

(SET -5)

- 1. (c) Quartz is a covalent solid in which constituent particles are atoms which are held together by covalent bond forces.
- **2.** (a) Constituent particles of covalent compounds are atoms.
- 3. (d) Iodine crystals are molecular crystals, in which constituent particles are molecules having interparticle forces are Vander Waal's forces.
- **4.** (d) Molecular crystals are soft and have low melting point.
- **5.** (d) In zinc blende (*ZnS*) half number of tetrahedral holes are filled by zinc atoms.
- **6.** (d) All are the iso-electronic species but Si^{4+} has high positive charge so have lowest radius.
- 7. (d) $2d \sin \theta = n\lambda$ or $2 \times d \times \sin 60^\circ = 2 \times 1 \text{ Å}$ or $2 \times d \times 0.8660 = 2$ or d = 1.15 Å (sin $60^\circ = \sqrt{3}/2$ or 0.8660).

- **8.** (c) Distance between centres of Na^+ and $Cl^ r_{Na^+} + r_{Cl^-} = 276 \ pm \quad \text{or} \quad 95 + r_{Cl^-} = 276 \ pm$ or $r_{Cl^-} = 276 95 = 181 \ pm$
- **9.** (c) $\frac{r_{c^+}}{r_{a^-}} = \frac{1.46}{2.16} = 0.676$

It permits co-ordination number 6 and octahedral structure of type NaCl.

- **10.** (d) The co-ordination number of a cation occupying a tetrahedral hole is 4.
- **11.** (d) When electrons are trapped in anion vacancies, these are called *F*-centres.





