SAMPLE CONTENT

FOUNDATION

MHT-CET CHEMISTRY

From vision to victory

Includes **Authentic Questions** from Latest MHT-CET Examination

- Based on Latest Paper Pattern
- Key Notes for Good Practice
- Quick Review
- Previous Years' Questions

Std. XII

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XII
Foundation
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CHEMISTRY MULTIPLE CHOICE QUESTIONS

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Chapter

1

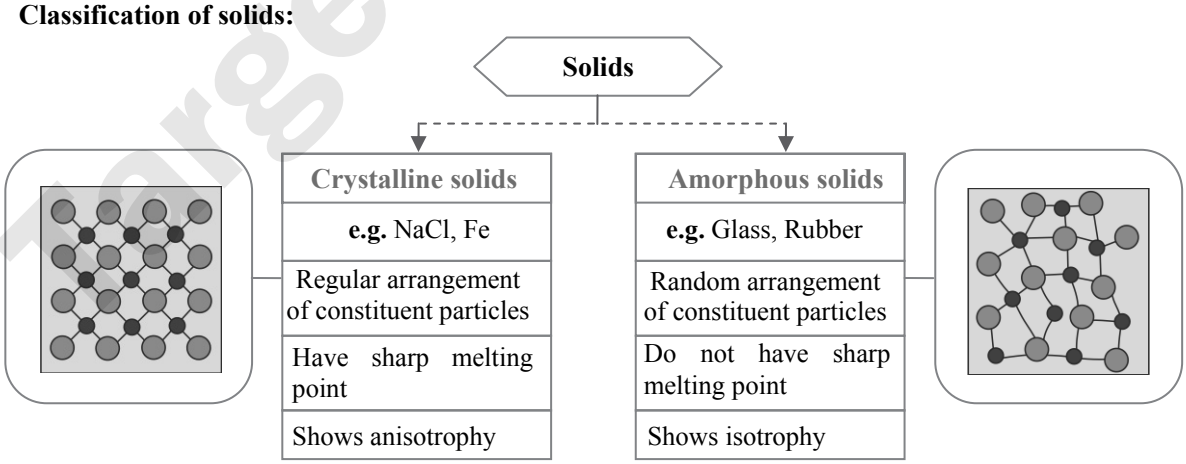
Solid State

Key Notes For Good Practice

- *Amorphous solids are also known as supercooled liquids.*
- *There are 14 Bravais lattices which are divided into 7 crystal systems.*
- *Cubic is the most symmetrical system while triclinic is the most unsymmetrical system.*
- *Each corner particle of a cubic unit cell is shared by 8 unit cells, each face particle is shared by 2 unit cells and each edge particle is shared by 4 unit cells.*
- *The number of neighbouring spheres that thouch any given sphere is its coordination number.*
- *Both hcp and ccp lattice are same coordination number of the particles (i.e., 12) and same packing efficiency (74 %).*
- *In a close packed structure, the number of octahedral voids is half that of tetrahedral voids.*
- *AgBr shows both Schottky and Frenkel defects.*
- *In Schottky defect, the density of solid decreases while in Frenkel defect, the density of solid remains unchanged.*
- *Alkali metal halides rarely exhibit Frenkel defect as alkali metal ions have large size and cannot occupy interstitial sites.*
- *F-centres or colour-centres are the anion vacant sites occupied by electrons.*
- *Band theory explains the electrical conductivity of metals, nonmetals and insulators by considering formation of conduction and valence bands.*
- *Electrical conductivity of metals decreases and that of semiconductors increases with increase in temperature.*

Quick Review

➢ **Classification of solids:**



➢ **Isomorphous and polymorphous substances:**

Isomorphous	Two or more substances having the same crystal structure are said to be isomorphous. Isomorphous pairs have same atomic ratio. **e.g.:** NaF and MgO (atomic ratio = 1:1), $NaNO_3$ and $CaCO_3$ (atomic ratio = 1:1:3)
Polymorphous	A single substance that exists in two or more forms or crystalline structures is said to be polymorphous. Polymorphism occurring in elements is called allotropy. **e.g.:** i. Calcite and aragonite: polymorphic forms of calcium carbonate, ii. α-quartz, β-quartz and cristobalite: polymorphic forms of silica.

➢ **Types and Properties of crystalline solids:**

	Property \ Type	Ionic solids	Covalent network solids	Molecular solids	Metallic solids
i.	Particles of unit cell	Cations and anions	Covalently bonded atoms	Monoatomic or polyatomic molecules	Metallic ions in a sea of electrons
ii.	Interparticle forces	Electrostatic	Covalent bonds	London, dipole-dipole forces and/ or hydrogen bonds	Metallic bonds (attraction between cations and mobile valence electrons)
iii.	Hardness	Hard and brittle	Very hard	Soft	Variable from soft to very hard
iv.	Melting points	High 600 °C to 3000 °C	High 1200 °C to 4000 °C	Low (−272 °C to 400 °C)	Wide range (−39 °C to 3400 °C)
v.	Thermal and electrical conductivity	Poor electrical conductors in solid state. Good conductors when melted or dissolved in water	Poor conductors Exceptions: Graphite: good conductor of electricity. Diamond: good conductor of heat	Poor conductor of heat and electricity	Good conductor of heat and electricity
vi.	Examples	NaCl, CaF_2	Diamond, silica	Ice, benzoic acid	Na, Mg, Cu, Au

➢ **Crystal lattice and Unit cell:**

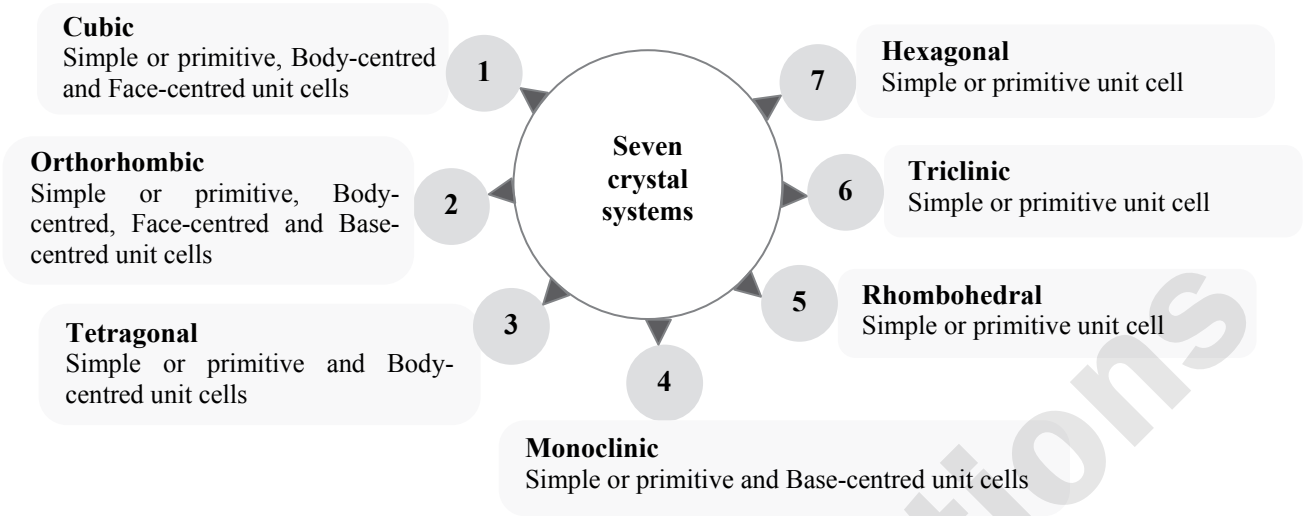
Crystal lattice	A crystal lattice or space lattice is a regular arrangement of the constituent particles (atoms, ions or molecules) of a crystalline solid in three dimensional space.
Unit cell	A unit cell is the smallest repeating structural unit of a crystalline solid**.**

➢ **Types of unit cells:**

Types of unit cells

1. **Primitive or simple unit cell**
   Particles are present at its corners only.
2. **Body-centred unit cell**
   One particle is present at the centre of its body in addition to the corner particles.
3. **Face-centred unit cell**
   Particles are present at the centre of each of the faces in addition to the corner particles.
4. **Base-centred unit cell**
   Particles are present at the centre of any two of its opposite faces in addition to the corner particles.

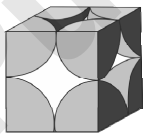
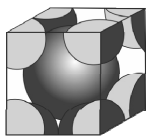
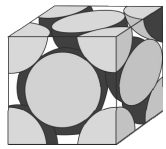
➢ **Seven crystal systems with the type of unit cells:**



Caution

Only orthorhombic crystal system has all the four types of unit cells.

➢ **Three types of cubic unit cells:**

Cubic unit cell	Simple cubic	Body-centred cubic	Face-centred cubic
Diagram			
Contribution of atoms at corners	$8 \times 1/8 = 1$	$8 \times 1/8 = 1$	$8 \times 1/8 = 1$
Contribution of atoms at faces	0	0	$6 \times ½ = 3$
Contribution of atoms in centre	0	1	0
Total	1	2	4

➢ **Packing in solids:**

Close packing of spheres

Linear packing in one dimension
In this arrangement, the spheres are placed in a horizontal row touching each other.

Coordination number = 2

Planar packing in two dimensions

AAAA type, square close packed structure

In this arrangement, several linear one dimensional identical rows are placed one over the other in such a way that they have horizontal and vertical alignment.

Coordination number = 4

ABAB type, hexagonal close packed structure

In this arrangement, several linear one dimensional identical rows are placed one over the other in such a way that alternate rows (i.e., first and third row) have horizontal and vertical alignment.

Coordination number = 6

Close packing in three dimensions

AAAA type, simple cubic structure

In this arrangement, several layers of two dimensional square close packed structures are placed one above the other in such a way that they have horizontal and vertical alignment. **e.g.** Polonium

Coordination number = 6

ABAB type, hexagonal close packed (hcp) structure

In this arrangement, several layers of two dimensional hexagonal close packed structures are placed one above the other in such a way that alternate layers (i.e., first and third row) have horizontal and vertical alignment.
Here, spheres of third layer are placed into the tetrahedral voids.
e.g. Metals such as magnesium, zinc, etc.

Coordination number = 12

ABCABC type, cubic close packed (ccp) or face-centred cubic (fcc) structure

In this arrangement, several layers of two dimensional hexagonal close packed structures are placed one above the other in such a way that first and fourth layer have horizontal and vertical alignment.
Here, spheres of third layer are placed into the octahedral voids.
e.g. Metals such as copper, silver, etc.

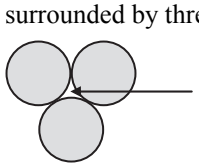
Coordination number = 12

Students can scan the adjacent QR code in *Quill - The Padhai App* to get conceptual clarity on hexagonal close packed structures with the aid of a relevant video.

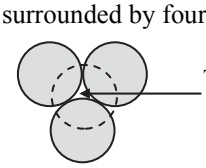
➢ **Types of voids:**

Types of voids

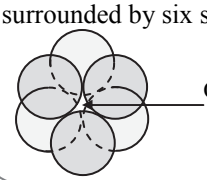
Triangular voids
A triangular void is surrounded by three spheres.



Tetrahedral voids
A tetrahedral void is surrounded by four spheres.



Octahedral voids
An octahedral void is surrounded by six spheres.



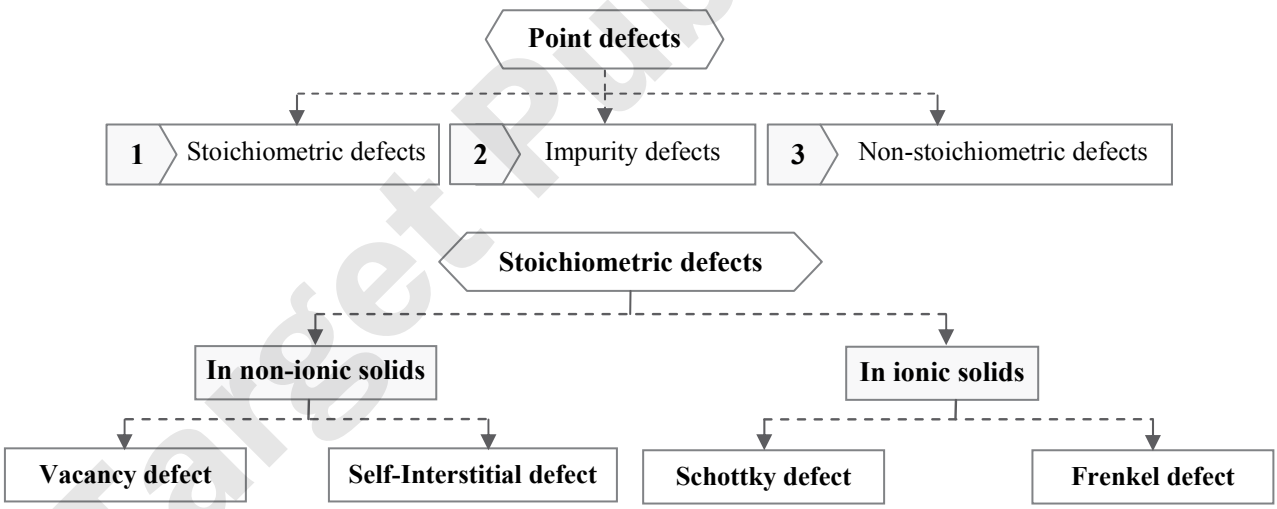
➢ **Number of voids in hcp and fcc (or ccp) structures:**

Tetrahedral voids	If the number of close packed spheres is N, then the number of tetrahedral voids = 2N
Octahedral voids	If the number of close packed spheres is N, then the number of octahedral voids = N

➢ **Coordination number and Packing efficiency of cubic unit cells:**

Type of unit cell	Simple cubic	Body-centred cubic	Face-centred cubic
No. of particles per unit cell	**1**	**2**	**4**
Relation between a and r	$r = \frac{a}{2} = 0.5000\ a$	$r = \frac{\sqrt{3}}{4}a = 0.4330\ a$	$r = \frac{\sqrt{2}}{4}a = 0.3535\ a$
Volume of one particle	$\frac{\pi a^3}{6} = 0.5237\ a^3$	$\frac{\sqrt{3}\pi a^3}{16} = 0.34\ a^3$	$\frac{\pi a^3}{12\sqrt{2}} = 0.185\ a^3$
Total volume occupied by particles in unit cell	$\frac{\pi a^3}{6} = 0.5237\ a^3$	$\frac{\sqrt{3}\pi a^3}{8} = 0.68\ a^3$	$\frac{\pi a^3}{3\sqrt{2}} = 0.74\ a^3$
Coordination number of atoms	**6** : four in the same layer, one directly above and one directly below	**8** : four in the layer below and one in the layer above	**12** : six in its own layer, three above and three below
Packing efficiency	**52.4 %**	**68 %**	**74 %**
Empty space	47.6 %	32 %	26 %

➢ **Classification of point defects:**



Vacancy defect	• Arises when a particle is missing from its regular site in the crystal lattice. • Density ⇒ decreases
Self-Interstitial defect	• Arises when: 1) an extra particle occupies an empty interstitial space in the crystal lattice, 2) a particle gets shifted from its original lattice point and occupies an interstitial space in the crystal lattice. • Density ⇒ varies In first case, density increases. In second case, density remains the same.
Schottky defect	• Arises when equal number of cations and anions are missing from their regular positions in the crystal lattice thereby creating vacancies. • **Conditions causing Schottky defect:** i. High degree of ionic character ii. High coordination number of anion

	iii. Small difference between size of cation and anion (i.e., the ratio $\frac{r_{cation}}{r_{anion}}$ is not far below unity) • Density ⇒ decreases **e.g.** NaCl, KCl, AgBr, etc.
Frenkel defect	• Arises when an ion (usually cation) of an ionic compound is missing from its regular lattice site and occupies interstitial position between lattice points. • **Conditions causing Frenkel defects:** i. Large difference between sizes of cation and anion. ii. The ions of ionic compounds must be having low coordination number. • Density ⇒ remains the same **e.g.** AgCl, AgBr, AgI, CaF_2, etc.

Impurity defects

Substitutional impurity defect
- Impurity atoms are found at the lattice sites in place of host atoms.
  e.g. Brass
- Vacancy through aliovalent impurity in ionic solid.
  e.g. NaCl containing $SrCl_2$ impurity

Interstitial impurity defect
- Impurity atoms occupy interstitial spaces.
  e.g. Stainless steel

Non-stoichiometric defects

Metal deficiency defects
Defects which arise due to the deficiency of positive ions.

Conditions causing defects

Cationic vacancies
e.g. $Ni_{0.97}O_{1.0}$

Metal excess defects
Defects which arise due to the excess of positive ions.

Conditions causing defects

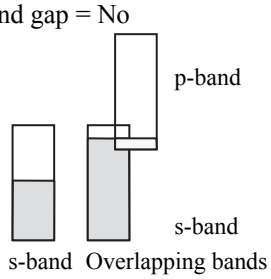
Presence of extra cations at interstitial sites
e.g. $Zn_{1+x}O_{1.0}$

Anionic vacancies (Colour or F-centres)
e.g. Excess Na in NaCl

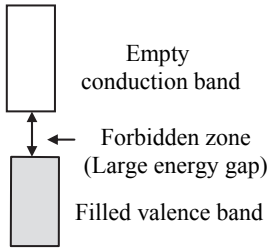
➢ **Classification of solids based on electrical properties:**

Solids

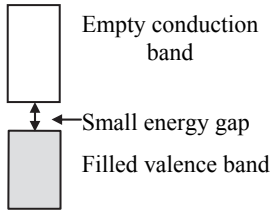
Metallic conductors
e.g. Cu, Al
- Conductivity: 10^4 **to** 10^7 $Ohm^{-1}\ m^{-1}$
- Band gap = No



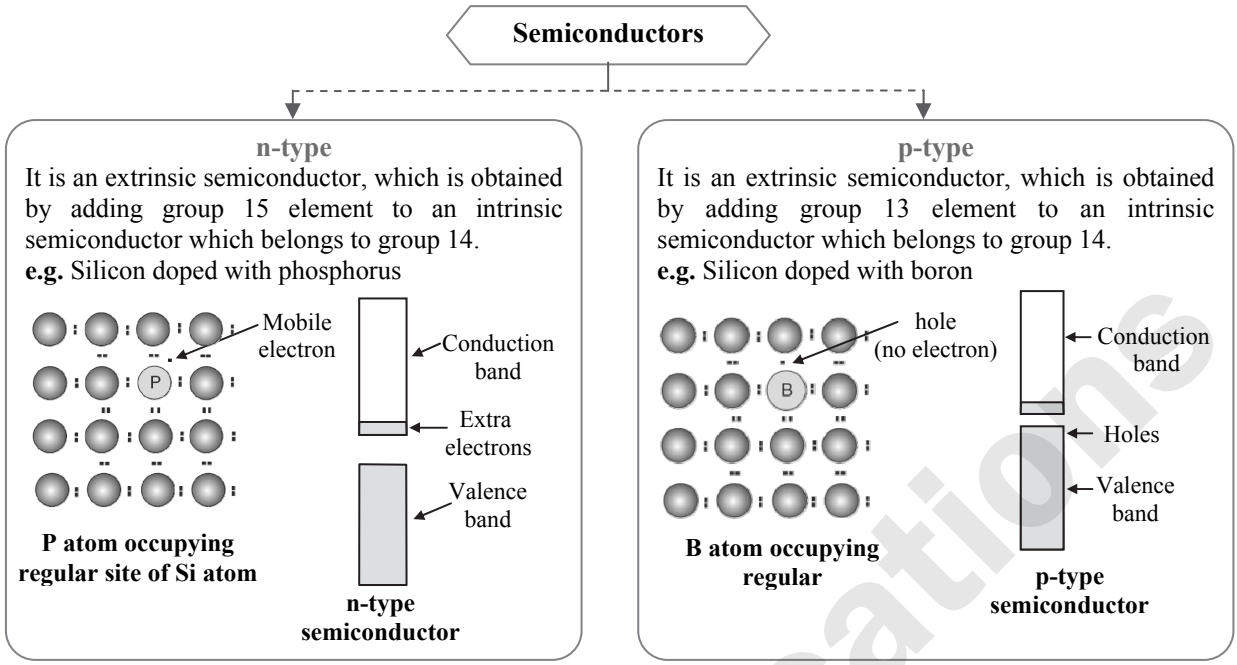
Insulators
e.g. Diamond
- Conductivity: 10^{-20} **to** 10^{-10} $Ohm^{-1}m^{-1}$
- Band gap = Large



Semiconductors
e.g. Si, Ge
- Conductivity: 10^{-6} **to** 10^4 $Ohm^{-1}\ m^{-1}$
- Band gap = small



➢ **Types of semiconductors:**



➢ **Classification of solids based on response to magnetic field:**

Diamagnetic materials	• Repelled weakly in magnetic field. • All electrons are paired.	**e.g.** N_2, F_2, NaCl, H_2O, benzene, etc.
Paramagnetic materials	• Weakly attracted in magnetic field. • Unpaired electrons are present. • Permanent magnetisation is not possible.	**e.g.** Oxygen, Cu^{2+}, Fe^{3+}, Cr^{3+}, etc.
Ferromagnetic materials	• Strongly attracted in magnetic field. • Unpaired electrons are present. • Permanent magnetisation is possible	**e.g.** Fe, Co, Ni, Gd, CrO_2, etc.

Classical Thinking

1.1 Introduction

1. Three common states of matter are solid, liquid and gas. Which of the following is a property of solids?
(A) Solids are characterized by very weak interparticle forces of attraction.
(B) Solids do not have definite volume.
(C) Solids can be easily compressed.
(D) Solids have definite shape.

1.2 Types of solids

1. Which of the following is CORRECT about crystalline solids?
(A) The particles are randomly arranged.
(B) They do not have sharp melting points.
(C) The particles do not have long range ordered structure, but they do have a short range order.
(D) The ordered arrangement of particles extends over a long range.

2. Amorphous solids _____.
(A) possess sharp melting points
(B) exhibit anisotropy
(C) are supercooled liquids
(D) possess long range ordered structure

3. _____ is a crystalline solid.
(A) Glass
(B) Rubber
(C) Plastic
(D) Common salt

4. Which of the following can be classified as an amorphous solid?
(A) Tar (B) Graphite
(C) Blue vitriol (D) Gold

5. NaF and MgO are isomorphous. Two or more substances are said to be isomorphous when they have the same _____.
(A) molar mass (B) crystal structure
(C) constituent atoms (D) melting point

6. Statement 1: The existence of a substance in more than one crystalline structure is known as polymorphism.
Statement 2: Polymorphs of a substance are formed under different conditions.
Select the appropriate option.
(A) Both the statements are correct.
(B) Both the statements are incorrect.
(C) Only statement 1 is correct.
(D) Only statement 2 is correct.

7. Find the odd one out.
(A) α-Quartz (B) Cristobalite
(C) β-Quartz (D) Calcite

8. Select the CORRECT option to complete the following correlation.
Aragonite **:** Polymorphic form of calcium carbonate **::** Fullerene **:** Polymorphic form of _____.
(A) sulphur (B) carbon
(C) calcium (D) silica

1.3 Classification of crystalline solids

1. Which of the following is **NOT CORRECT** for ionic crystals?
(A) They possess high melting points.
(B) The constituent particles are charged ions.
(C) They are hard and brittle.
(D) They are conductors of electricity in solid state.

2. In which of the following solids, the constituent particles are held together by electrostatic forces?
(A) Ca (B) CaF_2
(C) CO_2 (D) Fe

3. Diamond is an example of _____.
(A) solid with hydrogen bonding
(B) ionic solid
(C) covalent network solid
(D) molecular solid

4. Which of the following is CORRECT for diamond?
(A) Diamond is a good conductor of heat.
(B) Diamond is soft.
(C) Diamond is a bad conductor of heat.
(D) Diamond is made up of C, H and O.

5. CaF_2 is a/an _____ crystal.
(A) ionic
(B) covalent network
(C) metallic
(D) molecular

6. Which of the following solids is an example of metallic crystal?
(A) Boron nitride (B) Silver
(C) CO_2 (D) AgCl

7. Crystals of covalent compounds always have _____.
(A) atoms as their structural units
(B) molecules as structural units
(C) ions held together by electrostatic forces
(D) high melting points

8. In which of the following solids, molecules are held together by very weak dispersion or London forces?
(A) SO_2 (B) CH_4
(C) NH_3 (D) HF

9. Which of the following is a hydrogen bonded molecular solid?
(A) HCl (B) H_2
(C) CH_4 (D) Ice

10. Statement 1: In metallic crystal, molecules are held together by various intermolecular forces of attraction.
Statement 2: Molecular crystal consists of an array of positive ions immersed in a sea of mobile electrons.
Select the appropriate option.
(A) Both the statements are correct.
(B) Both the statements are incorrect.
(C) Only statement 1 is correct.
(D) Only statement 2 is correct.

1.4 Crystal structure

1. The smallest repeating structural unit of a crystalline solid is called _____.
(A) basis (B) space lattice
(C) crystal (D) unit cell

2. In primitive unit cell, the constituent particles are present at _____.
(A) the corners only
(B) the centre of each of the faces
(C) the corners and centre of its body
(D) the centre of its body only

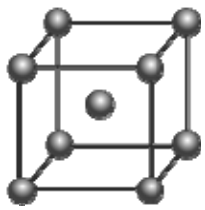
3. Fourteen Bravais lattices are divided into _____ crystal systems.
(A) 3 (B) 7 (C) 14 (D) 4

4. There are _____ kinds of unit cells in monoclinic crystal system.
(A) 2 (B) 5 (C) 3 (D) 4

1.5 Cubic system

1. A corner particle contributes its _____ part to the given unit cell.
(A) $1/4^{th}$ (B) $1/6^{th}$
(C) $1/8^{th}$ (D) $1/12^{th}$

2. The unit cell of tungsten is shown below.



The number of tungsten atoms per unit cell is _____.
(A) 1 (B) 2
(C) 3 (D) 4

3. The CORRECT formula to calculate density of a cubic unit cell is _____.
(A) Density (ρ) = $\frac{n\ M}{a^3\ N_A}$
(B) Density (ρ) = $\frac{n N_A}{a^3\ M}$
(C) Density (ρ) = $\frac{n}{a^3\ M\ N_A}$
(D) Density (ρ) = $\frac{a^3\ N_A}{n\ M}$

1.6 Packing of particles in crystal lattice

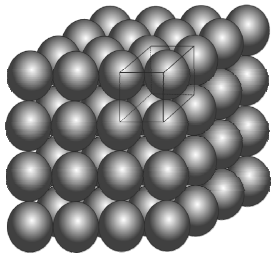
1. The coordination number of each sphere in a close packed one dimensional structure is _____.
(A) 1 (B) 2
(C) 4 (D) 8

2. In square close packing in two dimensions, each sphere touches _____ neighbouring spheres.
(A) two (B) four
(C) six (D) eight

3. In two dimensional ABAB type arrangement, the coordination number of each sphere is _____.
(A) 2 (B) 4
(C) 6 (D) 12

4. In hexagonal close packing in two dimensions, the voids (free spaces) are _____ in shape.
(A) tetragonal (B) hexagonal
(C) cubic (D) triangular

5. Simple cubic close packed structure is shown below:



The coordination number of each sphere is _____.
(A) 4 (B) 6 (C) 8 (D) 12

6. An octahedral void is surrounded by _____.
(A) four spheres (B) three spheres
(C) six spheres (D) eight spheres

7. Which of the following metal has fcc crystal structure?
(A) Copper (B) Magnesium
(C) Polonium (D) Zinc

8. In hcp structure, the number of nearest neighbours is _____.
(A) 10 (B) 7
(C) 2 (D) 12

9. In a close packed arrangement of N particles, the number of tetrahedral holes is _____.
(A) 4N (B) N/2
(C) 2N (D) N

10. The ratio of close-packed atoms to tetrahedral holes in cubic close packing is _____.
(A) 1 : 1 (B) 1 : 2
(C) 1 : 3 (D) 2 : 1

1.7 Packing efficiency

1. Packing efficiency is given by the formula:
Packing efficiency = $\frac{x}{y} \times 100$
x and y are _____ respectively.
(A) x = Volume occupied by particles in unit cell,
y = Total volume of unit cell
(B) x = Radius of each atom,
y = Volume occupied by particles in unit cell
(C) x = Volume occupied by particles in unit cell,
y = Edge length of unit cell
(D) x = Total number of atoms per unit cell,
y = Radius of each atom

2. The packing efficiency in simple cubic unit cell is _____.
(A) 52.36% (B) 68%
(C) 74% (D) 47.64%

3. What is the total volume occupied by atoms in a bcc unit cell?
(A) 50% (B) 68%
(C) 74% (D) 56%

4. A metal crystallizes in fcc structure. The vacant space in fcc unit cell is _____.
(A) 26 % (B) 10 %
(C) 46 % (D) 74 %

5. Body-centred cubic lattice has a coordination number of _____.
(A) 4 (B) 8 (C) 12 (D) 6

6. For bcc unit cell, radius (r) of a particle is given as:
(A) $r = 0.4330 \times a$ (B) $r = 0.3535 \times a$
(C) $r = 0.5000 \times a$ (D) $r = 0.5237 \times a$

7. In face-centred cubic unit cell, the edge length (a) is related to the radius of the particle by the equation _____.
(A) $a = \frac{4}{\sqrt{3}} r$ (B) $a = \frac{4}{\sqrt{2}} r$
(C) $a = 2r$ (D) $a = \frac{\sqrt{3}}{2} r$

8. The total volume occupied by particles in fcc unit cell is equal to _____.
(A) $\frac{\pi a^3}{3\sqrt{2}}$ (B) $\frac{\pi a^3}{6}$
(C) $\frac{\sqrt{3}\pi a^3}{8}$ (D) $\frac{\pi a^3}{\sqrt{3}}$

9. The total volume occupied by particles in a bcc unit cell is _____.
(A) $0.5237\ a^3$ (B) $0.68\ a^3$
(C) $0.74\ a^3$ (D) $0.34\ a^3$

10. Select the CORRECT option for simple cubic unit cell.
(A) Packing efficiency = 47.6 %
(B) Coordination number = 4
(C) Edge length of unit cell = 2r
(D) Volume of unit cell = $64\ r^3$

11. The number of particles in '*x*' g of a metallic crystal is _____.
(A) $\frac{x}{\rho a^3}$ (B) $\frac{a^3 N_A}{n}$
(C) $\frac{x n^2}{\rho a^3}$ (D) $\frac{x n}{\rho a^3}$

12. A compound is formed by elements A and B. This crystallizes in the cubic structure when atoms A are the corners of the cube and atoms B are at the centre of the body. The simplest formula of the compound is _____.
(A) AB (B) AB_2
(C) A_2B (D) A_2B_2

13. A solid has a structure in which 'W' atoms are located at the corners of a cubic lattice, 'O' atoms at the centre of edges and 'Na' atoms at the centre of the cube. The formula for the compound is _____.
(A) $NaWO_2$ (B) $NaWO_3$
(C) Na_2WO_3 (D) $NaWO_4$

1.8 Crystal defects or imperfections

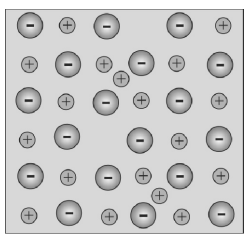
1. Which of the following is **NOT** a stoichiometric point defect?
(A) Frenkel defect (B) Impurity defect
(C) Vacancy defect (D) Schottky defect

2. Schottky defect is shown by _____.
(A) ionic compounds having high degree of ionic character
(B) compounds having high coordination number of anion
(C) compounds containing cations and anions of almost similar size
(D) all of these

3. Schottky defect is noticed in _____.
(A) NaCl (B) AgI
(C) CaF_2 (D) ZnS

4. Frenkel defect can be considered as combination of _____.
(A) vacancy defect and interstitial defect
(B) vacancy defect and impurity defect
(C) Schottky defect and impurity defect
(D) metal excess defect and interstitial defect

5. The following figure represents _____ defect.

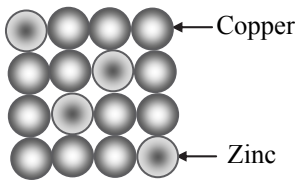


(A) Frenkel
(B) substitutional impurity
(C) Schottky
(D) metal deficiency

6. Which one of the following compounds shows both Schottky and Frenkel defects?
(A) KCl (B) AgI
(C) AgBr (D) AgCl

7. _____ defect arises when foreign atoms, that is, atoms different from the host atoms, are present in the crystal lattice.
(A) Frenkel (B) Impurity
(C) Schottky (D) Metal excess

8. The given structure represents _____.



(A) Schottky defect
(B) Frenkel defect
(C) Substitutional impurity defect
(D) Interstitial impurity defect

9. ZnO shows metal excess defect, with the excess Zn^{2+} ions occupying the _____ and the electrons occupying the neighbouring _____.
(A) interstitial sites, lattice sites
(B) lattice sites, interstitial sites
(C) interstitial sites, interstitial sites
(D) lattice sites, lattice sites

10. NaCl shows yellow colour due to _____.
(A) Schottky defect
(B) the formation of F-centre
(C) the impurity atoms occupying interstitial spaces of lattice structure
(D) the formation of vacancy through aliovalent impurity

1.9 Electrical properties of solids

1. Solids having electrical conductivities in the range _____ are called conductors.
(A) 10^{-20} to 10^{-10} Ohm^{-1} m^{-1}
(B) 10^{-6} to 10^{4} Ohm^{-1} m^{-1}
(C) 10^{-10} to 10^{4} Ohm^{-1} m^{-1}
(D) 10^{4} to 10^{7} Ohm^{-1} m^{-1}

2. Band theory of metals is based on _____.
(A) valence bond theory
(B) molecular orbital theory
(C) crystal field theory
(D) ligand field theory

3. The energy difference between valence band and conduction band is called _____.
(A) valence band (B) conduction band
(C) energy level (D) band gap

4. Which of the following has the highest band gap energy value (in eV)?
(A) Germanium (B) Diamond
(C) Sodium (D) Silicon

5. _____ is an example of conductor where the conduction band is partially filled s-band and there is no band gap.
(A) Metallic magnesium
(B) Silicon
(C) Metallic sodium
(D) Germanium

6. Germanium is an example of _____.
(A) an intrinsic semiconductor
(B) a n-type semiconductor
(C) a p-type semiconductor
(D) insulator

7. A semiconductor of Ge can be made p-type by adding _____ impurity.
(A) trivalent (B) tetravalent
(C) pentavalent (D) divalent

8. Si doped with _____ forms n-type semiconductor.
(A) B (B) In (C) Al (D) Sb

1.10 Magnetic properties of solids

1. Which among the following is **NOT** a diamagnetic substance?
(A) Water (B) Sodium chloride
(C) Oxygen (D) Benzene

2. Which of the following is paramagnetic?
(A) CrO_2 (B) Cr^{3+} (C) N_2 (D) Co

3. Ferromagnetic substances are _____.
(A) weakly repelled by magnetic field
(B) weakly attracted by magnetic field
(C) strongly repelled by magnetic field
(D) strongly attracted by magnetic field

MHT-CET Previous Years' Questions

1. Select a ferromagnetic material from the following. **[2015]**
(A) Dioxygen
(B) Chromium(IV) oxide
(C) Benzene
(D) Dihydrogen monoxide

2. Which among the following solids is a non-polar solid? **[2016]**
(A) Hydrogen chloride
(B) Sulphur dioxide
(C) Water
(D) Carbon dioxide

3. Which metal crystallizes in a simple cubic structure? **[2016]**
(A) Polonium (B) Copper
(C) Nickel (D) Iron

4. In face-centred cubic unit cell, what is the volume occupied? **[2016]**

(A) $\frac{4}{3}\pi r^3$ (B) $\frac{8}{3}\pi r^3$

(C) $\frac{16}{3}\pi r^3$ (D) $\frac{64r^3}{3\sqrt{3}}$

5. How many total spheres of constituent particles are present in bcc type of unit cell? **[2019]**

(A) 2 (B) 1 (C) 4 (D) 3

6. Which among the following defects is observed in Brass? **[2019]**

(A) Schottky
(B) Substitution impurity
(C) Interstitial impurity
(D) Frenkel

7. What is the number of atoms present per unit cell of aluminium having edge length 4 Å? (If density of Al = 2.7 g cm^{-3}, At. Mass of Al = 27) **[2020]**

(A) 2 (B) 1 (C) 4 (D) 8

8. Lithium crystallises into body centered cubic structure. What is the radius of lithium if edge length of its unit cell is 351 pm? **[2020]**

(A) 75.50 pm (B) 151.98 pm
(C) 240.80 pm (D) 300.50 pm

9. The edge length of fcc type unit cell of copper having atomic radius 127.6 pm is equal to _____. **[2020]**

(A) 361 pm (B) 295 pm
(C) 331 pm (D) 378 pm

10. What is the mass of an fcc unit cell if mass of one atom of an element is 6×10^{-23}? **[2020]**

(A) 4×10^{-23} g (B) 24×10^{-22} g
(C) 2.4×10^{-23} g (D) 2.4×10^{-22} g

11. An element crystallizes in bcc type of unit cell, the density and edge length of unit cell is 4 g cm^{-3} and 500 pm respectively. What is the atomic mass of an element? **[2020]**

(A) 100.1 (B) 150.0
(C) 125.5 (D) 250.0

12. Dry ice is an example of _____. **[2020]**

(A) ionic solid (B) covalent solid
(C) metallic solid (D) molecular solid

13. Which of the following is ferromagnetic in nature? **[2020]**

(A) Gadolinium (B) Oxygen
(C) Water (D) Benzene

14. What is the number of atoms in 12.08×10^{23} unit cells if an element crystallizes in bcc structure? **[2020]**

(A) 4.838×10^{24} (B) 2.416×10^{24}
(C) 2.08×10^{22} (D) 1.208×10^{23}

15. An element crystallizes as simple cubic having cell edge length 5 Å. What is the radius of atom of an element? **[2020]**

(A) 261.5 pm (B) 176.8 pm
(C) 216.5 pm (D) 250.0 pm

16. The radius of sphere in simple cubic lattice is 3 nm. What will be the edge length of unit cell? **[2020]**

(A) 9×10^{-9} m (B) 6×10^{-9} m
(C) 3×10^{-9} m (D) 1.5×10^{-8} m

17. Which among the following is **NOT** an amorphous solid? **[2020]**

(A) Tar (B) Camphor
(C) Butter (D) Rubber

18. An element crystallizes in bcc structure. The number of unit cells of an element in 4 g of it is (Given: At mass = 40) **[2020]**

(A) $2 \times 0.1\ N_A$ (B) $0.2 \times N_A$

(C) $\frac{0.1 \times N_A}{2}$ (D) $0.1\ N_A$

19. The mass of fcc type unit cell of copper is 419×10^{-24} g. What is the mass of one atom of copper? **[2020]**

(A) 1.047×10^{-21} g $atom^{-1}$
(B) 2.09×10^{-21} g $atom^{-1}$
(C) 1.048×10^{-22} g $atom^{-1}$
(D) 4.19×10^{-24} g $atom^{-1}$

20. What is the contribution of each particle at corner in unit cell of cubic system? **[2021]**

(A) $\frac{1}{2}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D) $\frac{1}{6}$

21. What is the value of density of an element having bcc structure with edge length 5 Å? (Atomic mass = 70 g mol^{-1}) **[2021]**

(A) 4.35 g cm^{-3} (B) 3.72 g cm^{-3}
(C) 5.35 g cm^{-3} (D) 1.86 g cm^{-3}

22. If 'a' is edge length of a simple cubic unit cell then atomic radius is given as _____. **[2021]**

(A) 0.1 a (B) 0.5 a (C) a (D) 1.5 a

23. An element (atomic mass 60) has BCC structure and density 6 g cm^{-3} then edge length of unit cell is _____. **[2021]**

(A) $\left(\frac{1}{3}\log 43.6\right) \times 10^{-8}$ cm

(B) $\left(\frac{1}{3}\log 3.32\right) \times 10^{-8}$ cm

(C) $\left(\frac{1}{3}\log 33.2\right) \times 10^{-8}$ cm

(D) $\left(\frac{1}{3}\log 56.2\right) \times 10^{-8}$ cm

24. How many lattice points are present in a face centred cubic unit cell? **[2021]**
(A) 8 (B) 17 (C) 14 (D) 9

25. How many tetrahedral voids are present in 1 mole of a compound that forms hcp structure? **[2021]**
(A) 1.0 mole (B) 2.0 mole
(C) 0.5 mole (D) 0.1 mole

26. An element has bcc structure with edge length of unit cell 600 pm. What is the atomic radius of element? **[2021]**
(A) $\sqrt{3} \times 150$ pm (B) 150 pm
(C) 300 pm (D) $\frac{300}{\sqrt{2}}$ pm

27. Calculate the number of atoms in 20 grams metal which crystallises to simple cubic structure having unit cell edge length 340 pm. (density of metal = 9.8 g cm^{-3}) **[2022]**
(A) 4.95×10^{22} (B) 5.81×10^{22}
(C) 5.19×10^{22} (D) 5.42×10^{22}

28. What is the co-ordination number of hcp crystal lattice? **[2022]**
(A) 8 (B) 12 (C) 6 (D) 4

29. Calculate the molar mass of metal having density 22.4 g cm^{-3}, crystallizes to form unit cell containing 4 particles. ($a^3 = 5.6 \times 10^{-23}$ cm^3) **[2022]**
(A) 280.2 g mol^{-1} (B) 210.6 g mol^{-1}
(C) 140 g mol^{-1} (D) 188.8 g mol^{-1}

30. Which of the following statements is **NOT** true about polymorphism? **[2022]**
(A) Fullerene is a polymorphic form of carbon.
(B) Single substance that exists in two or more forms is said to be polymorphous.
(C) NaF and MgO are polymorphous compounds.
(D) Polymorphism occurring in elements is called allotropy.

31. Which among the following is **NOT** ferromagnetic in nature? **[2022]**
(A) Zn (B) Fe
(C) Co (D) Ni

32. Which of the following is an example of covalent network solid? **[2022]**
(A) Magnesium metal (B) Benzoic acid
(C) Sodium chloride (D) Boron nitride

33. What type of unit cell is **NOT** present in cubic crystal system? **[2022]**
(A) Body centred (B) Simple
(C) Base centred (D) Face centred

34. Which among the following statements is **NOT** true about molecular solid? **[2022]**
(A) The molecules are held together by various intermolecular forces of attraction.
(B) It has low melting point.
(C) It is good conductor of heat and electricity.
(D) The constituent particles are molecules or unbounded single atoms of the same substance.

35. How many types of unit cells are present in tetragonal crystal system? **[2022]**
(A) 1 (B) 4 (C) 3 (D) 2

36. Which among the following is an example of molecular solid? **[2022]**
(A) SiO_2 (B) C_6H_5COOH
(C) SiC (D) CaF_2

37. What is the volume of one unit cell of a metal if it exists in simple cubic structure with edge length of unit cell 3Å? **[2022]**
(A) $\frac{3}{10^{20}}$ cm^3 (B) 2.7×10^{-23} cm^3
(C) 3×10^{-24} cm^3 (D) $\frac{27}{10^{20}}$ cm^3

38. Calculate the mass of bcc unit cell if metal has molar mass 56 g mol^{-1}. **[2022]**
(A) 1.86×10^{-22} gram (B) 9.3×10^{-24} gram
(C) 2.79×10^{-24} gram (D) 3.72×10^{-22} gram

39. Calculate the density of metal having volume of unit cell 64×10^{-24} cm^3 and molar mass of metal 192 g mol^{-1} containing 4 particles in unit cell. **[2022]**
(A) 14.92 g cm^{-3} (B) 19.93 g cm^{-3}
(C) 16.00 g cm^{-3} (D) 18.00 g cm^{-3}

40. Calculate the number of atoms in 36 gram element that has bcc crystal structure and edge length 2.88×10^{-8} cm.
(density of element = 7.2 g cm^{-3}) **[2022]**
(A) 3.88×10^{23} (B) 4.19×10^{23}
(C) 4.61×10^{23} (D) 4.92×10^{23}

41. What is the number of octahedral voids in 0.8 mole of compound which forms hcp structure? **[2022]**
(A) 2.48×10^{23} (B) 4.82×10^{23}
(C) 3.45×10^{23} (D) 5.69×10^{23}

42. A compound made of elements A and B form fcc structure. Atoms of A are at the corners and atoms of B are present at the centres of faces of cube. What is the formula of the compound? **[2023]**
(A) AB (B) AB_2 (C) AB_3 (D) A_2B

43. What is the packing efficiency of silver metal in its unit cell? **[2023]**
(A) 52.4% (B) 68.0%
(C) 32.0% (D) 74.0%

44. What is the number of unit cells when one mole atom of a metal that forms simple cubic structure? **[2023]**
(A) 6.022×10^{23} (B) 1.204×10^{24}
(C) 9.033×10^{23} (D) 3.011×10^{23}

45. Calculate the molar mass of an element having density 7.8 g cm^{-3} that forms bcc unit cell.
[$a^3.N_A = 16.2\ cm^3\ mol^{-1}$] **[2023]**
(A) 63.18 g mol^{-1} (B) 61.23 g mol^{-1}
(C) 59.31 g mol^{-1} (D) 65.61 g mol^{-1}

46. Identify the good conductor of electricity from following band gap energy values of solids. **[2023]**

Solid	E gap
A	5.47 eV
B	0.0 eV
C	1.12 eV
D	0.67 eV

(A) A (B) B (C) C (D) D

47. Which from following combinations is an example for construction of n-type semiconductor? **[2023]**
(A) Si doped with B (B) Si doped with P
(C) Si doped with Ga (D) Si doped with In

48. Calculate the density of a metal having molar mass 180 g mol^{-1} that forms fcc unit cells. (a^3. N_A= 36 $cm^{-3}\ mol^{-1}$) **[2023]**
(A) 20 g cm^{-3} (B) 32 g cm^{-3}
(C) 14 g cm^{-3} (D) 18 g cm^{-3}

49. Find the type of unit cell if its volume = 6.64×10^{-23} cm^3 and density = 2.7 g cm^{-3}.
(Molar mass of metal = 27 g mol^{-1}) **[2023]**
(A) Simple cubic
(B) Body centred
(C) Face centred
(D) Hexagonal close packed

50. Which of the following statements is **NOT** true about metallic solid? **[2023]**
(A) It is crystalline solid.
(B) The constituent particles are held together by covalent bond.
(C) It is malleable and ductile.
(D) It is good conductor of heat and electricity.

51. Calculate the volume of unit cell if an element having molar mass 56 g mol^{-1} that forms bcc unit cells.
[$\rho.N_A = 4.8 \times 10^{24}$ g $cm^{-3}\ mol^{-1}$] **[2023]**
(A) 1.17×10^{-23} cm^3 (B) 4.79×10^{-23} cm^3
(C) 3.31×10^{-23} cm^3 (D) 2.33×10^{-23} cm^3

52. Calculate the edge length of unit cell of metal which crystallises to bcc structure.
(Radius of metal atom = 173 pm) **[2023]**
(A) 5.01×10^{-8} cm (B) 4.00×10^{-8} cm
(C) 4.5×10^{-8} cm (D) 5.5×10^{-8} cm

53. What is the total number of Bravais lattices present for different crystal systems? **[2023]**
(A) 14 (B) 7
(C) 4 (D) 3

54. Find the radius of an atom in fcc unit cell having edge length 393 pm. **[2023]**
(A) 196.51 pm (B) 170.22 pm
(C) 78.63 pm (D) 138.93 pm

55. Calculate the number of atoms present in unit cell of an element having molar mass 190 g mol^{-1} and density 20 g cm^{-3}.
[$a^3.N_A = 38\ cm^3\ mol^{-1}$] **[2023]**
(A) 1 (B) 2 (C) 6 (D) 4

56. Which of the following characteristic properties is **NOT** true for crystalline solid? **[2023]**
(A) These substances have sharp melting point.
(B) These have different values of refractive index in different directions.
(C) The constituent particles are orderly arranged.
(D) These are isotropic.

57. Which from following is **NOT** an example of amorphous solid? **[2023]**
(A) Glass (B) Plastic
(C) Rubber (D) Diamond

58. Calculate the molar mass of metal having density 9.3 g cm^{-3} that forms simple cubic unit cell. [a^3. $N_A = 22.6\ cm^3\ mol^{-1}$] **[2023]**
(A) 210.2 g mol^{-1} (B) 105.3 g mol^{-1}
(C) 52.6 g mol^{-1} (D) 70.2 g mol^{-1}

59. Find the radius of an atom in fcc unit cell having edge length 405 pm. **[2023]**
(A) 202.5 pm (B) 175.3 pm
(C) 143.2 pm (D) 181.0 pm

60. Which from following metal has hcp crystal structure? **[2023]**
(A) Cu (B) Zn
(C) Ag (D) Po

61. Calculate the radius of metal atom in bcc unit cell having edge length 287 pm. **[2023]**
(A) 124.27 pm (B) 143.51 pm
(C) 101.45 pm (D) 57.4 pm

62. Calculate the number of atoms present in unit cell if an element having molar mass 23 g mol^{-1} and density 0.96 g cm^{-3}.
[$a^3.N_A = 48\ cm^3\ mol^{-1}$] **[2023]**
(A) 1 (B) 2 (C) 4 (D) 6

63. Which of the following statements is **NOT** true about polymorphism? **[2023]**
(A) The existence of substance in more than one crystalline form.
(B) Polymorphism occurring in element is called allotropy.
(C) Polymorphic forms of a substance are formed under different conditions.
(D) The crystal shape of polymorphic substances is identical to each other.

64. Find the radius of metal atom in bcc unit cell having edge length 450 pm. **[2023]**
(A) 225.04 pm (B) 194.85 pm
(C) 159.08 pm (D) 90.05 pm

65. Calculate the molar mass of an element having density 2.8 g cm^{-3} and forms fcc unit cell.
[$a^3.N_A = 38.5\ cm^3\ mol^{-1}$] **[2023]**
(A) 26.95 g mol^{-1} (B) 23.5 g mol^{-1}
(C) 29.2 g mol^{-1} (D) 21.6 g mol^{-1}

66. What is the number of different types of unit cells present in tetragonal crystal system? **[2023]**
(A) 1 (B) 2 (C) 3 (D) 4

67. Find the edge length of bcc unit cell if radius of metal atom is 126 pm. **[2023]**
(A) 2.91×10^{-8} cm (B) 4.52×10^{-8} cm
(C) 3.50×10^{-8} cm (D) 6.30×10^{-8} cm

68. Calculate the volume of unit cell having density 7.8 g cm^{-3} and molar mass of element 56 g mol^{-1} that crystallizes to form bcc structure. **[2023]**
(A) $2.38 \times 10^{-23}\ cm^3$ (B) $3.40 \times 10^{-23}\ cm^3$
(C) $4.5 \times 10^{-23}\ cm^3$ (D) $1.00 \times 10^{-23}\ cm^3$

69. Identify the compound exhibiting Frenkel defect. **[2023]**
(A) Calcium fluoride
(B) Sodium chloride
(C) Potassium chloride
(D) Lithium chloride

70. Which from following is **NOT** an example of covalent network solid? **[2023]**
(A) Silica (B) Boron nitride
(C) Silicon carbide (D) Calcium fluoride

71. Calculate the molar mass of an element having density 21 g cm^{-3} that forms fcc unit cell.
[$a^3.\ N_A = 36\ cm^3\ mol^{-1}$] **[2023]**
(A) 292.00 g mol^{-1} (B) 189.00 g mol^{-1}
(C) 140.00 g mol^{-1} (D) 108.00 g mol^{-1}

72. Which from following metal has ccp crystal structure? **[2023]**
(A) Cu (B) Zn (C) Mg (D) Po

73. Find the radius of metal atom in simple cubic unit cell having edge length 334.7 pm. **[2023]**
(A) 167.35 pm (B) 334.70 pm
(C) 144.93 pm (D) 118.32 pm

74. An element crystallizes in BCC structure having density of unit cell 6.20 g cm^{-3}. What is the edge length of unit cell if its atomic mass is 93? **[2023]**
(A) $\sqrt{50} \times 10^{-10}$cm (B) $\sqrt{50} \times 10^{-8}$ cm
(C) $\sqrt[3]{50} \times 10^{-10}$ cm (D) $\sqrt[3]{50} \times 10^{-8}$ cm

75. An element of BCC crystal structure has edge length of unit cell 2.93 Å. What is radius of atom? **[2023]**
(A) 0.293 Å (B) 1.268 Å
(C) 1.465 Å (D) 1.561 Å

76. What is the percentage of unoccupied volume in simple cubic cell? **[2023]**
(A) 52.4% (B) 47.64%
(C) 74.0% (D) 26.0%

77. Calculate the density of element having molar mass 23 g mol^{-1} that forms bcc unit cell.
[$a^3.Na = 45.62\ cm^3 mol^{-1}$] **[2023]**
(A) 1.8 g cm^{-3} (B) 1.0 g cm^{-3}
(C) 2.4 g cm^{-3} (D) 0.8 g cm^{-3}

78. Calculate the total volume occupied by atoms in bcc unit cell.
(edge length of unit cell = 4×10^{-8} cm) **[2023]**
(A) $4.35 \times 10^{-23}\ cm^3$ (B) $5.16 \times 10^{-23}\ cm^3$
(C) $3.54 \times 10^{-23}\ cm^3$ (D) $5.56 \times 10^{-23}\ cm^3$

79. Identify the compound exhibiting substitutional impurity defect. **[2023]**
(A) Sodium chloride (B) Zinc sulfide
(C) Brass (D) Silver bromide

80. Calculate the volume of unit cell having edge length 288 pm. **[2023]**
(A) $2.39 \times 10^{-23}\ cm^3$ (B) $2.02 \times 10^{-23}\ cm^3$
(C) $1.20 \times 10^{-23}\ cm^3$ (D) $3.42 \times 10^{-23}\ cm^3$

81. What is the number of unit cells in 1 mole atom of a metal that forms bcc structure? **[2023]**
(A) 6.022×10^{23} (B) 1.204×10^{24}
(C) 3.011×10^{23} (D) 9.033×10^{23}

82. What type of following solids the ice is? **[2023]**
(A) ionic solid
(B) covalent network solid
(C) molecular solid
(D) metallic solid

83. What is the number of tetrahedral voids in 0.6 mol compound if it forms CCP structure? **[2023]**
(A) 7.0×10^{23} (B) 7.86×10^{23}
(C) 7.23×10^{23} (D) 6.69×10^{23}

84. Which from the following unit cells is present in hexagonal crystal system? **[2023]**
(A) Body-centred (B) Face-centred
(C) Base-centred (D) Simple

85. Which from the following is an example of p-type semiconductor? **[2024, 2023]**
(A) Ge doped with As
(B) Ge doped with P
(C) Ge doped with B
(D) Ge doped with Sb

86. In a crystalline solid, atoms of element y forms hcp lattice and atoms of element x occupy $\frac{1}{3}$ of tetrahedral voids. What is the formula of compound? **[2024, 2023]**
(A) xy (B) x_2y_3 (C) x_3y_2 (D) xy_3

87. Calculate the molar mass of an element having density $2.7\ g\ cm^{-3}$ that forms fcc structure. $\left[a^3 \times N_A = 40\ cm^3\ mol^{-1}\right]$ **[2024, 2023]**
(A) $36\ g\ mol^{-1}$ (B) $30\ g\ mol^{-1}$
(C) $24\ g\ mol^{-1}$ (D) $27\ g\ mol^{-1}$

88. What is the minimum number of spheres required to develop an octahedral void? **[2024]**
(A) 2 (B) 4 (C) 6 (D) 8

89. Calculate the volume of bcc unit cell if the radius of an atom in it is 216.5 pm. **[2024]**
(A) $1.012\times10^{-22}\ cm^3$ (B) $1.25\times10^{-22}\ cm^3$
(C) $2.130\times10^{-22}\ cm^3$ (D) $2.541\times10^{-22}\ cm^3$

90. Calculate the total volume occupied by all particles in fcc unit cell if the volume of fcc unit cell is $1.25 \times 10^{-22}\ cm^3$. **[2024]**
(A) $8.52 \times 10^{-23} cm^3$ (B) $6.57 \times 10^{-23} cm^3$
(C) $7.53 \times 10^{-23} cm^3$ (D) $9.25 \times 10^{-23} cm^3$

91. What is the packing fraction of metal crystal in simple cubic lattice? **[2024]**
(A) 0.476 (B) 0.523
(C) 0.680 (D) 0.320

92. Find the number of particles per unit cell for unit having volume 3.6×10^{-23} with density $9.8\ g\ cm^{-3}$. [molar mass of element = $210\ g\ mol^{-1}$] **[2024]**
(A) 4 (B) 3 (C) 1 (D) 2

93. Calculate the total number of tetrahedral voids in 0.2 mol of a compound forming hcp structure. **[2024]**
(A) 1.2044×10^{23} (B) 2.4088×10^{23}
(C) 3.6132×10^{23} (D) 4.4176×10^{23}

94. Which of the following is not an example of polymorphic forms of carbon? **[2024]**
(A) Diamond (B) Aragonite
(C) Graphite (D) Fullerene

95. Calculate the number of unit cells in $1\ cm^3$ of metal if it forms fcc structure with edge length 200 pm. **[2024]**
(A) 4.50×10^{23} (B) 3.25×10^{23}
(C) 1.25×10^{23} (D) 5.56×10^{23}

96. Calculate the volume occupied by a particle in fcc unit cell if the volume of unit cell is $1.2\times10^{-22}\ cm^3$. **[2024]**
(A) $2.22\times10^{-23}\ cm^3$ (B) $1.12\times10^{-23}\ cm^3$
(C) $3.34\times10^{-23}\ cm^3$ (D) $4.45\times10^{-23}\ cm^3$

97. Calculate the density of an element having molar mass $63\ g\ mol^{-1}$ that forms fcc structure. $\left[a^3 \times N_A = 28\ cm^3\ mol^{-1}\right]$ **[2024]**
(A) $6.0\ g\ cm^{-3}$ (B) $9.0\ g\ cm^{-3}$
(C) $5.0\ g\ cm^{-3}$ (D) $7.0\ g\ cm^{-3}$

98. Find the void volume of bcc unit cell in cm^3 if volume of unit cell is $1.5\times10^{-22}\ cm^3$. **[2024]**
(A) 4.8×10^{-23} (B) 3.6×10^{-23}
(C) 2.4×10^{-23} (D) 1.2×10^{-23}

99. Calculate the void volume of simple cubic unit cell if the volume of unit cell is $5.5 \times 10^{-22}\ cm^3$. **[2024]**
(A) $1.435 \times 10^{-22}\ cm^3$
(B) $1.761 \times 10^{-22}\ cm^3$
(C) $2.619 \times 10^{-22}\ cm^3$
(D) $3.880 \times 10^{-22}\ cm^3$

100. What is the relation between edge length and total volume occupied by atoms in bcc unit cell? **[2024]**
(A) $V = \frac{\pi a^3}{6}$ (B) $V = \frac{\sqrt{3}\pi a^3}{8}$
(C) $V = \frac{\pi a^3}{3\sqrt{2}}$ (D) $V = \frac{\pi a^3}{16}$

101. Calculate the volume of fcc unit cell if radius of a particle in it is 106.05 pm. **[2024]**
(A) $7.4\times10^{-23}\ cm^3$ (B) $9.9\times10^{-23}\ cm^3$
(C) $2.7\times10^{-23}\ cm^3$ (D) $6.4\times10^{-23}\ cm^3$

102. In an ionic solid equal number of cations and anions are missing from their regular positions in the crystal lattice creating vacancies is called- **[2024]**
(A) Vacancy defect
(B) Self interstitial defect
(C) Schottky defect
(D) Frenkel defect

103. Metallic silver has fcc structure. If radius of Ag atom is 144pm. What is the edge length of unit cell? **[2024]**

(A) 4.07×10^{-8} cm (B) 3.22×10^{-8} cm
(C) 2.63×10^{-8} cm (D) 2.23×10^{-8} cm

104. What type of unit cell from following is common to all seven types of crystal systems? **[2024]**

(A) Simple (B) Body-centred
(B) Face-centred (D) Base-centred

105. A compound is formed by two elements A and B. The atoms of element B form ccp structure. The atoms of A occupy $\frac{1}{3}$ of tetrahedral voids. What is the formula of the compound? **[2024]**

(A) A_2B_3 (B) AB (C) AB_2 (D) AB_3

106. Unit cell of an element has edge length of 5Å with density 4 g cm^{-3}, if its atomic mass is 149, identify the crystal structure. **[2024]**

(A) Simple cubic close packed
(B) Body centred cubic
(C) Face centred cubic
(D) Hexagonal close packed

107. Calculate the number of unit cells in 0.9 g metal if it forms bcc structure. $\left[\rho\times a^3 = 3\times10^{-22}\,\text{gram}\right]$ **[2024]**

(A) 1.0×10^{21} (B) $2\cdot0\times10^{21}$
(C) 3.0×10^{21} (D) $4\cdot0\times10^{21}$

Answer Key

Classical Thinking

1.1:	1. (D)								
1.2:	1. (D)	2. (C)	3. (D)	4. (D)	5. (B)	6. (A)	7. (D)	8. (B)	
1.3:	1. (D)	2. (B)	3. (C)	4. (C)	5. (A)	6. (B)	7. (A)	8. (B)	9. (D)	10. (B)
1.4:	1. (D)	2. (A)	3. (B)	4. (A)					
1.5:	1. (C)	2. (B)	3. (A)						
1.6:	1. (B)	2. (B)	3. (C)	4. (D)	5. (B)	6. (C)	7. (A)	8. (D)	9. (C)	10. (B)
1.7:	1. (A)	2. (A)	3. (B)	4. (A)	5. (B)	6. (A)	7. (B)	8. (A)	9. (B)	10. (C)
	11. (D)	12. (A)	13. (B)							
1.8:	1. (B)	2. (D)	3. (A)	4. (A)	5. (A)	6. (C)	7. (B)	8. (C)	9. (C)	10. (B)
1.9:	1. (D)	2. (B)	3. (D)	4. (B)	5. (C)	6. (A)	7. (A)	8. (D)		
1.10:	1. (C)	2. (B)	3. (D)							

MHT-CET Previous Years' Questions

1. (B)	2. (D)	3. (A)	4. (C)	5. (A)	6. (B)	7. (C)	8. (B)	9. (A)	10. (D)
11. (B)	12. (D)	13. (A)	14. (B)	15. (D)	16. (B)	17. (B)	18. (C)	19. (C)	20. (B)
21. (D)	22. (B)	23. (C)	24. (C)	25. (B)	26. (A)	27. (C)	28. (B)	29. (D)	30. (C)
31. (A)	32. (D)	33. (C)	34. (C)	35. (D)	36. (B)	37. (B)	38. (A)	39. (B)	40. (B)
41. (B)	42. (C)	43. (D)	44. (A)	45. (A)	46. (B)	47. (B)	48. (A)	49. (C)	50. (B)
51. (D)	52. (B)	53. (A)	54. (D)	55. (D)	56. (D)	57. (D)	58. (A)	59. (C)	60. (B)
61. (A)	62. (B)	63. (D)	64. (B)	65. (A)	66. (B)	67. (A)	68. (A)	69. (A)	70. (D)
71. (B)	72. (A)	73. (A)	74. (D)	75. (B)	76. (B)	77. (B)	78. (A)	79. (C)	80. (A)
81. (C)	82. (C)	83. (C)	84. (D)	85. (C)	86. (B)	87. (D)	88. (C)	89. (B)	90. (D)
91. (B)	92. (C)	93. (B)	94. (B)	95. (C)	96. (A)	97. (B)	98. (A)	99. (C)	100. (B)
101. (C)	102. (C)	103. (A)	104. (A)	105. (A)	106. (B)	107. (C)			

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