



INDIAN SCHOOL MUSCAT
SENIOR SECTION
DEPARTMENT OF CHEMISTRY
CLASS XII
CHAPTER –THE SOLID STATE
OBJECTIVE TYPE QUESTIONS



Multiple choice type questions

- The empty space within hcp arrangement is
(a)34% (b)47.6% (c)32% (d)26%
- In a bcc ,the space occupied is about
(a)74% (b)20% (c)68% (d) 52.4%
- In a trigonal crystal
(a) $a = b = c, \alpha = \beta = \gamma \neq 90^\circ$
(b) $a = b \neq c, \alpha = \beta = \gamma = 90^\circ$
(c) $a \neq b \neq c, \alpha = \beta = \gamma = 90^\circ$
(d) $a = b \neq c, \alpha = \beta = 90^\circ, \gamma = 120^\circ$
- The number of tetrahedral voids per atom present in ccp is
(a)2 (b)4 (c) 1 (d) 3
- A metal crystallises in fcc lattice and edge length of the unit cell is 620pm.The radius of metal atom is
(a)265.5pm (b)310pm (c)219.2 pm (d)438.6 pm
- A metal crystallizes into two cubic phases, face centred cubic (FCC) and body-centred cubic (BCC) whose unit cell lengths are 3.5 and 3.0 Å, respectively. Calculate the ratio of densities of FCC and BCC.
(a)1.259 : 1 (b) 1 : 1 (c)1.5 : 1 (d) 1 : 2
- A metal crystallizes with fcc lattice ,the edge length of the unit cell is 408 pm ,the diameter of the metal atom is
(a)144 (b)204 (c)288 (d)408
- In fcc lattice ,a unit cell is shared equally by how many unit cells
(a)2 (b)4 (c) 6 (d)8
- The appearance of colour in solid alkali metal halides is generally due to
(a)Frenkel (b) Interstitial (c) Schottky (d)F Centre

10. Total volume of atoms present in fcc unit cell of metal is
 (a) $\frac{20}{3}\pi r^3$ (b) $8\pi r^3$ (c) $4\pi r^3$ (d) $\frac{16}{3}\pi r^3$
11. A compound formed by elements X and Y crystallises in a cubic structure in which atoms X are at the corners of the cube and atoms Y are at the face centres. The formula of the compound is
 (a) X_3Y (b) XY (c) XY_2 (d) XY_3
12. Which of the following is not a characteristic of amorphous solids?
 (a) have sharp melting point
 (b) have non-orderly or very short-range orderly arrangement
 (c) show isotropy
 (d) have tendency to undergo irregular cleavage
13. If A, B, C are unequal and α, β, γ are unequal and not 90° , it represents a
 (a) triclinic system (b) tetragonal
 (c) monoclinic (d) orthorhombic
14. What is the contribution of the atom present at the edge centre to the unit cell?
 (a) $1/8$ (b) $1/2$
 (c) $1/4$ (d) $1/3$
15. In which of the following crystal systems the end centered unit cell exists?
 (a) monoclinic (b) triclinic
 (c) cubic (d) all of these
16. The pattern of successive layers of ccp arrangement can be designated as
 (a) AB, ABC, AB, ABC . . .
 (b) AB, AB, AB . . .
 (c) AB, BA, AB, BA . . .
 (d) BC, ABC, ABC
17. AB Crystallises in a B.C.C lattice with edge length. a as 387 pm. The distance between two oppositely charged ions in the lattice is
 (a) 300 pm (b) 335 pm
 (c) 250 pm (d) 200 pm
18. In a compound, atoms of element Y form ccp lattice and those of element X occupy $2/3$ rd of tetrahedral voids. The formula of the compound will be
 a) $X_4 Y_3$ (b) $X_2 Y_3$
 (c) $X_2 Y$ (d) $X_3 Y_4$

19. How many unit cells are present in a cube shaped ideal crystal of NaCl of mass 1.00 g? [Atomic mass of Na = 23, Cl = 35.5]
(a) 2.57×10^{21} (b) 6.14×10^{21}
(c) 3.28×10^{21} (d) 1.71×10^{21}
20. The radius of an atom of an element is 80 pm. If it crystallises as a body centred cubic lattice, what is the edge of its unit cell?
(a) 140 pm (b) 184.7 pm
(c) 209.2 pm (d) 147.5 pm
21. The Ca^{2+} and F^- are located in CaF_2 crystal, respectively at face centred cubic lattice points and in
(a) Tetrahedral voids
(b) Half of tetrahedral voids
(c) Octahedral voids
(d) Half of octahedral voids
22. Which is *not* correct about the Schottky defects?
(a) Both cations and anions are missing from their lattice sites without affecting the stoichiometry of the compound
(b) Because of presence of holes the lattice energy decreases.
(c) The presence of holes causes the density of the crystal to decrease.
(d) The defect increases the electrical conductivity of the solid due to migration of the ions into the holes.
23. The space lattice of graphite is
(a) Cubic (b) Tetragonal
(c) Rhombic (d) Hexagonal
24. Constituent particles in quartz are bonded by
(a) Electrovalent bonds
(b) Covalent bonds
(c) Van der Waal's forces
(d) Metallic bonds
25. The unit cell of highest symmetry is
(a) cubic
(b) triclinic
(c) hexagonal
(d) monoclinic
26. Which of the following will show Schottky defect
(a) CaF_2 (b) ZnS (c) AgCl (d) CsCl
27. A metal crystallizes with a face-centered cubic lattice. The edge of the unit cell is 408 pm. The diameter of the metal atom is
(a) 144 (b) 248 (c) 288 (d) 418
28. The fraction of volume occupied by atoms in a primitive cubic unit cell is
(a) 0.48 (b) 0.52 (c) 0.55 (d) 0.68
29. If NaCl is doped with 10^{-4} mol % of SrCl_2 , the concentration of cation vacancies will be ($N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

- (a) $6.02 \times 10^{23} \text{ mol}^{-1}$ (b) $6.02 \times 10^{16} \text{ mol}^{-1}$
 (c) $6.02 \times 10^{17} \text{ mol}^{-1}$ (d) $6.02 \times 10^{18} \text{ mol}^{-1}$

Fill in the blanks

30. The rank of a cubic unit cell is 4. The type of cell as _____
31. A solid PQ has rock salt type structure in which Q atoms are the corners of the unit cell. If the body-centred atoms in all the unit cells are missing, the resulting stoichiometry will be _____
32. For a certain crystal, the unit cell axial lengths are found to be $a = 5.62 \text{ \AA}$, $b = 7.41 \text{ \AA}$ and $c = 10.13 \text{ \AA}$. The three coordinate axes are mutually perpendicular. The crystal system to which the crystal belongs is _____
33. The number of nearest neighbours that an atom has in a unit cell is called _____
34. _____ is the ratio of volume occupied by sphere to the total volume of the cube
35. _____ is added to AgCl so as to produce cation vacancies.
36. The edge length of a cube is 400 pm. Its body diagonal will be _____
37. Silver has an atomic radius of 144 pm. The density of silver is 10.6 g cm^{-3} . The type of cubic crystal of silver is _____
- A statement of assertion is followed by a statement of reason. Mark the correct choice from the options given below:**
- (a) Both assertion and reason are true and reason is the correct explanation of assertion.
 (b) Both assertion and reason are true but reason is not the correct explanation of assertion.
 (c) Assertion is true but reason is false.
 (d) Both assertion and reason are false
38. **Assertion:** Distance between nearest lattice points in BCC is greater than the same in FCC having the same edge length.
Reason: FCC has greater packing efficiency than BCC.
39. **Assertion :** Due to Frenkel defect, there is no effect on the density of the crystalline solid.
Reason : In Frenkel defect, no cation or anion leaves the crystal.
40. Assertion: Crystalline solids are anisotropic.
 Reason: The constituent particles are very closely packed