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## CHEMISTRY

## BOOKS - NARENDER AVASTHI CHEMISTRY (HINGLISH)

## SOLID STATE

Exercise

1. which of the following statement is true for ionic solids?
A. Ionic solids are soluble in non-polar solvent
B. Under the electric field cation and anions acquire translatory
motion in opposite directions
C. Structural units have strong electrostatic force of arrtraction
D. Structural units have dipole-dipole interactions

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2. Which one is called pseudo solid?
A. $C a F_{2}$
B. Glass
C. NaCl
D. All

## Answer: B

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3. Solid which do not show the same physical properties in different directions are called:
A. pseudo solids
B. isotropic solids
C. polymorphic solids
D. anisotropic solids

## Answer: D

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4. Graphite is an example of:
A. ionic solid
B. covalent solid
C. metallic solid
D. none of these
5. Amorphous solids are
A. isotropic and supercooled liquids
B. anisotropic and supercooled liquids
C. isoenthalpic and superheated liquids
D. isotropic and superheated solids

## Answer: A

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6. Which type of solid crystals will conduct heat and electricity?
A. ionic crystals
B. Covalent crystal
C. metallic crystals
D. molecular crystals

## Answer: C

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7. The bond length and bond angles in molecules in the solid state are calculated by:
A. X-ray diffraction technique
B. neutrons bombardment
C. protons bombardment
D. none of these
8. if $a=b \neq c$ and $\alpha=\beta=\gamma=90^{\circ}$, the crystal system is
A. cubic
B. triclinic
C. hexagonal
D. tetragonal

## Answer: D

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9. Triclinic crystal has the following the cell parameters:
A. $a=b=c, \alpha=\beta=\gamma=90^{\circ}$
B. $a=b \neq c, \alpha=\beta=\gamma=90^{\circ}$
C. $a \neq b \neq c, \alpha \neq \beta \neq \gamma \neq 90^{\circ}$
D. $a \neq b \neq c, \alpha=\beta=90^{\circ} \gamma \neq 120^{\circ}$

## Answer: C

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10. If all three iterfacial angeles defining the unit cell, are equal in magniture, the crystal cannot be:
A. rhombohedral
B. cubic
C. hexagonal
D. tetragonal

## Answer: C

11. In a hexagoanl crystal:
A. $\alpha=\beta=\gamma \neq 90^{\circ}, a=b=c$
B. $\alpha=\beta=\gamma=90^{\circ}, a=b \neq c$
C. $\alpha=\beta=\gamma=90^{\circ}, a \neq b \neq c$
D. $\alpha=\beta=90^{\circ}, \gamma=120^{\circ}, a=b \neq c$

## Answer: D

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12. Orthorhombic crystal has the following unit cell parameters:
A. $a=b=c, \alpha=\beta=\gamma=90^{\circ}$
B. $a=b \neq c, \alpha=\beta=\gamma=90^{\circ}$
C. $a \neq b \neq c, \alpha=\beta=\gamma=90^{\circ}$,
D. $a=b \neq c, \alpha=\beta=90^{\circ}, \gamma=120^{\circ}$

## Answer: C

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13. Which of the crystal systems has maximum number of Bravais lacttices?
A. Cubic
B. Hexagonal
C. Triclinic
D. Orthohombic

## Answer: D

14. The most unsysmmetrical and symmeterical systems are, respectively:
A. Tertragonal, Cubic
B. triclinic , Cubic
C. Rhombohedral, Hexagonal
D. Orthohombic, Cubic

## Answer: B

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15. Tetragonal crystal system has the following unit cell dimensions
A. cubic
B. tertragonal
C. monoclinic
D. rhombohedral

## Answer: B

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16. In the primitive cubic unit cell, the atoms are present at the:
A. corners of the unit cell
B. centre of the unit cell
C. centre of each face of the unit cell
D. one set of faces of the unit cell
17. In the body centered unit cell, the lattice point are present at the:
A. corners of the unit cell only
B. corners and centre of the unit cell
C. corners and centre of each face of the unit cell
D. corners and at one set of faces of unit cell

## Answer: B

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18. In the face centered per unit cell, the lattice points are present at the:
A. corners of unit cell only
B. corners and centre of the unit cell
C. corners and centre of each face of the unit cell
D. face centres of the unit cell

## Answer: C

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19. The number of atom per unit in a simple cubic, face - centered cubic and body - centered cubic are ....respectively
A. 1,4,2
B. 1,2,4
C. 8,14,9
D. $8,4,2$

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20. What would be the effective number of atoms per unit cell in end centred cubic uit cel, if this type of unit cell exist in nautre?
A. 1
B. 2
C. 3
D. 4

## Answer: B

21. In the body centered cubic unit cell and simple unit cell, the radius of atoms in terms of edge length (a) of the unit cell is respectively:
A. $\frac{a}{2}, \frac{a}{2 \sqrt{2}}$
B. $\frac{a}{\sqrt{2}}, \frac{a}{2}$
C. $\frac{a}{2 \sqrt{2}}, \frac{a}{2}$
D. $\frac{3 \sqrt{a}}{4}, \frac{a}{2}$

## Answer: D

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22. In face -centered cubic unit cell, edge length is
A. $a / / 2$
B. $a / \sqrt{2}$
C. $a / 2 \sqrt{2}$
D. $3 \sqrt{2} / 4$

## Answer: C

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23. The fraction of total volume occupied by the atom present in a simple cubic is
A. 0.48
B. 0.52
C. 0.55
D. 0.68

Answer: B
24. The fraction of volume occupied by atoms in a body centered cubic unit cell is:
A. 0.32
B. 0.48
C. 0.68
D. 0.74

## Answer: C

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25. The fraction of volume occupied by atoms in a face centered cubic unit cell is:
A. 0.32
B. 0.48
C. 0.68
D. 0.74

## Answer: D

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26. Which of the following crystal lattice has the miniumuum empty space?
A. simple cubic
B. Body centred cubic
C. Face centred cubic
D. Simple tertragonal
27. Which of the following has the smallest packing efficency for atoms of a single type?
A. Body centred cubic
B. Face centred cubic
C. Face centred cubic
D. Simple tertragonal

## Answer: C

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28. Polonium crystallizes in a simple cubic strtucture. The edge of the unit cell is 0.236 nm . What is the radius of the polonium atoms:
A. 0.144 NM
B. 0.156 NM
C. 0.118 NM
D. 0.102 nm

## Answer: C

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29. Lithium crystallizes as body centered cubic crystals. If the length of the side of unit cell is $350=\mathrm{pm}$, the atomic radius of lithium is:
A. 303.1 pm
B. 606.2 pm
C. 151.5 pm
D. 123.7 pm

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30. Metallic gold crystallises in face centred cubic lattice with edgelength $4.07 \AA$. Closest distance between gold atoms is:
A. 576.6 pm
B. 287.8 pm
C. 352.5 pm
D. 704.9pm

## Answer: B

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31. The neon atoms has a radius of 160 pm . What is the edge of the unit cell of a face centered structure of neon?
A. 490 pm
B. 320 pm
C. 453 pm
D. 481 pm

## Answer: C

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32. What are the number of atoms per unit cell and the number of nearest neighbours in a simple cubic structure?
A. 1,6
B. 4,12
C. 2,8
D. 2,6

## Answer: A

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33. What are the number of atoms per unit cell and the number of nearest neighbours in a face centered cubic structure?
A. 4,8
B. 2,8
C. 2,6
D. 4,12

## Answer: D

34. What are the number of atoms per unit cell and the number of nearest neighbours in a body centered cubic structure?
A. 4,12
B. 1,6
C. 2,8
D. 2,5

## Answer: C

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35. Each edge of a cubic unit cell is 400pm long. If atomic mass of the elements is 120 and its desity is $6.25 \mathrm{~g} / \mathrm{cm}^{2}$, the crystal lattice is: $\left(u s e N_{A}=6 \times 10^{23}\right)$
A. primitive
B. body centred
C. Face centred
D. end centred

## Answer: D

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36. Tungsten has an atomic radius of 0.136 nm . The density of tungsten is $19.4 \mathrm{~g} / \mathrm{cm}^{3}$. What is the crystal structure of tungsten?
(Atomic mass $W=184$ )
A. simple cubic
B. Body centred cubic
C. Face centred cubic
D. none of these

## Answer: B

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37. The density of argon (face centered cubic cell) is $1.83 \mathrm{~g} / \mathrm{cm}^{3} \mathrm{at} 20^{\circ} \mathrm{C}$. What is the length of an edge a unit cell? (Atomic mass : $A r=40$ )
A. 0.599 nm
B. 0.569 nm
C. 0.525 nm
D. 0.551 nm

## Answer: C

38. The density of nickel (face centered cubic cell) is $8.94 \mathrm{~g} / \mathrm{cm}^{3} a t 20^{\circ} \mathrm{C}$. What is the radius of the atom? (Atomic mass: $N i=59$ )
A. 0.124 nm
B. 0.136 nm
C. 0.149 nm
D. 0.110 nm

## Answer: A

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39. The density of krypton (face centered cubic cell) is $3.19 \mathrm{~g} / \mathrm{cm}^{3}$.

What is the radius of the atom? (Atomic mass : $K r=84$ )
A. 0.198 nm
B. 0.221 nm
C. 0.206 nm
D. 0.225 nm

## Answer: A

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40. The face centered cubic cell of platinum ha an edge length of 0.392 nm . Calculate the density of platinum $\left(\mathrm{g} / \mathrm{cm}^{3}\right)$ : (Atomic mass : $P t=195$ )
A. 20.9
B. 20.4
C. 19.6
D. 21.5

## Answer: D

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41. Chromium metal crystallizes with a body-centred cubic lattice. The length of the unit cell edge is found to be 287pm. Calculate the atomic radius. What woulds be the density of chromium in $\mathrm{gcm}^{-3}$ ?
A. 6.8
B. 7.6
C. 6.6
D. 7.23

## Answer: D

42. An elemetnts crystallizes in a face centered cubic lattice and the edge of the unit cell is 0.559 nm . The density is $3.19 \mathrm{~g} / \mathrm{cm}^{3}$. What is the atomic mass?
A. 87.6
B. 79.9
C. 85.5
D. 83.9

## Answer: D

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43. The elements crystallizes in a body centered cubic lattice and the edge of the unit cell is 0.351 nm . The density is $0.533 \mathrm{~g} / \mathrm{cm}^{3}$. What is the atomic mas?
A. 12
B. 6.94
C. 9.01
D. 10.8

## Answer: B

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44. An element $X(A t, w t=80 \mathrm{~g} / \mathrm{mol})$ having fcc structure, calculate the number of unit cells in 8 gof $X$
A. $0.4 \times N_{A}$
B. $0.1 \times N_{A}$
C. $4 \times N_{A}$
D. none of these

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45. Moldydenum (At. mass $=96 \mathrm{~g} / / \mathrm{mol}^{-1}$ ) crystallizes as bcc crystal. If density of crystal is $10.3 \mathrm{~g} / \mathrm{cm}^{3}$, then radius of Mo atoms $\left(u s e N_{A}=6 \times 10^{23}\right):$
A. 111PM
B. 314 PM
C. 135.96PM
D. none of these

## Answer: C

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46. What is the condition number of an atom for an element crystallizing with a cubic lattice? Calculate the corresponding coordination number for the simple, fcc and bcc lattics:
A. $12 \mathrm{sc}, 12 \mathrm{fcc}, 8 \mathrm{bc} \mathrm{c}$
B. $6 \mathrm{sc}, 14 \mathrm{fcc}, 8 \mathrm{bc} \mathrm{c}$
C. $8 \mathrm{sc}, 12 \mathrm{fcc}, 6 \mathrm{bc} \mathrm{c}$
D. $\mathrm{sc}, 12 \mathrm{fcc}, 8 \mathrm{bc} \mathrm{c}$

## Answer: D

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47. The most malleable metals ( $\mathrm{Cu}, \mathrm{Ag}, \mathrm{Au}$ ) have close-packaing of the type:
A. Hexagonal closse-packing
B. Cubic close-packing
C. Body-cebtred cubic packing
D. Malleablity is not related to type of paacking

## Answer: B

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48. The cordination number of a metal crystallising in a hexagonal close-packed structure is:
A. 12
B. 4
C. 8
D. 6
49. If the ratio of coordination no. of $A$ to that iof $B$ is $x: y$, then the ratio of no. of atoms of $A$ to that no, of atoms of $B$ in the unit cell is
A. $x: y$
B. $y: x$
C. $x^{2}: y$
D. $y: x^{2}$

## Answer: B

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50. The atomic radius of strontium $(S r)$ is $215 p m$ and it crystallizes with a cubic. Closest packing . Edge length of the cube is :
A. 4.30 pm
B. 608.2 pm
C. 496.53 pm
D. none of these

## Answer: B

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51. By X-ray diffraction it is found tht nickel (at mass $=59 \mathrm{gmol}^{-1}$ ) , crystakkuzes with ccp. The edge length of the unit cell is $3.5 \AA$. If density of Ni crystal is $9.0 \mathrm{~g} / \mathrm{cm}^{3}$, then value of Avogadro's number from the data is:
A. $6.05 \times 10^{23}$
B. $6.11 \times 10^{23}$
C. $6.02 \times 10^{23}$
D. $6.023 \times 10^{23}$

Answer: B
(D) Watch Video Solution
52. Stacking of square close packed layers give rise to:
A. bcc structure
B. fcc structure
C. Simple cubic structure
D. hcp structur

Answer: C

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53. In a hexagonal close packed (hcp) structure of spheres, the fraction of the volume occupied by the sphere is A. In a cubic close packed structure the fraction is $B$. The relation for $A$ and $B$ is:
A. $A=B$
B. A It B
C. Agt B
D. $A$ is equal to the fraction in a simple cubic lattice.

## Answer: A

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54. The unit cell present in $A B C A B C$, closet packing of atoms is:
A. Hexagonal
B. tertragonal
C. Face centred cubic
D. primitive cubic

## Answer: C

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55. The number of atoms present in a hexagonal close-packed unit cell is:
A. 4
B. 6
C. 8
D. 12

## Answer: B

56. The unit cell present in ABAB, closest packing of atoms is:
A. Hexagonal
B. tertragonal
C. face centered cubic
D. primitive cubic

## Answer: A

## (D) Watch Video Solution

57. The number of terrahedral and octahedral holes in a hexagonal primitive unit cell are respectively:
A. 8,4
B. 6,12
C. 2,1
D. 12,6

## Answer: D

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58. Which one of the following schemes of ordering closed packed sheets of equal sized spheres does not generate close packed lattice?
A. $A B C A B C$
B. ABACABAC
C. ABBAABBA
D. ABCBCABCBC
59. In the closet packing of atoms, there are:
A. one tetrahedral void and two octahedral voids per atom
B. two tetrahedral voids and one octahedral void per atom
C. two of each tertrahedral and octahedral voids per atom
D. one of each tetrahedral and octahedral voids per atom

## Answer: B

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60. Which of the following figures represets the cross-section of an octahedral site?
A.

B.

C.


Answer: D

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61. In which of the following paris of structures, tetrahedral as well as octahedrak as well as octahedral holes are found?
A. bcc and fcc
B. hcp and simple cubic
C. hcp and ccp
D. bcc and hcp

## Answer: C

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62. The number of octahedral void in bcc structure is:
A. 0
B. 1
C. 2
D. 4

## Answer: A

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63. An ionic compound is expected to have octahedral structure if $r_{c} / r_{a}\left(r_{c}<r_{a}\right)$ lies in the range of:
A. 0.414 to 0.732
B. 0.732 to 0.82
C. 0.225 to 0.414
D. 0.155 to 0.225

Answer: A
64. A ionic compound is expected to have tetrahedral structure if $r_{c} / r_{a}:$
A. lies in the range of 0.141 to 0.732
B. lies in the range of 0.225 to 0.414
C. lies in the range of 0.155 to 0.225
D. is more than 0.732

## Answer: B

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65. An ionic compound is expected to have body centred type cubic unit cell if $r_{c} / r_{a}$ :
A. is greater than 0.732
B. lies in the range of 0.141 to 0.732
C. lies in the range of 0.255 to 0.414
D. lies in the range of 0.155 to 0.225

## Answer: A

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66. In the closed packing of atoms A (radius: $r_{a}$ ), the radius of atom $B$ that can be fitted into tetrahedral void is:
A. $0.155 r_{a}$
B. $0.255 r_{a}$
C. $0.414 r_{a}$
D. $0.732 r_{a}$
67. In closest packing of A type of atoms (radius $r_{A}$ ) the radius of atom $B$ that can be fitted into octabedral voids is
A. $1.155 r_{a}$
B. $0.255 r_{a}$
C. $0.414 r_{a}$
D. $0.732 r_{a}$

## Answer: C

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68. How many nearest neighbours are there in an atom or ion for an octahedral hole of a closed packed structure?
A. 4
B. 6
C. 8
D. 12

## Answer: D

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69. How many "nearst" and "next nearst" neighbours, respectively, does potassium have in bcc lattice?
A. 8,8
B. 8,6
C. 6,8
D. 6,6

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70. In the closest packing of atoms
A. the size of tetrahedral void is greater than that of octahedral
void
B. the size of tertrahedral void is smaller than that of octahedral void
C. the size of tertrahedral void is equal than that of octahedral
void
D. the size of tetraderal void may be or smaller or equal to that of octahedral void depending upon the size of atoms
71. The the ionic compound AB the ratio $r_{A+}: r_{B-} i s 0.414$. Indicate the correct statement among the following:
A. Cation form close packing and anion exactly fir into the octahedral voids
B. Anion form close packing and anion occupy precisely half of the tetrahedral voids
C. Anion form close packing and cation occupy precisely all the octahedral voids
D. Cation form close packing and anion fit into the octahedral voids loosely

Answer: C
72. In the unit cell of $\mathrm{KCl}\left(\mathrm{NaCl}\right.$ type), $\mathrm{Cl}^{\wedge}(-)$ ions constitute ccp and $K^{+}$ion fall into the octahedral holes. These holes are:
A. One at the centre and 6 at the centres of the faces
B. one at the centre and 12 at the centres of the edges
C. 8 at the centres of 8 small cubes forming the unit cell
D. none of these

## Answer: B

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73. Which is incorrect statement?
A. In NaCl structure, tetrahedral voids are unoccupied
B. In ZnS structure, octahedral voids are unoccupied
C. In $C a F_{2}$ structure, all tetrahedral voids are occupied
D. In $\mathrm{Na}_{2} \mathrm{O}$ structure, all tetrahedral voids are unoccupied

## Answer: D

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74. In the radius of the anion in an ionic acid solid is 200pm, what would be the radius of the cation that fits exactly into a cubic hole:
A. 146.4 pm
B. 82.8 pm
C. 45 pm
D. none of these
75. The CsCl type structure is exhibited by alkali halides only when the radius of the cation is large enough to keep touching its eight nearst neighbour aniion. Below what minimum raiton of cation of anion radii $\left(r^{+} / r^{-}\right)$this contact is prevented
A. 0.225
B. 0.414
C. 0.632
D. 0.732

## Answer: D

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76. MgO crystallizes in a cubic type crystal system. The ionic radii for $\mathrm{Mg}^{2+}$ and $\mathrm{O}^{2-}$ are 0.066 abd 0.140 nm respectively One can conclude that the $M g^{2+}$ ions occypy:
A. a cubic hole in a simple structure
B. every tetrahedral hole in a close packed structure
C. an octahedral hole in a cubic packed structure
D. every other tetrahedral hole in a close paked structure

## Answer: C

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77. The unit cell of diamond is made up of:
A. 8 carbon atoms, 4 atoms ccp and two atoms occuypy half of
B. 8 carbon atom, 4 atoms constitute $\operatorname{ccp}$ and 4 atoms occupy all
the octahedral voids
C. 8 carbon atoms, 4 atoms form fcc lattice and 4 atoms occupy
half of the tetrahedral voids altenately
D. 12 carbon atoms. 4 atoms form fcc lattice and 8 atoms occupy
all the tetrahedral holes

## Answer: C

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78. In diamond, the coordination number of carbon is:
A. four and its unit cell has eight carbon atoms
B. four and its unit cell has six carbon atoms
C. six and its unit cell has four carbon atoms
D. four and its unit cell has four carbon atoms

## Answer: A

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79. Predict coordination umber of the cation in crystals of the following compounds :
(1). $M g O: r_{c}=0.65 \AA, r_{a}=1.40 \AA$
(2). $M g S: r_{c}=0.65 \AA, r_{a}=1.84 \AA$
A. 6,4
B. 4,6
C. 3,4
D. 6,8
80. In a cubic unit cell, seven of the eight corners are occupied by atoms A and centres of faces are occupied by atoms B. The general formula of the compound is:
A. $A_{7} B_{6}$
B. $A_{7} B_{12}$
C. $A_{7} B_{24}$
D. $A_{24} B_{7}$

## Answer: C

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81. CaS exists in a cubic close packed arrangement of $S^{2-}$ ions in which $\mathrm{Ca}^{2+}$ ions occupy $1 / 2$ of the available tetrahedral holes. How
many $\mathrm{Ca}^{2+}$ and $S^{2-}$ ions are contained in the unit cell?
A. 1,1
B. 2,4
C. 4,4
D. 4,2

## Answer: C

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82. In the spinel structur, oxides ions are cubical-closet packed whereas $1 / 8$ th of tetrahedral voids are occupied by $A^{2+}$ cation and $1 / 2$ of octahedral voids are occupied by $B^{+}$cations. The general formula of the compound having spinel structure is:
A. $A_{2} B_{2} O_{4}$
B. $A B_{2} O_{4}$
C. $A_{2} B_{2} O_{2}$
D. $A_{4} B_{2} O_{2}$

## Answer: B

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83. If the anion (A) form hexagonal closet packing and cation (C ) occupy only $2 / 3$ octahedral voids in it, then the general formula of the comound is:
A. CA
B. $C A_{2}$
C. $C_{2} A_{3}$
D. $C_{3} A_{2}$

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84. In a solid, oxide ions are arrnged in ccp, cations A occupy A occupy $\left(\frac{1}{8}\right)^{t} h$ of the tetrahedral voids and cation B occupy $\left(\frac{1}{4}\right)^{t h}$ of the octahedral voids. The formula of the compound is:
A. $\mathrm{ABO}_{4}$
B. $A B_{2} O_{3}$
C. $A_{\circ} B O_{4}$
D. $A B_{4} O_{4}$

Answer: A
85. In a face centered cubic arrangement of $A$ and $B$ atoms whose $A$ atoms are at the corner of the unit cell and $B$ atoms at the face centers. One of the $B$ atoms missing from one of the face in unit cell. The simplest formula of compounding is:
A. $A B_{3}$
B. $A_{8} B_{5}$
C. $A_{2} B_{5}$
D. $A B_{2 / 5}$

## Answer: C

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86. An alloy of $C u, A g$ and $A u$ is found to have copper constituting
the $c . c . p$. lattice. If $A g$ atom occupy the edge centres and $A u$ atom is present at body centre, the formula of this alloy is :
A. $C u_{4} A g_{2} A u$
B. $C u_{4} A g_{4} A u$
C. $C u_{4} A g_{3} A u$
D. $C u A g A u$

## Answer: C

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87. Which of the following statements is correct in the rock-salt structure of ionic compounds?
A. Co-ordination number of cation is four and anion is six
B. Co-ordination number of cation is six and anion is four
C. Co-ordination number of each cation and anion in four
D. Co-ordination number of each cation and anion in six

## Answer: D

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88. Which of the following statement is correct for the bodycentred cubic structure of an ionic compound?
A. Co-ordination number of each cation and anion is two
B. Co-ordination number of each cation and anion in four
C. Co-ordination number of each cation and anion in six
D. Co-ordination number of each cation and anion in eight

## Answer: D

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89. Which of following statements is correct in the zinc-blende-type structure of an ionic compound?
A. Co-ordination number of each cation and anion is two
B. Co-ordination number of each cation and anion in four
C. Co-ordination number of each cation and anion in six
D. Co-ordination number of each cation and anion in eight

## Answer: B

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90. Which of the following expressions is correct in the case of a sodium chloride unit cell (edge length, $a$ )?
A. $r_{c}+r_{a}=a$
B. $r_{c}+r_{a}=2 a$
C. $r_{c}+r_{a}=\sqrt{2} a$
D.

Answer: B

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91. In an idaeal closet rock salt structure (edge length a) which of the following expression is correct?
A. $r_{a}=\sqrt{2} a$
B. $r_{a}=a / \sqrt{2}$
C. $r_{a}=a / 2 \sqrt{2}$
D. $r_{a}=a / 4$

## Answer: C

92. Which of the following expression is correct in case of a CsCl unit cell (edge length, a)?
A. $r_{c}+r_{a}=a$
B. $r_{c}+r_{a}=a / \sqrt{2}$
C. $r_{c}+r_{a}=\sqrt{3} a / 2$
D. $r_{c}+r_{a}=a / 2$

## Answer: C

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93. In NaCl the centres of two nearst like-charged ions are present
at a distance of:
A. $\frac{1}{2} a \sqrt{2}$
B. $\frac{1}{2} a$
C. $\frac{\sqrt{3}}{2} a$
D. $\frac{1}{\sqrt{2}} 2 a$

## Answer: A

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94. In sodium chloride crystal, the number of next nearst neighbours of each $N a^{+}$ion is:
A. $8 \mathrm{Cl}^{-}$ions
B. $12 \mathrm{Na}^{+}$ions
C. $12 \mathrm{Cl}^{-}$ions
D. $24 \mathrm{Cl}^{-}$ions
95. In an ionic compound $A^{+} X^{-}$, the radii of $A^{+}$and $X^{-}$ions ar 1.0 pm and 2.0 om , respectively. The volume of the unit cell of the crystal AX will be:
A. $27 \mathrm{pm}^{3}$
B. $64 \mathrm{pm}^{3}$
C. $125 \mathrm{pm}^{3}$
D. $216 \mathrm{pm}^{3}$

## Answer: D

## - Watch Video Solution

96. The coordination number of cation and anion in fluorite $C a F_{2}$ and anti-fluroite $\mathrm{Na}_{2} \mathrm{O}$ are respectively:
A. 8:4 and 6:3
B. $6: 3$ and $4: 4$
C. $8: 4$ and $4: 8$
D. $4: 8$ and $8: 4$

## Answer: C

## D Watch Video Solution

97. Select the incorrect statement in a CsCl crystal:
A. $C s^{+}$forms a simple cubic lattice, $C l^{-}$forms a simple cubinc
B. $\mathrm{Cl}^{-}$occupies body centre of $\mathrm{Cs}^{+}$
C. $\mathrm{Cs}^{+}$occupies body centre of $\mathrm{Cl}^{-}$
D. It is impossible for $\mathrm{Cl}^{-}$to occupy body centre of $\mathrm{Cs}^{+}$ because the body centre void of $\mathrm{Cs}^{+}$is smaller than $\mathrm{Cl}^{-}$

## Answer: D

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98. The radius of a divaent cation $A^{2+}$ is 94 pm and of divalent anion $B^{2-}$ is 146 pm . The compound $A B$ has:

## D Watch Video Solution

99. A binary solid (AB) has a rock salt structure. If the edge length is 400pm, radius of cation is 80 pm the radius of anion is:
A. 100 pm
B. 120 pm
C. 250 pm
D. 325 pm

## Answer: B

## ( Watch Video Solution

100. For a solid with the structure shown in Fig, the coordination number of the points of the points $A$ and, respectively are

A. 6,8
B. 8,8
C. 6,6
D. 4,6

Answer: C
101. An ionic compound $A B$ has fluorite type structres. If the radius $B^{-} i s 200 \mathrm{pm}$, then the ideal radius of $A^{\wedge}(+)^{`}$ would be:
A. 82.8 pm
B. 146.4 pm
C. 40pm
D. 45 pm

## Answer: D

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102. In which of the following structures, the anion has maximum coordination number?
A. NaCl
B. ZnS
C. $C a F_{2}$
D. $\mathrm{Na}_{2} \mathrm{O}$

## Answer: D

## (D) Watch Video Solution

103. CsCl has bcc structure with $\mathrm{Cs}^{+}$at the centre and $\mathrm{Cl}^{-}$ion at each corner. If $r_{C s^{+}}$is $1.69 \AA$ and $r_{C l^{-}}$is $1.81 \AA$ what is the edge length of the cube?
A. $3.50 \AA$
B. $3.80 \AA$
C. $4.04 \AA$ A
D. $4.50 \AA$

## Answer: C

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104. CsBr has bcc like structures with edge length $4.3 \AA$. The shortest inter ionic distance in between $\mathrm{Cs}^{+}$and $\mathrm{Br}^{-}$is:
A. 3.72 pm
B. 1.86 pm
C. 7.44 pm
D. 4.3 pm

## Answer: A

105. If the radius of $C l^{1}$ ion 181 pm , and the radius of $\mathrm{Na}^{\wedge}(+)^{\wedge}$ ion is 101pm then the edge length of unit cel I is:
A. 282 pm
B. 285.71 pm
C. 512 pm
D. 564 pm

## Answer: D

## - Watch Video Solution

106. Ammonium chloride, crystalliazes in a body centered cubic latteice iwh edge length of unit cell equal to 387 pm . If the size of $\mathrm{Cl}^{-}$ion is 181 pm , the size of $\mathrm{NH}_{4}^{+}$ion would be:
A. 116 pm
B. 154 pm
C. 174pm
D. 206pm

## Answer: B

## - Watch Video Solution

107. Salt $A B$ has a zinc blende structre. The radius of $A^{2+}$ and $B^{2-}$ ion are $0.7 \AA$ and $0 . \AA$ respectively. The edge length of $A B$ unit cell is:
A. $2.5 \AA$
B. $5.09 \AA$
C. $5 \AA$
D. $5.77 \AA$

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108. Transition metals, when they form interestitial compounds, the non-metals (H,B,C,N) ar accodated in:
A. voids or holes in cubic-packed structure
B. tetrahedral voids
C. octahedral voids
D. all of these

## Answer: D

- Watch Video Solution

109. In a diamond, each carbon atom is bonded to four other carbon atoms tetrahedrally. Alternate tetrahedral voids are occupied by carbon atoms. The number of carbon atoms per unit cell is:
A. 4
B. 6
C. 8
D. 12

## Answer: C

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110. Which of the folloiwng statement for cyrstals having Schottly defect is not correct?
A. Schottky defect arises due to the absence of a cation and
anion from the position which it is expected to occupy
B. schooty defect ar emore commmon in ionic compound with high co-ordination number
C. The dinsity of the crystals having schottky defect is larger than that of the perfect crystal
D. The crystal having schottly defect is electrically neutral as a whole.

## Answer: C

## - Watch Video Solution

111. Which is correct statement?
A. When temperature increases then number of defects decreases.
B. Schottky defect occurs when radius of cation is smaller
C. Frenkel defect occurs when radius of cation is smaller
D. none of these

## Answer: C

## - Watch Video Solution

112. Frenkel defects asre observed where the differnce in size of cation and anion is large
A. The density of crystals having Frenkel defect is less than that of a pure percfect crystal
B. In an ionic crystal having Frenkel defect may also contian Schottky defrect
C. Usually alkali halides do not Frenkel defect
D. Usually alkali halides do not have Frenkel defect

## Answer: B

## (D) Watch Video Solution

113. When anion leaves the normal lattice site and electron occupies interstitial sites in its crystal lattice, It is called:
A. Schottky defect
B. Frenkel defect
C. Metal excess defect
D. Stoichiometric defect

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114. Which of the following defects does KBr show?
A. Frenkel
B. Schottky defect occurs when radius of cation is smalller
C. Metal excess
D. Metal deficiency

## Answer: B

## - Watch Video Solution

115. Dopping of AgCl crystals with $\mathrm{CdCl}_{2}$ results in:
A. Schottky defect
B. Frenkel defect
C. Substitutional cation vacancy
D. Formation of F-centres

## Answer: C

## - Watch Video Solution

116. NaCl shows Schottky defects and AgCl shows Frekel defects.

Their electrical conductivity is due to the
A. motion of ions and not the motion of electrons
B. motion of electrons and not the motion of ions
C. lower coordination number of NaCl
D. higher coordinaiton number of AgCl

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117. Which one of the following crystal does not exhibit Frenkel defect?
A. AgBr
B. AgCl
C. CsCl
D. ZnS

## Answer: C

D Watch Video Solution
118. Select the incorrect statement :
A. Stiochiometery of crystal remains uneffected dure to Schottky defect
B. Frenkel defect is usually shown by ionic compounds having low coordinaiton number
C. F-centres generation is responsible factor for imparting the colour to the crystal
D. Density of crystal always increases due to substitutional impurity defect.

## Answer: D

## - Watch Video Solution

119. In a diamond, carbon atom occupy fcc lattice points as well as alternate tetrahedral voids. If edge length of the unit cell is 356 pm , then diameter of carbon atom is:
A. 77.07 pm
B. 154.14 pm
C. 251.7 pm
D. 89pm

## Answer: B

## - Watch Video Solution

120. When NaCl is dopped with $10^{-5}$ mole $\%$ of $\mathrm{SrCl}_{2}$, what is the no. of cationic vacanies?
A. $10^{-5} \times N_{A}$
B. $10^{-7} \times N_{A}$
C. $2 \times 10^{-7} \times N_{A}$
D. none of these

## D Watch Video Solution

121. The composition of a sample of Wustite is $\mathrm{Fe}_{0.93} \mathrm{O}_{1.00}$. What percentage of the iron is present in the form of $\mathrm{Fe}(I I I)$ ?
A. 0.1505
B. 0.25
C. 0.35
D. 0.45

## Answer: A

D Watch Video Solution
122. A certain sample of cuprous sulphide is found to have composition $C u_{1.8} S$, , because of imcroporation of $C u^{2+}$ ion in the lattice, What is the mole $\%$ of $\mathrm{Cu}^{2+}$ in total content in this crystal?
A. 0.998
B. 0.1111
C. 0.8888
D. none of these

## Answer: B

## D Watch Video Solution

123. Ferrimagnetism is in:
A. $\uparrow \uparrow \uparrow \uparrow \uparrow$
B. $\uparrow \downarrow \uparrow \downarrow$
C. $\uparrow \uparrow \uparrow \downarrow \downarrow$
D. none of these

## Answer: C

## - Watch Video Solution

124. $\mathrm{Fe}_{3} \mathrm{O}_{4}$ is ferrimagnetic at room temperature but at 850 K it becomes::
A. diamagnetic
B. ferromagnetic
C. non-magnetic
D. paramagnetic

## Answer: D

125. When heated above $916^{\circ} \mathrm{C}$, iron changes its bcc crystalline from to fcc without the change in the radius of atom. The ratio of density of the crystal before heating and after heating is :
A. 1.069
B. 0.918
C. 0.725
D. 1.231

## Answer: B

## - Watch Video Solution

126. $\operatorname{TIAI}\left(\mathrm{SO}_{4}\right)_{2} \cdot x \mathrm{H}_{2} \mathrm{O}$ is bcc with 'a' $=1.22 \mathrm{~nm}$. If the density of the solid is $2.32 g / c c$, then the value of x is (Given : $N_{A}=6 \times 10^{23}$ ),
at. Mass : $T I=204, A I=27, S=32$ ).
A. 2
B. 4
C. 47
D. 70

## Answer: C

## - Watch Video Solution

127. In an atomic bcc lattie what fraction of edge is not covered by atoms?
A. 0.32
B. 0.16
C. 0.134
D. 0.268

## Answer: C

## - Watch Video Solution

128. The packing efficiency of a simple cubic crystal with an interstitcal atom exctly fitting at the boby center is :
A. 0.48
B. 0.52
C. 0.73
D. 0.91

## Answer: C

129. An atomic solid crystalliuzen in a body centre cubic lattice and the inner surface of the atoms at the adjacent corner are separated by 60.3 pm .If the atomic mass of $A$ is 48 , then density of the solid, is nearly :
A. $2.7 \mathrm{~g} / \mathrm{cc}$
B. $50.7 \mathrm{~g} / \mathrm{cc}$
C. $3.5 \mathrm{~g} / \mathrm{cc}$
D. $1.75 b$ /

## Answer: D

## D Watch Video Solution

130. Sodium ( $\mathrm{Na}=23$ ) crystallizen in bcc arrangement with the interfacial separation between the atoms at the edge 53.6 pm . The density of sodium crystal is:
A. $2.07 \mathrm{~g} / \mathrm{cc}$
B. $2.46 \mathrm{~g} / \mathrm{cc}$
C. $1.19 g / \mathrm{cc}$
D. None of these

## Answer: C

## - Watch Video Solution

131. The density of solid $\operatorname{Ar}$ ( $\mathrm{Ar}=40 \mathrm{~g} / \mathrm{mole}$ ) is $1.68 \mathrm{~g} / \mathrm{ml}$ at 40 K . if the argon atom is assumed to be a sphere of radius $1.50 \times 10^{-8} \mathrm{~cm}$, then \% of solid Ar is apparently empty space?
A. 35.64
B. 64.36
C. 74
D. None of these

## Answer: B

## - Watch Video Solution

132. A bcc lattice is made up of hollow spheres of $B$. Spheres of solids $A$ are present in hollow spheres of $B$. The radius of $A$ is half of the radius of $B$. The ratio of total volume of spheres of $B$ unoccupied by $A$ in a unit cell and volume of unit cell is $A \times \frac{\pi \sqrt{3}}{64}$. Find the value of $A$.
A. $\frac{7 \sqrt{3 \pi}}{64}$
B. $\frac{7 \sqrt{3}}{128}$
C. $\frac{7 . \pi}{24}$
D. None of these

## D Watch Video Solution

133. First three nearest neighboure distance for primitive cubic lattice are respectively (edge length of unit cell =a):
A. $a, \sqrt{2 a}, \sqrt{3 a}$
B. $\sqrt{3 a}, \sqrt{2 a}, a$
C. $a \sqrt{2 a}, 2 a$
D. $a \sqrt{3 a}, 2 a$

## Answer: A

D Watch Video Solution
134. First three nearestneighbour distances for body centered cubic lattice are respectively :
A. $\sqrt{2 a}, a, \sqrt{3 a}$
B. $\frac{a}{\sqrt{2}}, a, \sqrt{3 a}$
C. $\frac{\sqrt{3 a}}{2}, a, \sqrt{2}$
D. $\frac{\sqrt{3 a}}{2}, a, \sqrt{3 a}$

## Answer: C

D Watch Video Solution
135. Given : The unit cell structure o fcompound is show below .


O A

- B
$\square \mathrm{C}$

The formula of compound is :
A. $A_{8} B_{12} C_{15}$
B. $A B_{2} C_{3}$
C. $A_{2} B_{2} C_{5}$
D. $A B C_{5}$

Answer: B
136. The density of apure substance ' $A$ ' whose atoms are in cubic close pack arragement is $1 g / c c$. If the all the tetrahedral voids are occu[pioed by 'B' atom, What is the density of resulting solid in $g / c c$ [ "Atomic mass" $=(A)=30 \mathrm{~g} / \mathrm{mol}$ and atomic mass $(B)=50 \mathrm{~g} / \mathrm{mol}]$
A. 33.3
B. 4.33
C. 2.33
D. 5.33

## Answer: B

137. In a planar tetra - atomic molecule, $X Y_{3}, \mathrm{X}$ is at the centroid of the equilateral triangle formed by the atoms, Y . If the $\mathrm{X}-\mathrm{Y}$ bond distance is $1 \AA$, what is the distance between the centres of any two Y atoms?
A. $1 / \sqrt{3} \AA$
B. $\sqrt{2} \AA$
C. $\sqrt{3} \AA$
D. $1 / \sqrt{2} \AA$

## Answer: C

## - Watch Video Solution

138. How many unit cells are present in 5.0 gm of crystal $A B$ (formula mass of $\mathrm{AB}=40$ ) having rock salt type structure ? $\left(N_{A}=\right.$

Avogadro 's no.)
A. $N_{A}$
B. $\frac{N_{A}}{10}$
C. $4 N_{A}$
D. None of these

## Answer: D

## - Watch Video Solution

139. The density of $C a F_{2}$ (flourtie structure) is $3.18 \mathrm{~g} / \mathrm{cm}^{3}$. The length of the side of the unit cell is :
A. 253 pm
B. 344 pm
C. 546 pm
D. 273 pm

## Answer: C

## - Watch Video Solution

140. A crystal of lead (II) sulphide has NaCl strcuture . In this crystal the shorest distance between a $\mathrm{Pb}^{2+}$ ion and $S^{2-}$ ion is 297 pm . What is the volume the of unit cell in lead sulphide?
A. $209.6 \times 10^{-24} \mathrm{~cm}$
B. $207.8 \times 10^{-23} \mathrm{~cm}$
C. $22.3 \times 10^{-23} \mathrm{~cm}$
D. $209.8 \times 10^{-23} \mathrm{~cm}$

## Answer: A

141. CdO has NaCl like structure with density $8.27 \mathrm{~g} / \mathrm{cc}$. If the ionic radius of $\mathrm{O}^{2-}$ is $1.24 \mathrm{~A}^{\circ}$ determine the ionic radius of $\mathrm{Cd}^{2+}$ :
A. $1.5 \AA$
B. $1.1 \AA$
C. $1.9 \AA$
D. $1.5 \AA$

## Answer: B

## - Watch Video Solution

142. KCl crystallizes int the same type of lattic as done NaCl . Given that $r_{\mathrm{Na}^{+}} / r_{\mathrm{Cl}^{-}}=0.50$ and $r_{\mathrm{Na}^{+}} / r_{K^{+}}=0.70$, Calcualte the ratio of the side of the unit cell for KCl to that for NaCl :
A. 1.143
B. 1.224
C. 1.414
D. 0.875

## Answer: A

## D Watch Video Solution

143. Ferrous oxide has a cubie structure and edge length of the uint cell is $5.0 \AA$. Assuming the density o ferrous oxide to be $3.84 \mathrm{~g} / \mathrm{cm}^{3}$ , the no. Of $\mathrm{Fe}^{2+}$ and $\mathrm{O}^{2-}$ ions present in each unit cell be : (use $\left.N_{A}=6 \times 10^{23}\right):$
A. $4 \mathrm{Fe}^{2+}$ and $4 \mathrm{O}^{2-}$
B. $2 \mathrm{Fe}^{2+}$ and $2 \mathrm{O}^{2-}$
C. $1 \mathrm{Fe}^{2+}$ and $1 \mathrm{O}^{2-}$
D. $3 \mathrm{Fe}^{2+}$ and $4 \mathrm{O}^{2-}$

## Answer: A

## - Watch Video Solution

144. If an element (at. Mass $=50$ ) crystallise in fc lattie ,with $a=0.50$ nm . What is the denstiy of unit cell if it conatins $0.25 \%$ Schottuy defects (use $N_{A}=6 \times 10^{23}$ )?
A. $2.0 \mathrm{~g} / \mathrm{cc}$
B. $2.66 \mathrm{~g} / \mathrm{cc}$
C. $3.06 \mathrm{~g} / \mathrm{cc}$
D. None of these

## Answer: B

145. An element $X$ (At. Wt. =224) forms FCC lattice. If the edge length of lattice is $4 \times 10^{-8} \mathrm{~cm}$ and the observed density is $2.4 \times 10^{3 \mathrm{~kg} / \mathrm{m}^{3}}$. Then the percentage occupancy of lattice point by element X is: $\left(N_{A}=6 \times 10^{23}\right)$
A. 96
B. 98
C. 99.9
D. None of these

## Answer: A

## (D) Watch Video Solution

146. In fcc lattice ,A, B, C,D atoms are arranged at corner, face centre, ocatahedral void and tetrahedral void respectively, then
the body diagonal contains :
A. $2 A, C, 2 D$
B. $2 A, 2 B, 2 C$
C. $2 A, 2 B, D$
D. $2 A, 2 D$

## Answer: A

## - Watch Video Solution

147. The distance between an ocatahral and tetrahedral void in fcc lattice would be:
A. $\sqrt{3} a$
B. $\frac{\sqrt{3 a}}{2}$
C. $\frac{\sqrt{3 a}}{3}$
D. $\frac{\sqrt{3 a}}{4}$

## Answer: D

## - Watch Video Solution

148. $A_{2} B$ molecules ( molar mass $=259.8 \mathrm{~g} / \mathrm{ml}$ ) crystallises in a hexagonal lattice as shown in figure .The lattic constants were $a=5 \AA$ and $b=8 \AA$. If denstiy of crystal is $5 \mathrm{~g} / \mathrm{cm}^{3}$ then how many
molecules are contained in given unit cell ? $\left(\mathrm{Use} N_{A}=6 \times 10^{23}\right)$

A. 6
B. 4
C. 3
D. 2

## Answer: D

## D Watch Video Solution

149. Graphite has h.c.p arrangements of carbon atoms and the parallel planes are $3.35 \AA$ apart . Determine density of graphite :
A. $2.46 / \mathrm{cc}$
B. $0.41 \mathrm{~g} / \mathrm{cc}$
C. $1 g / \mathrm{cc}$
D. $1.41 \mathrm{~g} / \mathrm{cc}$

## Answer: B

150. How many effiective $N a^{+}$and $\mathrm{Cl}^{-}$ions are present respectively in a uint cell of NaCl solid (Rock salt structure ) if all ions along line connecting opposite face centres are absent ?
A. 3,3
B. $\frac{7}{2}, 4$
C. $\frac{7}{2}, \frac{7}{2}$
D. $4, \frac{7}{2}$

## Answer: A

## - Watch Video Solution

151. A crystal is made of particles $X$ and $Y . X$ form fcc packing and $Y$ occupies all the octahedral voids. If all the particles along one body
diagonal are removed then the formula of the crystal would de :
A. $X_{4} Y_{3}$
B. $X_{5} Y_{5}$
C. $X_{4} Y_{5}$
D. None of these

## Answer: B

## - Watch Video Solution

152. Select right expression for determinig packing fraction (P.F.) of NaCl unit cell (assume ideal), if ions along an edge diagonal are absent :
A. P.F. $=\frac{\frac{4}{3} \pi\left(r_{+}^{3}+r_{-}^{3}\right)}{16 \sqrt{2} r_{-}^{3}}$
B. $P$. $F .=\frac{\frac{5}{2} \pi\left(r_{+}^{3}+4 r_{-}^{3}\right)}{16 \sqrt{2} r_{-}^{3}}$
C. P.F. $=\frac{\frac{4}{3} \pi\left(\frac{5}{2} r_{+}^{3}+r_{-}^{3}\right)}{16 \sqrt{2} r_{-}^{3}}$
D. P.F. $=\frac{\frac{4}{3} \pi\left(\frac{7}{2} r_{+}^{3}+r_{-}^{3}\right)}{16 \sqrt{2} r_{-}^{3}}$

## Answer: B

## - Watch Video Solution

153. A crystal is made of particles $X, Y$ and $Z . X$ form fcc packing . $Y$ occupies all the octahedral void of $X$ and $Z$ occupies all the tetrahedral voids of $X$. If all the particles along one body diagonal are removed then the formula of the crystal would be:
A. $X Y Z_{2}$
B. $X_{2} Y Z_{2}$
C. $X_{8} Y T_{4} Z_{5}$
D.

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154. A crystal is made of particles $A$ and $B$. From fcc packing and $B$ occupies all the octahedral voids. If all the particle along the plane as shown in figure are removed, then, the formula of the crystal
would be :

A. $A B$
B. $A_{5} B_{7}$
C. $A_{7} B_{5}$
D. $A B C_{8}$

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155. In the rock salt $A B$, if $C$ introduced in tetrahedral voids such that no distoration occurss, then fromula of resultant compound is
A. $A B C$
B. $A B C_{2}$
C. $A_{4} B_{4} C$
D. $A B C_{8}$

## Answer: B

156. Given length of side of hexagonal uint cell is $\frac{100}{\sqrt{2}} \mathrm{pm}$. The volumes of hexagonal unit cell is $\left(\mathrm{inpm}^{3}\right)$ :
A. $8 \times 10^{6}$
B. $1.5 \times 10^{6}$
C. $64 \times 10^{6}$
D. $36 \times 10^{6}$

## Answer: B

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157. packing fraction of a unit cell is drfined as the fraction of the total volume of the unit cell occupied by the atom(s).
$P . E=\frac{\text { Volume of the atoms(s) present in a unit cell }}{\text { Volume of unit cell }}=\frac{Z \times \frac{4}{3} \pi r^{3}}{a^{3}}$
and $\%$ of empty space $=100-P . F . \times 100$
where $Z=$ effective number of stoms in $s$ cube.
$r=$ radius of $a$ an atoms
a = edge lenght of the cube
\% of energy space in body centered cubic cell unit is nearly :
A. 52.36
B. 68
C. 32
D. 26

## Answer: C

## - Watch Video Solution

158. packing fraction of a unit cell is drfined as the fraction of the total volume of the unit cell occupied by the atom(s).
$P . E=\frac{\text { Volume of the atoms(s) present in a unit cell }}{\text { Volume of unit cell }}=\frac{Z \times \frac{4}{3} \pi r^{3}}{a^{3}}$
and $\%$ of empty space $=100-P . F . \times 100$
where $Z=$ effective number of stoms in $s$ cube.
$r=$ radius of $a$ an atoms
a = edge lenght of the cube
Packing fraction in face centered cubic unit cell is :
A. 0.7406
B. 0.6802
C. 0.5236
D. None of these

## Answer: A

## D Watch Video Solution

159. Density of a unit cell is respresented as
$\rho=\frac{\text { Effective no. of atoms }(\mathrm{s}) \times \text { Mass of a unit cell }}{\text { Volume of a unit cell }}=\frac{Z . M}{N_{A} \cdot a^{3}}$
where, mass of unit cell =mass of effectuive no . of atoms(s) or ion
(s).

M=At . mass// formula
$N_{A}=$ Avogadro's no $. \Rightarrow 6.0323 \times 10^{23}$
a= edge lemght of unit cell
Silver crystallizes in a facts lattice and has a density of $10.6 \mathrm{~g} / \mathrm{cm}^{3}$.
What is the length of a edge of the unit cell ?
A. 40.7 nm
B. 0.2035 nm
C. 0.101 nm
D. 4.07 nm

## Answer: A

## D Watch Video Solution

160. Density of a unit cell is respresented as
$\rho=\frac{\text { Effective no. of atoms (s) } \times \text { Mass of a unit cell }}{\text { Volume of a unit cell }}=\frac{Z . M}{N_{A} \cdot a^{3}}$
where, mass of unit cell =mass of effectuive no . of atoms(s) or ion
(s).

M=At . mass// formula
$N_{A}=$ Avogadro' s no $. \Rightarrow 6.0323 \times 10^{23}$
a= edge lemght of unit cell

An elemetn crystallizes in a steucture having fcc unit cell of an edge 200 pm . Calculate the density , if 100 g of this element contains $12 \times 10^{23}$ atoms :
A. $41.66 \mathrm{~g} / \mathrm{cm}^{3}$
B. $4.166 \mathrm{~g} / \mathrm{cm}^{3}$
C. $10.25 \mathrm{~g} / \mathrm{cm}^{3}$
D. $1.025 \mathrm{~g} / \mathrm{cm}^{3}$

## Watch Video Solution

161. Density of a unit cell is respresented as
$\rho=\frac{\text { Effective no. of atoms }(\mathrm{s}) \times \text { Mass of a unit cell }}{\text { Volume of a unit cell }}=\frac{Z . M}{N_{A} \cdot a^{3}}$
where, mass of unit cell =mass of effectuive no. of atoms(s) or ion (s).

M=At.mass// formula
$N_{A}=$ Avogadro' s no $. \Rightarrow 6.0323 \times 10^{23}$
$a=$ edge lemght of unit cell
The density of KBr is $2.75 \mathrm{~g} / \mathrm{cm}^{-3}$. The length of the edge of the unit cell is 645 pm .To which type of cubic crystal , KBr belongs ?
A. Simple cubic
B. bcc
C. fcc
D. None of these

## D Watch Video Solution

162. A spinel is an important class of oxide consisting two types of metal ions withs the oxide ions arranged in ccp layers. The normal spinel has one -eight of the tetrahendral holes occupied by one type of metal ions and one- half of the octaherdral holes occupied by another type of metal ion. Such a spine is formed by $\mathrm{Mg}^{2+}, A l^{3+}$ and $\mathrm{O}^{2-}$. The netutrality of the crystal is benig maintained.

The fromule of the spinel is:
A. $\mathrm{Mg}_{2} \mathrm{AlO}_{4}$
B. $\mathrm{MgAl}_{2} \mathrm{O}_{4}$
C. $M g_{3} A l_{2} O_{6}$
D. None of these

## Answer: B

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163. A spinel is an important class of oxide consisting two types of metal ions withs the oxide ions arranged in ccp layers. The normal spinel has one eeight of the tetrahendral holes occupied by one type of metal ions and one- half of the octaherdral holes occupied by another type of metal ion. Such a spine is formed by $\mathrm{Mg}^{2+}, \mathrm{Al}^{3+}$ and $\mathrm{O}^{2-}$. The netutrality of the crystal is benig maintained.

Type of hole occupied by $A l^{3+}$ ions is:
A. tetrahedral
B. octahedral
C. both (a) amd(b)
D. None of these

## Answer: B

## - Watch Video Solution

164. A spinel is an important class of oxide consisting two types of metal ions withs the oxide ions arranged in ccp layers. The normal spinel has one eeight of the tetrahendral holes occupied by one type of metal ions and one- half of the octaherdral holes occupied by another type of metal ion. Such a spine is formed by $\mathrm{Mg}^{2+}, \mathrm{Al}^{3+}$ and $\mathrm{O}^{2-}$. The netutrality of the crystal is benig maintained.

Type of hole occupied by $\mathrm{Mg}^{2+}$ ions is:
A. tetrahedral
B. octahedral
C. both (a) amd(b)
D. None of these

## Answer: A

## - Watch Video Solution

165. A spinel is an important class of oxide consisting two types of metal ions withs the oxide ions arranged in ccp layers. The normal spinel has one -eight of the tetrahendral holes occupied by one type of metal ions and one- half of the octaherdral holes occupied by another type of metal ion. Such a spine is formed by $M g^{2+}, A l^{3+}$ and $O^{2-}$. The netutrality of the crystal is benig maintained.

If oxide ion is replaced by $X^{-8 / 3}$, the number of anionic vacancy per unit cells is :
A. 1
B. 2
C. 3
D. $3 / 4$

## Answer: A

## - Watch Video Solution

166. Ionic lattic has two major points defects ,(1) Schottky (2) Frenkel defects. Schottkly defects occurs due to the cations - anion pair's missing from the lattice sites. Frenkel defects occurs levels its lattic site and fits into an intersitial space. The neturaity of the crystal is benig maintained and we considerd all losses from interstitical positions.
which defect decrease density of the crystal ?
A. Frenkel defect
B. Schootky defect
C. both (a) amd(b)
D. None of these

## Answer: B

## - Watch Video Solution

167. Ionic lattic has two major points defects ,(1) Schottky (2) Frenkel defects. Schottkly defects occurs due to the cations - anion pair's missing from the lattice sites. Frenkel defects occurs levels its lattic site and fits into an intersitial space. The neturaity of the crystal is benig maintained and we considerd all losses from interstitical positions.

Structure shown here represents :

A. Schootky defect
B. Frenkel defect
C. Mental excess defect
D. None of these

## Answer: B

168. Ionic lattic has two major points defects ,(1) Schottky (2) Frenkel defects. Schottkly defects occurs due to the cations - anion pair's missing from the lattice sites. Frenkel defects occurs levels its lattic site and fits into an intersitial space. The neturaity of the crystal is benig maintained and we considerd all losses from interstitical positions.

Structure shown here represents :

A. Schootky defect
B. Frenkel defect
C. Both defect
D. None of these

## Answer: D

## - Watch Video Solution

169. Doping mens introduction of small amount of impurities like phosphorus, arsenic or boron into the pure crystal . In pure silicon, ther are four valenices used in bonding with other four adjacent silicon crystal is doped with a group -15 element ( with five valence electron ) such as $\mathrm{P}, \mathrm{As}$, or Bi , the structure of the crystal lattic remains unchanged. Out of the five valence electron of group -15 doped element four element are used in normal covalent bonding with silicon while fiffth electron is delcoasiled and thus conducts electricity

Doping a silicon crystal with a group -13 element (with three valence electrons ) such as $\mathrm{B}, \mathrm{Al}, \mathrm{Ga}$ or $\operatorname{In}$ products a semiconductor
with three electrons in in dopant. The place where fourth electron is missing is called an electron vacancy or hole. Such hole can move throught the crystal like a positive charge giving rise conduction of electricity.

No. of valene electrons in silicon are :
A. 3
B. 4
C. 5
D. 6

## Answer: B

## D Watch Video Solution

170. Doping mens introduction of small amount of impurities like phosphorus, arsenic or boron into the pure crystal . In pure silicon,
ther are four valenices used in bonding with other four adjacent silicon crystal is doped with a group -15 element ( with five valence electron ) such as $\mathrm{P}, \mathrm{As}$, or Bi , the structure of the crystal lattic remains unchanged. Out of the five valence electron of group - 15 doped element four element are used in normal covalent bonding with silicon while fiffth electron is delcoasiled and thus conducts electricity

Doping a silicon crystal with a group -13 element (with three valence electrons ) such as $\mathrm{B}, \mathrm{Al}, \mathrm{Ga}$ or In products a semiconductor with three electrons in in dopant. The place where fourth electron is missing is called an electron vacancy or hole. Such hole can move throught the crystal like a positive charge giving rise conduction of electricity.

Silicon that has been dopend with group-15 elements is called :
A. $p$-type semicondouctor
B. n-type semiconductor
C. electron vancany or hole
D. None of these

## Answer: B

## - Watch Video Solution

171. Doping mens introduction of small amount of impurities like phosphorus, arsenic or boron into the pure crystal . In pure silicon, ther are four valenices used in bonding with other four adjacent silicon crystal is doped with a group -15 element ( with five valence electron ) such as $\mathrm{P}, \mathrm{As}$, or Bi , the structure of the crystal lattic remains unchanged. Out of the five valence electron of group -15 doped element four element are used in normal covalent bonding with silicon while fiffth electron is delcoasiled and thus conducts electricity

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Silicon that has been dopend with group-13 elements is called :
A. $p$-type semicondouctor
B. n-type semiconductor
C. electron vancany or hole
D. None of these

## Answer: A

## D Watch Video Solution

172. Mentallic Gold crystallise in fcc lattice and the length of cubic unit cell is 407 pm .
(Given : Atomic mass of Gold $=197, N_{A}=6 \times 10^{23}$ )
The density if it have $0.2 \%$ Schottky defect is (ingm $/ \mathrm{cm}^{3}$ )
A. 4.86
B. 9.72
C. 19.48
D. 19.44

## Answer: D

## - Watch Video Solution

173. Metallic gold crystallises in face centred cubic lattice with edgelength $4.07 \AA$. Closest distance between gold atoms is:
A. 407 pm
B. $407 \sqrt{1}$
C. $\frac{407}{\sqrt{2}}$
D. $407 \frac{\sqrt{3}}{2}$

## Answer: A

## D Watch Video Solution

174. In diamond structure ,carbon atoms form fcc lattic and $50 \%$ tetrahedral voids occupied by acrbon atoms . Evergy carbon atoms is surrounded tetrachedral by four carbon atom with bond length

154 pm . Germanium , silicon and grey tin also crystallise in same way as diamond $\left(N_{A}=6 \times 10^{23}\right)$

The mass of diamond unit cell is:
A. $96 a \mu$
B. 96 gm
C. $144 a \mu$
D. 144 gm

## Answer: A

## - Watch Video Solution

175. In diamond structure ,carbon atoms form fcc lattic and $50 \%$ tetrahedral voids occupied by acrbon atoms. Evergy carbon atoms is surrounded tetrachedral by four carbon atom with bond length 154 pm . Germanium, silicon and grey tin also crystallise in same way as diamond $\left(N_{A}=6 \times 10^{23}\right)$

The side length of diamond unit cell is (in pm):
A. 154
B. 1422.63
C. 711.32
D. 355.66

## D Watch Video Solution

176. In diamond structure ,carbon atoms form fcc lattic and $50 \%$
tetrahedral voids occupied by acrbon atoms . Evergy carbon atoms is surrounded tetrachedral by four carbon atom with bond length 154 pm . Germanium, silicon and grey tin also crystallise in same way as diamond $\left(N_{A}=6 \times 10^{23}\right)$

The density of daimond unit cell is (in $\mathrm{gm} / \mathrm{cm}^{3}$ )
A. 28.48
B. 0.0556
C. 0.445
D. 3.56
177. Select the correct statement (s).
A. Co-ordination no. of an atom at a lattice point in sample cubic arrangement is 6
B. Co- ordination no. of an atom at octahedral site 8 .
C. Co-ordination no. of an atom at lattice point in hcp arrangment is 6
D. Co-ordination no.of an atmo at octahedral site is 6

## Answer: A::B

## - Watch Video Solution

178. Packing fraction of an identical solid sphere is $74 \%$ in :
A. simple cubic structure
B. fcc structure
C. hcp structure
D. bcc structure

## Answer: B::C

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179. Position of octahedral voids in fcc structure is//are
A. edge centers
B. face centers
C. body centers
D. corners
180. If the radius of $\mathrm{Na}^{+}$ion is 95 pm and that of $\mathrm{Cl}^{-}$ion is 181 pm , then :
A. co-ordination no. Of $\mathrm{Na}^{+}$is 6
B. co-ordination no. Of $\mathrm{Cl}^{-}$is 8
C. length of the unit cell is 552 "pm"
D. length of the unit cell is 380 "pm"

## Answer: A::C

## D Watch Video Solution

181. Select the correct statement (s) :
A. The co-ordinaton number of each type of ions a CsCl crystal is twelve
B. A metal that crystallizes in a bcc structure has a co-ordination number of twelve
C. A unit cell of an ionic crystal shares some of its ions with other units cells
D. The length of the unit cell in NaCl in 552 "pm" (given that $r_{N a}^{+}=$ 85 "pm" and $r_{C l}^{-}=181$ " pm")

## Answer: C

## ( Watch Video Solution

182. An hcp and a ccp structure for a given element would be expected to have
A. The same co-ordinational number
B. the same density
C. the same packing fraction
D. all of the above

## Answer: A::C

## - Watch Video Solution

183. Select the correct statement (s) for the rock -salt structure ( NaCl ) :
A. The tetrahedral voids are smaller than the octhedral sites
B. The octahedral voids are occupied by cations and the tetraherdral sites are empty
C. The radius ratio $\left(r_{c} / r_{a}\right)$ is 0.225
D. The radius ratio $\left(r_{c} / r_{a}\right)$ is 0.732

## Answer: A::B

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184. select the correct statement (s)
A. The ionic crstal of AgBr may have Schottky defect
B. The unit cell having crystal parameters, $a=b \neq c, \alpha=\beta=90^{\circ}, \gamma=10^{\circ}$ is hexagonl
C. In ionic compounds having Frenkel defect the ratio $r^{+} / r^{-}$is high
D. The co-ordination number of $\mathrm{Na}^{+}$ion in NaCl is 6

## Answer: A::B::D

185. Which of the following represents the closet packed arrangement of uniform solid spheres:
A. simple cubic unit cell
B. body centered cubic unit cell
C. face centered cubic unit cell
D. hcp unit cell

## Answer: C::D

## (D) Watch Video Solution

186. select the correct statement (s)
A. A cubic system possesses a total of 23 elements of symmetry
B. A cubic contains centre of symmetry, planes of symmetry as well as axes of symmetry
C. For triclinic system $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90^{\circ}$
D. The total no. of Bravais space lattic belonging ta all the seven crystals are 14

## Answer: A::B::C::D

## - Watch Video Solution

187. select the correct statement (s)
A. Co-ordinational no. of $\mathrm{Cs}^{+}$and $\mathrm{Cl}^{-}$are 8,8 in CsCl crystal
B. If radius ratio $\left(r_{c} / r_{a}\right)<0.225$ then shap of compound must be linear
C. If radius $\left(r_{c} / r_{a}\right)$ lies between 0.414 to 0.732 then shope of ionic compound may be square planner $\left(E x . \mathrm{PtCl}_{4}^{2-}\right)$
D. If radius ratio is less than than 0.155 then shape of compound is linaer

## Answer: A::C::D

## - Watch Video Solution

188. select the correct statement (s)
A. CsCl change to NaCl structure on heating
B. NaCl changes to CsCl structure on applying pressure
C. Co-ordination number decreses on applyping pressure
D. Co-ordination number increses on heating
189. select the correct statement (s)
A. A NaCl type AB crystal lattice can be interperted to be made
up of two individual fcc type uint lattice of $A^{+}$and $B^{-}$fused
togther is such a manner that the corner of one unit lattic
becomes the edge centre of the other
B. In a fcc unit, cell the body centre is an octahedral void
C. In an scc lattice, there can be no octahedral void
D. In an scc lattice,the body centre is the octaedral

## Answer: A::B::C

## - Watch Video Solution

190. In a AB unit cell (Rock salt type) assuming $A^{+}$forming fcc :

## - Watch Video Solution

191. Amorphous soilds :
A. do not have sharp melting points .
B. are isotrophic
C. have same physical propertical in all direction
D. are supercooled liquids

## Answer: A::B::C::D

## - Watch Video Solution

192. Which is /are correct statement about zinc blende structure?
A. The number of first neighbours of $S^{2-}$ is 4
B. The maximum distance $Z n^{2+}$ is $a \frac{\sqrt{3}}{2}$, where 'a' = egde length of unit cell
C. If all tetrahedral voids are occupied by $\mathrm{Zn}^{2+}$ then C.N. of $\mathrm{S}^{2-}$ is 8
D. If all tetrahedral voids are occupied by $\mathrm{Zn}^{2+}$ then C.N. change from 4: 4 to 8: 8.

## Answer: A::B::C

## - Watch Video Solution

193. Compound $X_{2} Y$ have antiflurate structure. What is /are correct statement ?
A. The miimum distance between $X^{+}$is $\frac{a}{2}$, where 'a' =edge length of unit cell
B. The co-ordination number ratio of $x$ and $y 8: 4$
C. If $X^{+}$removed from alternate tetrahedral void then CN is 4 :

4
D. If $X^{+}$removed from alternate tetrahedral void then CN is 4 :

8

## Answer: A::C

## - Watch Video Solution

194. Which is / are correct statement ?
A. Packing fraction in 2D-hcp is 0.785
B. Packing fraction in AAA..... Is 0.52
C. Packing fraction in ABAB...... is 0.74
D. Packing fraction in ABCABC....... Is 0.26

## Answer: A::B::C::D

## - Watch Video Solution

195. Given : Radius of $A^{2+}=100 \pm$ : Radius of $C^{+}=240$ "pm" , RadiusofB^(2-0 " pm", RadiusofD^(-) =480 `"pm" . Which is/are corret statement ?
A. Coordiantion number of $A^{2+}$ in comp AB is 4
B. Coordiantion number of $A^{2+}$ in comp AB is 6 .
C. Coordiantion number of $C^{+}$in comp AB is 6.
D. Coordiantion number of $C^{+}$in comp AB is 8.

## Answer: A::C

196. Match
following

## Column-I

(A) Tetragonal and Hexagonal
(B) Cubic and Rhombohedral
(C) Monoclinic and Triclinic
(D) Cubic and Orthorhombic

## Column-II

(P) are two crystal systems
(Q) $\alpha=\beta=\gamma$
(R) $a \neq b \neq c$
(S) $a=b=c$

## (D) Watch Video Solution

## 197. Match <br> Column-I

the
following
columns

Column-II
(A) If radius ratio
(P) Co-ordination no. is 8

$$
x=\left(\frac{r_{c}}{r_{a}}\right)<0.155
$$

(B) If $0.225 \leq x<0.414$
(Q) Co-ordination no. is 4
(C) If $0.414 \leq x<0.732$
(R) Co-ordination no. is 6
(D) If $0.732 \leq x<1$
(S) Co-ordination no. is 2

## Column-I

(Shape of Compound)
(A) Linear
(B) Triangular planar
(C) Square planar
(D) Octahedral

## Column-II

(Co-ordination No.)
(P) 6
(Q) 4
(R) 2
(S) 3

## Watch Video Solution

## 199. <br> Match <br> the <br> following <br> columns

## Column-I

(A) Rock salt structure
(B) Zinc blende structure
(C) Fluorite structure
(D) Anti fluorite structure

## Column-II

(P) general formula is $A B$
(Q) general formula is $A B_{3}$
(R) general formula is $A_{2} B$
(S) general formula is $A B_{2}$

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## Column-I

(A) Co-ordination no. of $\mathrm{Ca}^{2+}$ and $\mathrm{F}^{-}$
(P) 8,4 in fluorite structure
(B) C.No. of $\mathrm{Zn}^{2-}$ and $\mathrm{S}^{2-}$ in zinc
blende structure
(B) C.No. of $\mathrm{Zn}^{2-}$ and $\mathrm{S}^{2-}$ in zinc
blende structure
(C) C.No. of $\mathrm{Cs}^{+}$and $\mathrm{Cl}^{-}$in CsCl (bcc (R) type) structure
(D) C.No. of Li ${ }^{+}$and $\mathrm{O}^{2-}$ in antifluorite structure
(B) in fuorite structure
(Q) 8,8
R) 4,8
(S) 4,4

## Column-II

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Column-I
[Bravais Lattice(s)]
(A) Primitive, face centered, body centered, end centered
(B) Primitive, face centered, body centered
(C) Primitive, body centered
(D) Primitive only

Column-II

## (Crystal System)

(P) Cubic
(Q) Orthorhombic
(R) Hexagonal
(S) Tetragonal

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## Column-I

## Column-II

(A) Magnetic moment in a paramagnetic substance
(P) $\mid \uparrow \uparrow \uparrow \uparrow \uparrow$
(B) Magnetic moment in a ferromagnetic

(C) Magnetic moment in a antiferromagnetic

(D) Magnetic moment in a ferrimagnetic


## - Watch Video Solution

## 203.

Match
the
following
columns

## Column-I (Structure)

(A) Rock salt ( NaCl )
(B) CsCl
(C) Zinc blende ( ZnS )
(D) Anti fluorite $\left(\mathrm{Na}_{2} \mathrm{O}\right)$

Column-II (Edge length of unit cell)
(P) $a=\left(r_{\text {Cation }}+r_{\text {Anion }}\right)$
(Q) $a=\frac{4}{\sqrt{3}}\left(r_{\text {Cation }}+r_{\text {Anom }}\right)$
(R) $a=\frac{2}{\sqrt{3}}\left(r_{\text {Cation }}+r_{\text {Amion }}\right)$
(S) $a=2\left(r_{\text {Cation }}+r_{\text {Anon }}\right)$

Column-I (Structure)
(A) Rock salt
(B) Zinc blende
(C) Fluorite
(D) Anti fluorite $\left(\mathrm{Na}_{2} \mathrm{O}\right)$

Column-II (Voids occupied)
(P) 100\% tetrahedral voids occupied by cation
(Q) $100 \%$ tetrahedral voids occupied bs anion
(R) $\mathbf{1 0 0 \%}$ octahedral voids occupied by caton
(S) $50 \%$ tetrahedral voids occupied by cation

## - Watch Video Solution

## 205.

1. 

.
(A)

(B)

(C)

(D)

the

Column-II (Name of void)
(P) Tetrahedral void
(Q) Octahedral void
(R) Cubic void
(S) Triangular void
206. Statement I: In any ionic solid $[M X]$ with Schottky defect, the number of positive and negative ions are same.

Statement II: An equal number of cation and anion vacancies is present.
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B.
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

FALSE
D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

TRUE

## Answer: A

207. STATEMENT -1 : Amorphous solids are isotrophic

STATEMENT -2 : Amorphous solids lack a regular three-dimensional arrangement of atoms.
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT -2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

## FALSE

D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

TRUE

Answer: A
208. STATEMENT -1 : Diamond is a covalent solid .

STATEMENT -2 The co-ordination number of each carbon atom is diamond is 4
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT - 2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

## FALSE

D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is TRUE

## Answer: B

209. STATEMENT -1: In NaCl structure , $N a^{+}$ion occupy octahedral holes and $\mathrm{Cl}^{-}$ions
occupy ccp.
STATEMENT -2 : The distance of the nearest neighours in NaCl structure is $a / 2$ where a is the edge length of the cube .
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT -2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

## FALSE

D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

## Answer: B

## - Watch Video Solution

210. STATEMENT -1 : For fluorite structure, the $F^{-}$ions occupy tetrahedral void and $C a^{2+}$
ions in ccp

STATEMENT-2 : The radius ratio of fluorte structure is 0.414
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT -2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is
D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

## TRUE

## Answer: C

## - Watch Video Solution

211. Statement-1 C.N of $C s^{+}$ion in CsCl structure is 8

Statement -2 CsCl crystallizes in BBC structure
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT -2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is
D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

## TRUE

## Answer: D

## - Watch Video Solution

212. Assertion (A) : The electrical conductivity of a semiconductor increases with increase in temperature.

Reason ( R ) : With increase in temperature, large number of electrons from the valence band can jump to the conduction band.
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT -2 is NOT the
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

## FALSE

D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

## TRUE

## Answer: A

## - Watch Video Solution

213. STATEMENT -1 : FeO is non-stoichiometric with formula $\mathrm{Fe}_{0.95} \mathrm{O}$. STATEMENT - 2 : Some $\mathrm{Fe}^{2+}$ ions are replaced by $\mathrm{Fe}^{3+}$ as $3 \mathrm{Fe}^{3+}=$ $2 \mathrm{Fe}^{3+}$ to mainatain electrons neutrally .
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT - 2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

## FALSE

D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

## TRUE

## Answer: A

## - Watch Video Solution

214. Assertion : The number of tetrahedral voids is double the number of octahedral voids

Reason : The size of the tetrhedral voids is half of that of the ochedral void
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT -2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

## FALSE

D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

## TRUE

## Answer: C

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215. Statement : Due to Frenkel defect the density of the crystalline solid remains same.

Explanation : In Frenkel defect, no cations or anions leave the lattice.
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT - 2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

FALSE
D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

TRUE

## Answer: A

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216. Assertion (A) : Antiferromagnetic substances on heating to high temperature become paramagnetic.

Reason (R): On heating, the randomization of spins occurs.
A. If both the statement are TRUE and STATEMENT -2 is the correct explanation of STATEMENT -1
B. If both the statement are TRUE and STATEMENT -2 is NOT the correct explanation of STATEMENT -1
C. If STATEMENT -1 is the correcct and TRUE and STATEMENT -2 is

## FALSE

D. If STATEMENT -1 is the correcct and FALSE and STATEMENT -2 is

TRUE

## Answer: A

## 217. SEVEN CRYSTAL SYSTEMS

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218. In seven pssible crystal system hoe many crystal system have more than one Bravais lattic?

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219. The number of atoms present per unit cell in simple, fcc and bcc are $\qquad$ and $\qquad$ respectively.

## - Watch Video Solution

220. In soild $X$ atoms goes to coner of the cube and two alternate
face center. Calculate effective number of atom of $X$ in unit cell ?

## Watch Video Solution

221. Find the distance (in pm) between the body centered atoms one corner atom in an element ( $a=2.32 \mathrm{pm}$ )

## - Watch Video Solution

222. The strcture of $M g O$ is similar to NaCl . What is the coordination number of $M g$ ?

## - Watch Video Solution

223. Calculate the following:
a. Number of $Z n s$ units in a unit cell of zine blende.
b. Number of $C a F_{2}$ unit cell of $C a F_{2}$.
224. What is the co-ordination number of sodium in $\mathrm{Na}_{2} \mathrm{O}$ ?

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225. Lithium has a bcc structure .Its density is $530 \mathrm{kgm}^{-3}$ and its atomic mass is $6.94 \mathrm{gmol}^{-1}$.Calculate the edge length of a unit cell of lithium metal $\left(N_{A}=6.02 \times 10^{23} \mathrm{~mol}^{-1}\right)$

## D Watch Video Solution

226. What is the co-ordination number of $\mathrm{Cl}^{-}$in CsCl structure?

## - Watch Video Solution

227. In cubic system how many atoms arrangement exsit in nature ?

## - Watch Video Solution

228. The ionic radii of $A^{+}$and $B^{-}$are $1.7 \AA$ and $1.8 \AA$ respectively .

Find the co-ordination number of $A^{+}$

## - Watch Video Solution

229. If edge fraction unoccupied in ideal anti -fluorite structure is $x$.

Caluclate the value of $Z$. Where $Z=(x) /(0.097)$.

## D Watch Video Solution

230. Calculate the value of ${ }^{`}(Z) /(10)$. Where
z = co-ordination number of 2D-square close packing
$+$

Co-ordination number of 2D-hcp

Co-ordination number of 3D-square close packing
$+$

Co-ordination number of 3D, ABCABC........packing
$+$

Co-ordiantional number of 3D, ABAB.......packing .

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## Level 1 Q 33 To Q 62

1. Which of the following layering pattern will have a void fraction of 0.260 ?
A. ABCCBAABC
B. ABBAABBA
C. ABAABCABA
D. ABCAABCA

## Answer: C

## - View Text Solution

## Level 3 One Or More Answers Are Correct

1. Which is / are correct statement ?
A. In simple cubic close packed arrangement no octahedral void is present at edge centre.
B. In fcc unit cell octaherdral void and tetrahedral void are vacant.
C. Packing fraction : simple cubic cell $<$ bcc unit cell $<$ fcc unit cell.
D. Size of void : cubic $>$ octachedral void $>$ trtrahedral void.

## Answer: A::B::C::D

## - View Text Solution

## Level 3 Match The Column

Column-I (Ideal structure)
(A) Rock salt
(B) Zinc blende
(C) Fluorite
(D) CsCl
1.
(S) 0.748
(Q) 0.756
(R) 0.793

## Level 3 Subjective Problems

1. Ionic solid $\mathrm{Na}^{+} A^{-}$crystallise in rock salt type structure . 2.592 gm of ionic solid salt NaA dissolved in water to make 2 litre solution . The
