CHEMICAL BONDING

13. LATTICE ENTHALPY, CRYSTAL STRUCTURES, FAJAN'S RULES, POLARIZING POWER

SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS

1. The relatively high solubility of Lithium Chloride (LiCl) in acetone, a non-polar solvent, compared to other alkali metal chlorides is primarily due to:
   A) Its high lattice energy
   B) The significant covalent character from polarization
   C) Its low melting point
   D) The small size of the chloride ion

Answer:B

Solution:Acetone is polar aprotic, but LiCl solubility is due to covalent character from high polarizing power of small Li^+ (Fajans' rule).

2. The lattice energy of Magnesium Oxide (MgO) is much higher than that of Sodium Chloride (NaCl) because: **(FA & SA- 2 Marks)**
   A) The mass of the magnesium ion is greater.
   B) The charges on the ions in MgO (Mg^{2+} and O^{2-}) are higher.
   C) The oxygen ion is larger than the chloride ion.
   D) Sodium is more reactive than magnesium.

Answer:B

Solution:MgO: Mg^{2+} : O^{2-}; NaCl: Na^+ , Cl^-. Higher charges $\rightarrow$ stronger attraction.

3. For a series of ionic compounds with a common anion, the lattice energy increases with:
   A) An increase in the size of the cation
   B) A decrease in the charge on the cation
   C) A decrease in the size of the cation
   D) An increase in the mass of the cation

Answer:C

Solution:Smaller cations bring ions closer together $\rightarrow$ stronger electrostatic attraction $\rightarrow$ larger lattice energy

4. Which of the following statements is/are correct?
   A) The Ag^+ ion has a higher polarizing power than the Na^+ ion, making AgCl more covalent.
   B) A small, highly charged cation can polarize a large anion effectively.
   C) Beryllium Chloride ($BeCl_2$) is covalent while Barium Chloride ($BaCl_2$) is ioniC)

D) All of the above.

Answer:D

Solution:A) True — Ag^+ higher polarizing power than Na^+ $\rightarrow$AgCl covalent.
B) True — small, highly charged cation polarizes large anion well.
C) True — $BeCl_2$ covalent, $BaCl_2$ ionic.

5. The melting point of Beryllium Chloride ($BeCl_2$) is 399°C, while that of Strontium Chloride ($SrCl_2$) is 874°C, even though Be^{2+} is smaller than Sr^{2+}. The best explanation is: **(FA & SA- 5 Marks/8 Marks)**
A) $BeCl_2$ has a higher lattice energy.
B) $BeCl_2$ is covalent due to the high polarizing power of the small Be^{2+} ion.
C) $SrCl_2$ has a higher molecular mass.
D) The chloride ion is more polarizable in $SrCl_2$.

Answer:B

Solution:Be^{2+} very small, high charge density $\rightarrow$ polarizes Cl^- $\rightarrow$covalent bonding $\rightarrow$ lower m.p.

6. According to Fajans' rules, which of the following pairs of ions would form the compound with the most covalent character?
A) K^+ and I^- B) Mg^{2+} and O^{2-} C) Al^{3+} and F^- D) Na^+ and Cl^-

Answer:C

Solution:Small, highly charged cation (Al^{3+}) and small anion (F^-) lead to the greatest covalent character.

7. The correct order of increasing covalent character for the following compounds is:
A) LiF < LiCl < LiBr < LiI B) LiI < LiBr < LiCl < LiF
C) LiCl < LiF < LiBr < LiI D) LiF < LiBr < LiI < LiCl

Answer:A

Solution:Larger anion $\rightarrow$ more polarizable $\rightarrow$ more covalent character:
LiF < LiCl < LiBr < LiI

8. The correct order of decreasing ionic character for the chlorides of Group 2 elements is: **(FA & SA- 3 Marks/4 Marks)**
A) $BeCl_2 > MgCl_2 > CaCl_2 > SrCl_2 > BaCl_2$
B) $BaCl_2 > SrCl_2 > CaCl_2 > MgCl_2 > BeCl_2$
C) $BeCl_2 > MgCl_2 > BaCl_2 > CaCl_2 > SrCl_2$
D) $MgCl_2 > CaCl_2 > BeCl_2 > SrCl_2 > BaCl_2$

Answer:B

Solution:Ionic character increases as cation size increases down group:
$BeCl_2 < MgCl_2 < CaCl_2 < SrCl_2 < BaCl_2$ (most ionic).
Decreasing ionic character reverse order: $BaCl_2 > SrCl_2 > CaCl_2 > MgCl_2 > BeCl_2$

9. Which of the following factors contributes to the high polarizing power of a cation?
A) Low charge and large size

B) High charge and small size
C) Low charge and small size
D) High charge and large size

Answer:B

Solution: Polarizing power is determined by the charge-to-size ratio of a cation. A smaller cation with a higher charge can more effectively distort the electron cloud of an anion, leading to greater polarization.

10. The dissolution of an ionic compound in water often involves:
A)An endothermic lattice energy step and an exothermic hydration energy step.
B)An exothermic lattice energy step and an endothermic hydration energy step.
C) Both steps being exothermiC)
D) Both steps being endothermiC)

Answer:A

Solution:Breaking the lattice requires energy (endothermic); hydration (solvation) releases energy (exothermic). Net dissolution enthalpy depends on the balance

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. Which of the following statements is/are correct regarding the application of Fajans' rules?
A) Silver Iodide (AgI) is more covalent than Silver Chloride (AgCl).
B) Magnesium Sulphide (MgS) has a higher percentage of ionic character than Magnesium Oxide (MgO).
C) For a given anion, the covalent character increases as the polarizing power of the cation increases.
D) Potassium Fluoride (KF) is more ionic than Cesium Fluoride (CsF).

Answer:A,C

Solution:

A) True. AgI is more covalent than AgCl because I^- is larger and much more polarizable than Cl^-, so Ag^+ polarizes I^- more $\rightarrow$ greater covalent character.
B) False. MgO is more ionic than MgS. O^{2-} is smaller and less polarizable than S^{2-}, so Mg^{2+}–O^{2-} is more ionic; MgS has relatively more covalent character.
C) True. For a given anion, increasing the cation's polarizing power (smaller radius / higher charge) increases covalent character — that's exactly Fajans' point.
D) False. KF is less ionic (more polarizing) than CsF because K^+ is smaller than Cs^+ and polarizes F^- more. So CsF is the more ionic of the two.

12. For the formation of the ionic compound Calcium Fluoride (CaF_2), which of the following energy changes would be required in its Born-Haber cycle?
A) The sublimation energy of solid calcium.
B) The second electron affinity of fluorine.
C) The bond dissociation energy of the F_2 molecule.

D) The second ionization energy of calcium.

Answer:A,C,D

Solution:

A) The sublimation energy of solid calcium — Yes. Ca(s) $\rightarrow$ Ca(g) is required.

B) The second electron affinity of fluorine — No. We only add one electron to each F atom (first EA). The second electron affinity of F would mean $F^- \rightarrow F^{2-}$, which does not occur in forming CaF_2.

C) The bond dissociation energy of the F_2 molecule — Yes. You must break F_2 into 2 F atoms before electron capture.

D) The second ionization energy of calcium — Yes. Ca must form Ca^{2+}, so both first and second ionization energies are required

Statement Type:

A) Both statement I and II are correct and statement II is correct explanation of statement I.

B) Both statement I and II are correct and statement II is not correct explanation of statement I.

C) Statement I is correct and statement II is incorrect.

D) Statement I is incorrect and statement II is correct.

13. **Statement I** : Beryllium Chloride ($BeCl_2$) has a much lower melting point than Calcium Chloride ($CaCl_2$).

Statement II : The Be^{2+} ion, being much smaller than the Ca^{2+} ion, has a higher polarizing power, introducing significant covalent character in $BeCl_2$.

Answer:A

Solution:$BeCl_2$ has a much lower melting point than $CaCl_2$ because Be^{2+} is very small and highly polarizing, so it induces covalent character (polymeric/covalent network or molecular-like bonding) in $BeCl_2$. That reduces the strong electrostatic lattice present in fully ionic $CaCl_2$, so $BeCl_2$ melts at a much lower temperature. Statement II explains Statement.

14. **Statement I** : The lattice energy of Aluminium Oxide (Al_2O_3) is significantly higher than that of Sodium Oxide (Na_2O).

Statement II : Lattice energy is directly proportional to the product of the charges of the ions and inversely proportional to the distance between them.

Answer:A

Solution:Al_2O_3 contains Al^{3+} and O^{2-} (higher charges) while Na_2O contains Na^+ and O^{2-} (lower cation charge). Lattice energy scales with the product of ionic charges and falls with increasing interionic distance (Coulomb's law). Thus Al_2O_3 has a much larger lattice energy than Na_2O, and Statement II directly explains Statement

Comprehension Type:

The arrangement of ions in the crystal of an ionic solid is known as its lattice arrangement.

The smallest part of the crystal of an ionic compound that represents its lattice arrangement is known as the **unit cell.**

The crystal of an ionic solid is a combination of different unit cells. The ions packed in a crystalline substance are shown by points in a crystal lattice. These points are called lattice points. In different cubic unit cells there are mainly four kinds of lattice points.

15. What is the term for the smallest, repeating unit in a crystal that perfectly represents the entire lattice structure of an ionic solid?
A)Lattice Point B)Crystal Matrix C)Unit Cell D)Ionic Block

Answer:C

Solution:A unit cell is the basic repeating building block of a crystal lattice. When repeated in 3D, it generates the entire crystal structure.

16. In a crystal model, the positions where the centers of the ions are located are represented by specific points. What are these points called?
A) Atomic Centers B)Lattice Points C)Unit Cells D)Ionic Nodes

Answer:B

Solution:Lattice points represent fixed positions that show where ions, atoms, or molecules are located in the crystal structure.

17. The overall three-dimensional pattern in which ions are arranged in an ionic solid is known as its:
A) Molecular Geometry B) Lattice Arrangement
C) Atomic Structure D) Ionic Grid

Answer:B

Solution:The lattice arrangement (or crystal lattice) represents the complete 3D pattern in which ions are arranged in the entire solid.

Matrix Matching Type:

18.

Column-I (Factor)	**Column-II (Effect on Covalent Character)**
(A) Size of the cation increases	(1) Covalent character increases
(B) Charge on the anion increases	(2) Covalent character decreases
(C) Cation has a pseudo inert gas configuration	(3) No effect on covalent character
(D) Charge on the cation decreases	(4) Covalent character remains the same

Answer:A-2,B-1,C-1,D-2

Solution:

(A) Size of the cation increases	(2) Covalent character decreases
(B) Charge on the anion increases	(1) Covalent character increases
(C) Cation has a pseudo inert gas configuration	(1) Covalent character increases
(D) Charge on the cation decreases	(2) Covalent character decreases

Integer type:

19. In a binary compound MX, the coordination number of both the cation (M^+) and the anion (X^-) is 6. The total number of atoms present in one unit cell of this ionic compound is _____.

Answer:8

Solution:In a binary compound MX where the coordination number of both the

cation (M^+) and the anion (X^-) is 6, the compound has a rock-salt (NaCl) structure.

This structure is a face-centered cubic (FCC) array of one ion type with the other ion type occupying all the octahedral voids.

The total number of atoms (ions) present in one unit cell of this ioni compound is determined by the number of (M^+) and (X^-) ions:

Number of (X^-) ions (e.g., in an FCC lattice):

8 corners x 1/8 contribution per corner = 1 ion

6 faces x 1/2 contribution per face = 3 ions

Total (X^-) ions = 1 + 3 = 4 ions

So total atoms (ions) in unit cell = 4+4=8 atoms.

20. The number of electrons lost by one atom of Aluminum (Al) to achieve the stable electronic configuration of the nearest noble gas and form an Al^{3+} ion is _____.

Answer:3

Solution:Aluminum atom:Atomic number = 13

electronic configuration: 2, 8, 3

To achieve the nearest noble gas (Neon: 2,8), it loses 3 electrons

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LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS

1. The coordination number of the cation in a body-centered cubic lattice like Caesium Chloride (CsCl) is:

A) 4 B) 8 C) 6 D) 12

Answer:B

Solution:The coordination number of the cation (Cs+) in a body-centered cubic (BCC) lattice like Caesium Chloride (CsCl) is 8

2. In a Sodium Chloride (NaCl) crystal lattice, the number of chloride ions immediately surrounding a single sodium ion is:

A) 8 B) 6 C) 4 D) 2

Answer:B

Solution:NaCl is face-centered cubic, each Na^+ surrounded octahedrally by 6 Cl^-.

3. Which of the following aluminium halides is the most ionic?

A) AlF_3 B) $AlCl_3$ C) $AlBr_3$ D) AlI_3

Answer:A

Solution:.Fluoride is smallest and most electronegative $\rightarrow$ least polarizable $\rightarrow$ Al–F is the most ionic

4. Among the chlorides of Group 2 elements, the one with the highest ionic character is:

A) $BeCl_2$ B) $MgCl_2$ C) $CaCl_2$ D) $BaCl_2$

Answer:D

Solution:Ionic character increases down group: $BaCl_2$ most ionic

5. Which of the following metal ions has the least tendency to form covalent compounds?
   A) Li^+ B) Be^{2+} C) K^+ D) Al^{3+}

Answer:C

Solution:Large cation, low charge $\rightarrow$ least polarizing power $\rightarrow$ K^+ .

6. The distortion of an anion's electron cloud by a cation, which leads to electron sharing, is known as:
   A) Ionization B) Polarization C) Sublimation D) Dissociation

Answer:B

Solution:Distortion of an anion's electron cloud by a cation = polarization

7. According to Fajans' rules, the polarizing power of a cation is directly proportional to its:
   A) Atomic mass B) Ionic radius
   C) Ionic charge D) Number of electron shells

Answer:C

Solution:Polarizing power α charge / radius $\rightarrow$ directly proportional to ionic charge.

8. Which of the following cations has the lowest polarizing power?
   A) Li^+ B) Be^{2+} C) K^+ D) Mg^{2+}

Answer:C

Solution:K^+ largest size, +1 charge $\rightarrow$ lowest polarizing power.

9. The compound with the maximum covalent character among the following is:
   A) LiCl B) $BeCl_2$ C) BCl_3 D) CCl_4

Answer:D

Solution:Carbon tetrachloride is a neutral covalent molecular compound and shows the maximum covalent character here.

10. According to Fajans' rules, conditions that favor the formation of an ionic bond (low covalent character) are:
    A) Small cation and large anion
    B) High charge on both cation and anion
    C) Large cation and small anion
    D) Cation with a pseudo noble gas configuration

Answer:C

Solution:Large cation and small anion. That minimizes polarization (small anion is less polarizable and a large cation has low polarizing power) — favors ionic bonding.

JEE MAINS LEVEL QUESTIONS

1. The correct order of increasing polarizing power for the following cations is:
(FA & SA- 3 Marks/4 Marks)

A) $Na^+ < K^+ < Mg^{2+} < Al^{3+}$
B) $K^+ < Na^+ < Mg^{2+} < Al^{3+}$
C) $Al^{3+} < Mg^{2+} < Na^+ < K^+$
D) $K^+ < Na^+ < Al^{3+} < Mg^{2+}$

Answer:B

Solution:Polarizing power α charge / radius.
K^+ (largest, +1) < Na^+ (smaller, +1) < Mg^{2+} (small, +2) < Al^{3+} (smallest among these, +3).

2. For a series of ionic compounds with a common anion, the lattice energy is expected to:
A) Increase with increasing size of the cation
B) Decrease with increasing charge on the cation
C) Increase with decreasing size of the cation
D) Be independent of the cation size

Answer:C

Solution:Increase with decreasing size of the cation
Smaller cation $\rightarrow$ shorter ion–ion distance $\rightarrow$ stronger Coulombic attraction $\rightarrow$ larger lattice energy

3. Silver Chloride (AgCl) is sparingly soluble in water, while Sodium Chloride (NaCl) is highly soluble. This is best explained by:
A) The higher lattice energy of NaCl.
B) The significant covalent character in AgCl due to the polarizing power of Ag^+.
C) The smaller size of the Cl^- ion in AgCl.
D) The higher hydration energy of Ag^+ compared to Na^+.

Answer:B

Solution:Ag^+ polarizes Cl^- $\rightarrow$ partial covalency, lowers solubility compared with the very ionic NaCl.

4. According to Fajans' rules, which of the following factors does not favor covalent character in an ionic compound?
A) Small cation B) Large anion
C) High charge on the cation D) Cation with an inert gas configuration

Answer:D

Solution:A cation with a pseudo/inert-gas configuration has low polarizing power $\rightarrow$ favors ionic character.

5. In a crystal of Zinc Sulphide (ZnS), which has a coordination number of 4:4, the number of formula units (ZnS) per unit cell is:
A) 1 B) 2 C) 4 D) 8

Answer:C

Solution:Zinc blende structure: 4 Zn and 4 S per cubic unit cell $\rightarrow$ 4 formula units.

6. The melting point of Lithium Chloride (LiCl) is lower than that of Sodium Chloride (NaCl), even though the Li^+ ion is smaller. This anomaly is primarily due to:
   A) The lower lattice energy of LiCl.
   B) The higher covalent character in LiCl.
   C) The higher hydration energy of Li^+.
   D) The larger size of the Cl^- ion in LiCl.

Answer:B

Solution:Small Li^+ polarizes Cl^- , making LiCl partially covalent $\rightarrow$ lower melting point than NaCl, despite Li^+ being smaller and having higher lattice energy expected.

7. Which of the following compounds has the highest lattice energy?
(FA & SA- 2 Marks)
   A) KCl B) CaO C) MgS D) NaF

Answer:B

Solution:Factors Affecting Lattice Energy
Charge of ions (Q): Higher ionic charges $\rightarrow$ stronger electrostatic attraction $\rightarrow$higher lattice energy.
Ionic radius (r): Smaller ions $\rightarrow$ shorter distance between charges $\rightarrow$ stronger attraction.

Mathematically, lattice energy is proportional to: $U \propto \frac{Q1 \cdot Q2}{r}$

CaO has the highest lattice energy because:
Both ions are doubly charged (Ca^{2+} and O^{2-}).
Oxygen is smaller than sulfur, so the distance between charges is shorter than in MgS.This maximizes electrostatic attraction.

8. The number of nearest neighbors (coordination number) for a chloride ion in the Caesium Chloride (CsCl) crystal structure is:
   A) 4 B) 6 C) 8 D) 12

Answer:C

Solution:CsCl structure: each Cl^- surrounded by 8 Cs^+ at cube corners.

9. For the halides of a given alkali metal, the covalent character increases in the order: **(FA & SA- 5 Marks/8 Marks)**
   A) Fluoride < Chloride < Bromide < Iodide
   B) Iodide < Bromide < Chloride < Fluoride
   C) Chloride < Fluoride < Bromide < Iodide
   D) Bromide < Chloride < Iodide < Fluoride

Answer:A

Solution:Covalent character increases down the halide group because polarizability of anion increases (I^- most polarizable).

10. In the Born-Haber cycle for the formation of Magnesium Oxide (MgO), which of the following steps would require the most energy?
    A) Sublimation of Magnesium
    B) First ionization energy of Magnesium
    C) Second ionization energy of Magnesium
    D) Bond dissociation energy of Oxygen

Answer:C

Solution:The second ionization energy (I_2) for Mg is much larger than first ionization, sublimation, or bond dissociation energy of O_2, because removing an electron from Mg^+ (already +1 ion) requires more energy.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. The Born-Haber cycle for the formation of Magnesium Chloride ($MgCl_2$) would necessarily involve the calculation or use of which of the following energies?
    A) The second ionization energy of Magnesium.
    B) The bond dissociation energy of the Chlorine molecule (Cl_2).
    C) The sublimation energy of solid Magnesium.
    D) The electron affinity of Chlorine.

Answer:A,B,C,D

Solution:A (2nd IE of Mg): required to form Mg^{2+}.
B (bond dissociation of Cl_2): needed to give 2 Cl atoms from Cl_2.
C (sublimation of Mg): to convert Mg(s) $\rightarrow$ Mg(g) before ionization.
D (electron affinity of Cl): each Cl atom gains an electron (EA of Cl) to form Cl^-

12. According to Fajans' rules, which of the following comparisons about the covalent character in ionic compounds are correct?
    A) Sodium Chloride (NaCl) is more ionic than Copper(I) Chloride (CuCl).
    B) Aluminium Fluoride (AlF_3) is more ionic than Aluminium Iodide (AlI_3).
    C) Beryllium Chloride ($BeCl_2$) is more covalent than Barium Chloride ($BaCl_2$).
    D) Potassium Iodide (KI) is more covalent than Potassium Fluoride (KF).

Answer:A,B,C,D

Solution:A (NaCl > CuCl ionic): Cu^+ is more polarizing than Na^+, so CuCl is relatively more covalent — hence NaCl is more ionic.
B (AlF_3 more ionic than AlI_3): F^- is small and hard (less polarizable) so AlF_3 is more ionic than AlI_3.
C ($BeCl_2$ more covalent than $BaCl_2$): small, highly polarizing Be^{2+} induces covalency; Ba^{2+} is large and gives a more ionic compound.
D (KI more covalent than KF): I^- is much more polarizable than F^-, so KI shows greater covalent character than KF

Statement Type:

A) Both statement I and II are correct and statement II is correct explanation of statement I.
B) Both statement I and II are correct and statement II is not correct

explanation of statement I.
C) Statement I is correct and statement II is incorrect.
D) Statement I is incorrect and statement II is correct.

13. **Statement I** : Silver Chloride (AgCl) is less soluble in water than Sodium Chloride (NaCl).
Statement II : The Ag^+ ion has a high polarizing power which introduces significant covalent character in the Ag-Cl bond, reducing its interaction with polar water molecules.

Answer:A

Solution:Ag^+ polarizes Cl^- $\rightarrow$ partial covalent character in AgCl, lowering its solubility compared with very ionic NaCl.

14. **Statement I** : In the crystal structure of Caesium Chloride (CsCl), the coordination number is 8:8.
Statement II : The large size of the Cs^+ ion allows eight chloride ions to pack efficiently around it in a cubic arrangement.

Answer:A

Solution:CsCl is 8:8; the large Cs^+ fits into a cube formed by eight Cl^- so eight anions can surround it in cubic coordination

Comprehension Type:

Born Haber process or more commonly referred to as Born Haber cycle is a method that allows us to observe and analyze energies in a reaction. It mainly helps in describing the formation of ionic compounds from different elements. The methodology further enables us to understand the overall reaction process through a series of steps.

Born-Haber cycle was introduced in the year 1919 by German scientists named Fritz Haber and Max Born. Born Haber cycle is mainly used to calculate the lattice energy. It also involves several steps or processes such as electron affinity, ionization energy, sublimation energy, the heat of formation and dissociation energy.

15. What is the primary application of the Born-Haber cycle in chemistry?
A)To calculate the rate of a chemical reaction.
B)To determine the electron configuration of an element.
C)To calculate the lattice energy of an ionic compounD)
D)To measure the pH of a salt solution.

Answer:C

Solution:The Born-Haber cycle is primarily used to calculate the lattice energy of an ionic compound from other thermochemical quantities.

16. The Born-Haber cycle is used to understand the formation of an ionic compound by breaking it down into:
A)A single, direct reaction step.
B)A series of elemental mixtures.
C) A series of steps involving energy changes.
D) The combustion of its constituent elements.

Answer:C

Solution:The cycle breaks the formation of an ionic compound into a series of steps involving energy changes (sublimation, ionization, dissociation, electron affinity, lattice formation).

17. Which of the following is NOT listed in the paragraph as one of the energy processes involved in the Born-Haber cycle?
A)Ionization energy
B)Electron affinity
C)Free energy change
D)Sublimation energy

Answer:C

Solution:Common energy processes in Born-Haber cycle:
Sublimation energy
Ionization energy
Bond dissociation energy
Electron affinity
Lattice energy
Free energy change is not part of the individual steps in the Born-Haber cycle — it's a thermodynamic quantity (ΔG) not directly one of the steps in Hess's-law breakdown.

Matrix Matching Type:

18.

Column I	Column II
(A) Crystal structure where each ion is surrounded by 4 oppositely charged ions	(1) NaCl
(B) The smallest repeating unit that shows the entire crystal pattern	(2) 8:8
(C) Coordination number in the Caesium Chloride (CsCl) structure	(3) Unit Cell
(D) An ionic compound that crystallizes in a 6:6 coordination structure	(4)Zinc Blende (ZnS)

Answer:A-4,B-3,C-2,D-1

Solution:

(A) Crystal structure where each ion is surrounded by 4 oppositely charged ions	(4)Zinc Blende (ZnS)
(B) The smallest repeating unit that shows the entire crystal pattern	(3) Unit Cell
(C) Coordination number in the Caesium Chloride (CsCl) structure	(2) 8:8
(D) An ionic compound that crystallizes in a 6:6 coordination structure	(1) NaCl

Integer type:

19. In the Sodium Chloride (NaCl) crystal structure, the total number of chloride ions (Cl^-) surrounding a single sodium ion (Na^+) as its nearest neighbors is _____.

Answer:6

Solution:In the NaCl crystal structure, each Na^+ ion is surrounded by 6 Cl^- ions as its nearest neighbors.

20. In the Born-Haber cycle for the formation of Magnesium Oxide (MgO), the total number of electrons lost by one mole of magnesium atoms to form Mg^{2+} ions is _____.

Answer:2

Solution:So, one mole of Mg atoms (6.022×10^{23} atoms) will lose 2 moles of electrons, but the integer asked is the number of electrons each atom loses, which is 2.

KEY

				TEACHING TASK					
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	B	C	D	B	C	A	B	B	A
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17	18		
A,C	A,C,D	A	A	C	B	B	A-2,B-1,C-1,D-2		
19	20								
8	3								
				LEARNERS TASK					
			CONCEPTUAL UNDERSTANDING QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	B	A	D	C	B	C	C	D	C
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	C	B	D	C	B	B	C	A	C
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17	18		19
A,B,C,D	A,B,C,D	A	A	C	C	C	A-4,B-3,C-2,D-1		6
20									
2									