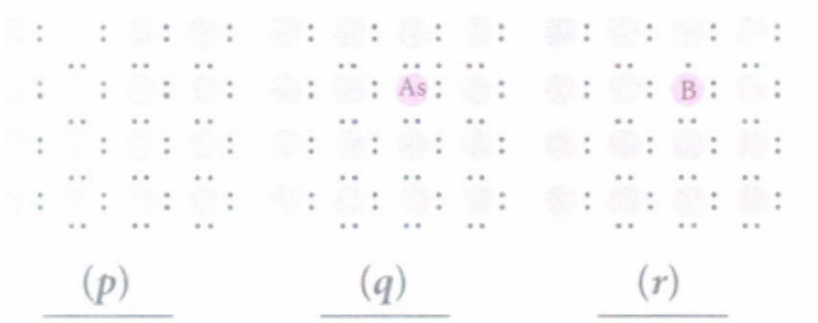
RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 1 Mins **SOLID STATE 1** **Marks : 860**

1. Zinc oxide loses oxygen on heating according to the reaction,
   $ZnO \xrightarrow{heat} Zn^{2+} + \frac{1}{2}O_2 + 2e^-$
   It becomes yellow on heating because
   a) Zn^{2+}ions and electrons move to interstitial sites and F-centres are created
   b) oxygen and electrons move out of the crystal and ions become yellow
   c) Zn^{2+} again combine with oxygen to give yellow oxide
   d) $Zn^{2+}$are replaced by oxygen
2. A compound is formed by two elements Y and Z. The element Z forms ccp and atoms Yoccupy 1/3 rd of tetrahedral voids. The formula of the compound is
   a) Y_2Z_3 b) YZ c) YZ_3 d) Y_2Z
3. In a close packed structure of mixed oxides, the lattice is composed of oxide ions, one-eighth of tetrahedral voids are occupied by divalent cations while one-half of octahedral voids are occupied by trivalent cations. The formula of the oxide is
   a) A_2BO_4 b) AB_2O_3 c) A_2BO_3 d) AB_2O_4
4. A compound formed by elements X and crystallizes in a cubic structure in which the X atoms are at the corners of a cube and the Y atoms are at the facecentres. The formula of the compound is :
   a) XY_3 b) X_3Y c) XY d) XY_2
5. The unit cell of aluminium is a cube with an edge length of 405 pm. The density of aluminium is 2.70 g cm^{-3}. What is the structure of unit cell of aluminium?
   a) Body-centred cubic cell b) Face-centred cubic cell
   c) End-centred cubic cell d) Simple cubic cell
6. Which of the following primitive cells show the given parameters?
   $a \neq b \neq c$, $\alpha = \beta = \gamma = 90°$
   a) Cubic b) Tetragonal c) Orthorhombic d) Hexagonal

7. Which kind of defects are introduced by doping?
   a) Dislocation defects b) Schottky defects c) Frenkel defects
   d) Electronic defects
8. A unit cell of $BaCl_2$ (fluorite structure) is made up of
   a) four Ba^{2+} ions and four Cl^- ions b) four Ba^{2+} ions and eight Cl^- ions
   c) eight Ba^{2+} ions and four Cl^- ions d) four Ba^{2+} ions and six Cl^- ions
9. Assertion: Packing efficiency of body centred cubic structure is 68%.
   Reason : 68% is the maximum packing efficiency any crystal can have
   a)
   If both assertion and reason are true and reason is the correct explanation of assertion.
   b)
   If both assertion and reason are true but reason is not the correct explanation of assertion
   c) If assertion is true but reason is false.
   d) If both assertion and reason are false
10. The density of a metal which crystallises in bcc lattice with unit cell edge length 300 pm and molar mass 50 g mol^{-1} will be:
    a) 10 g cm^{-3} b) 14.2 g cm^{-3} c) 6.15 g cm^{-3} d) 9.32 g cm^{-3}
11. Assertion: Iron, cobalt, nickel and CrO_2 are called ferromagnetic substances.
    Reason : Ferromagnetic substances are weakly attracted by magnetic field
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false.
    d) If both assertion and reason are false
12. Which of the following oxides behaves as conductor or insulator depending upon temperature?
    a) TiO b) SiO_2 c) TiO_3 d) MgO

13. Observe the given figure carefully and fill in the blanks by choosing the correct option.



a)

(P)	(Q)	(R)
Perfect crystal	p-type semiconductor	n-typEe semiconductor

b)

(P)	(Q)	(R)
Doped crystal	n-type semiconductor	p-type semiconductor

c)

(P)	(Q)	(R)
Perfect crystal	n-type semiconductor	p-type semiconductor

d)

(P)	(Q)	(R)
n-type semiconductor	Perfect crystal	p-type semiconductor

14. When Zn converts from melted state to its solid state, it has hcp structure, then find the number of nearest atoms?
    a) 6 b) 8 c) 12 d) 4
15. The major binding force in diamond, silicon and quartz is
    a) electrostatic force b) electrical attraction c) covalent bond force
    d) van der Waals force
16. A metal crystallises into a lattice containing a sequence of layers as AB AB AB _____What percentage of voids are left in the lattice?
    a) 72% b) 48% c) 26% d) 32%
17. Fe_3O_4 is ferrimagnetic at room temperature but at 850 K, it becomes
    a) diamagnetic b) ferrimagnetic c) paramagnetic. d) anti-ferromagnetic.

18. The fraction of octahedral or tetrahedral voids occupied depends upon the radii of the ions occupying the voidsThe edge lengths of the unit cells in terms of the radius of spheres constituting fcc, bee and simple cubic unit cell are respectively
    a) $2\sqrt{2r}, \frac{4r}{\sqrt{3}}, 2r$ b) $\frac{4r}{\sqrt{3}}, 2\sqrt{2r}, 2r$ c) $2r, 2\sqrt{2r}, \frac{4r}{\sqrt{3}}$ d) $2r, \frac{4r}{\sqrt{3}}, 2\sqrt{2r}$
19. Which of the following structures is not correctly matched?
    a)

NaCl type	Cl^- ions in ccp structure. Na^+ ions in half octahedral holes.

    b)

ZnS type	S^{2-} ions in ccp structure. Zn^{2+} ions in alternate tetrahedral voids.

    c)

CaF_2 type	Ca^{2+} ions in eep structure. F^- ions in all tetrahedral voids.

    d)

Na_2O type	O^{2-} ions in ccp structure. Na^+ ions in all tetrahedral holes

20. With which one of the following elements silicon should be doped so as to give p-type of semiconductor?
    a) Selenium b) Boron c) Germanium d) Arsenic
21. Alkali halides do not show Frenkel defect because
    a) cations and anions have almost equal size
    b) there is a large difference in size of cations and anions
    c) cations and anions have low coordination number
    d) anions cannot be accommodated in voids
22. Assertion: Glass panes fixed to windows or doors of old buildings are slightly thicker at the bottom than at the top.
    Reason : Glass is a pseudo solid or supercooled liquid.

a)

If both assertion and reason are true and reason is the correct explanation of assertion.

b)

If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false.

d) If both assertion and reason are false

23. A metal has a fcc lattice. The edge length of the unit cell is 404 pm. The density of the metal is 2.72 g cm^{-3}. The molar mass of the metal is: (N_A Avogadro's contant = 6.02 x 10^{23} mol^{-1})

    a) 27 g mol^{-1} b) 20 g mol^{-1} c) 40 g mol^{-1} d) 30 g mol^{-1}

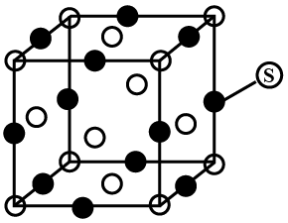
24. The ionic radii of A^+ and B^- ions are 0.98 x 10^{-10} I m and 1.81 x 10^{-10} m. The coordination number of each ion in AB is :

    a) 8 b) 2 c) 6 d) 4

25. How many lithium atoms are present in a unit cell with edge length 3.5 $\mathring{A}$ and density 0.53 g cm^{-3} ? (Atomic mass of Li = 6.94)

    a) 2 b) 1 c) 4 d) 6

26. For the structure given below the site marked as S is a



    a) tetrahedral void b) cubic void c) octahedral void d) none of these.

27. Which of the following statements is not correct about molecular crystals?

    a) They are generally soft and easily compressible

    b)

    They are good conductors of electricity as the electrons are delocalised in the bonds.

    c) They have low melting and boiling points

    d) They consist of polar or non-polar molecules

28. The distance between Na^+ and Cl^- ions in NaCl with a density 3.165 g cm^{-3} is

    a) 497 pm b) 248.5 pm c) 234 pm d) 538.5 pm

29. Which of the following shows correct range of conductivity?
    (i) Conductors: 10^4 to 10^7 ohm^{-1} m^{-1}
    (ii) Insulators: 10^{-6} to 10^4 ohm^{-1} m^{-1}
    (iii) Semiconductors: 10^{-10} to 10^{-6} ohm^{-1} m^{-1}
    a) (i) and (ii) b) (i) only c) (ii) and (iii) d) (i), (ii) and (iii)

30. Which among the following will show anisotropy?
    a) Glass b) NaBr c) Plastic d) Rubber

31. Match the types of packing given in column I with the items given in column II

Column-I		**Column-II**	
i)	Square close packing in two dimensions	(p)	Triangular voids
ii)	Hexagonal close packing in two dimensions	(q)	Pattern of spheres is repeated in every fourth layer
iii)	Hexagonal close packing in three dimensions	(r)	Coordination number = 4
iv)	Cubic close packing in three dimensions	(s)	Pattern of sphere is repeated in alternate layers

    a) (i) → (p), (ii) → (r), (iii) → (q), (iv) → (s)
    b) (i) → (q), (ii) → (s), (iii) → (p), (iv) → (r)
    c) (i) → (r), (ii) → (p), (iii) → (s), (iv) → (q)
    d) (i) → (r), (ii) → (p), (iii) → (q), (iv) → (s)

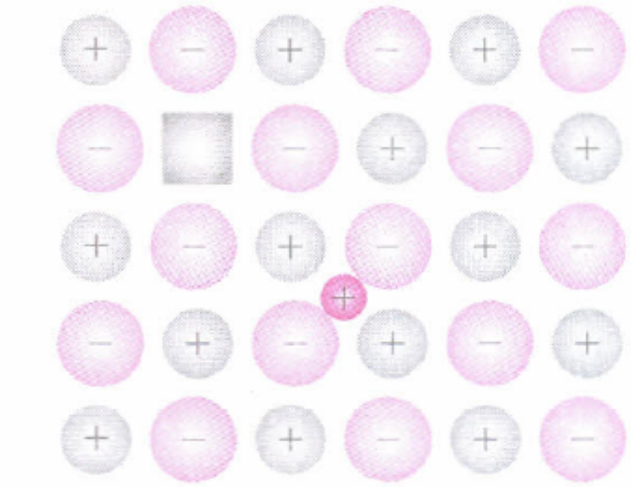
32. Assertion: At low temperature, particles of matter occupy fixed positions and exist in solid state.
    Reason: Under a given set of conditions of temperature and pressure, the state of a substance depends upon the net effect of thermal energy and intermolecular forces.
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false.
    d) If both assertion and reason are false

33. The second order Bragg diffraction of X-rays with λ = 1.00 Å from a set of parallel planes in a metal occurs at an angle 60°. The distance between the scattering planes in the crystal is :
    a) 2.00Å b) 1.00Å c) 0.575Å d) 1.15Å
34. In cube of any crystal A-atom placed at every corners and B-atom placed at every centre of face. The formula of compound is :
    a) AB b) AB_3 c) A_2B_2 d) A_2B_3
35. Which of the following statements is not correct regarding diamond and graphite?
    a)
    In diamond, each carbon atom is covalently bonded to four other carbon atoms.
    b)
    In graphite, each carbon atom is covalently bonded to three other carbon atoms in the same plane
    c)
    The C- Cbond length in graphite isintermediate between single and double bond distance.
    d)
    Diamond is a layered structure, the two layers joined by van der Waals' forces
36. Which of the following point defects are shown by $AgBr_{(s)}$ crystals?
    (I) Schottky defect
    (II) Frenkel defect
    (III) Metal excess defect
    (IV) Metal deficiency defect
    a) (I) and (II) b) (III) and (IV) c) (I) and (III) d) (II) and (IV)
37. Copper crystallises in face-centred cubic lattice with a unit cell length of 361 pm. What is the radius of copper atom in pm?
    a) 157 b) 181 c) 108 d) 128
38. A metal crystallises into two cubic phases, face centred cubic (fcc) and body centred cubic (bcc), whose unit cell lengths are 3.5 Å and 3.0 Å, respectively. The ratio of densities of fee and bee is:
    a) 1.259: 1 b) 1: 1.259 c) 3: 2 d) 1.142: 1

39. Which of the following statements is not true about the voids?
    a)
    Octahedral void is formed at the centre of six spheres which lie at the apices of a regular octahedron.
    b) There is one octahedral site for each sphere
    c) There are two tetrahedral sites for each sphere.
    d)
    Octahedral voids are formed when the triangular voids in second layer exactly overlap with similar voids in the first layer.
40. How many chloride ions are surrounding sodium ion in sodium chloride crystal?
    a) 4 b) 8 c) 6 d) 12
41. The number of atoms contained in a facc unit cell of a monoatomic substance is
    a) 4 b) 6 c) 8 d) 3
42. Coordination numbers of Cs^+ and Cl^- in CsCl crystal are
    a) 8,8 b) 4,4 c) 6,6 d) 8,4
43. The number of octahedral void(s) per atom present in a cubic close-packed structure is
    a) 1 b) 3 c) 2 d) 4
44. For orthorhombic system axial ratios are and the axial angles are $a \neq b \neq c$
    a) $\alpha = \beta = \gamma \neq 90^\circ$ b) $\alpha = \beta = \gamma = 90^\circ$ c) $\alpha = \gamma = 90^\circ, \beta \neq 90^\circ$
    d) $\alpha \neq \beta \neq \gamma = 90^\circ$
45. Which of the following forms a molecular solid when solidified?
    a) Calcium fluoride b) Silicon dioxide c) Carbon dioxide d) Sodium chloride
46. Graphite is a good conductor of electricity due to the presence of_____
    a) cations b) anions c) lone pair of electrons d) free valence electrons
47. A metal crystallizes with a face-centred cubic lattice. The edge of the unit cell is 408 pm. The diameter of the metal atom is:
    a) 288 pm b) 408 pm c) 144 pm d) 204 pm
48. To get n-type of semiconductor, germanium should be doped with
    a) gallium b) arsenic c) aluminium d) boron.
49. Assertion: Diode is a combination of n-type and p-type semiconductors.
    Reason: The solar cell is an efficient photo-diode used for conversion of light energy into electrical energy

a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

50. Which is the defect represented by the given figure?



a) Schottky defect b) Frenkel defect c) Vacancy defect d) Interstitial defect

51. In face centred cubic unit cell, edge length is
a) $\frac{4}{\sqrt{3}}r$ b) $\frac{4}{\sqrt{2}}r$ c) 2r d) $\frac{\sqrt{3}}{2}r$

52. The number of atoms in 100 g of a fcc crystal with density d = 10 g/cm^3 and cell edge equal to 100 pm, is equal to:
a) 2 x 10^{25} b) 1 x 10^{25} c) 4 x 10^{25} d) 3 x 10^{25}

53. Cation and anion combine in a crystal to form following type of compound:
a) ionic b) metallic c) covalent d) dipole-dipole.

54. In face-centred cubic lattice, a unit cell is shared equally by how many unit cell?
a) 2 b) 4 c) 6 d) 8

55. Which of the following represents correct order of conductivity in solids?
a) $K_{metais} > > K_{insuiators} < K_{semiconductors}$ b) $K_{metais} < < K_{insuiators} < K_{semiconductors}$
c) K_{metais}; $K_{semiconductors} > K_{insuiators}$ = zero
d) $K_{metais} < K_{semiconductors} > K_{insuiators} \neq$ zero

56. Which of the following is not a characteristic of a crystalline solid?

a) Definite and characteristic heat of fusion b) Isotropic nature

c)

A regular periodically repeated pattern of arrangement of constituent particles in the entire crystal

d) A true solid

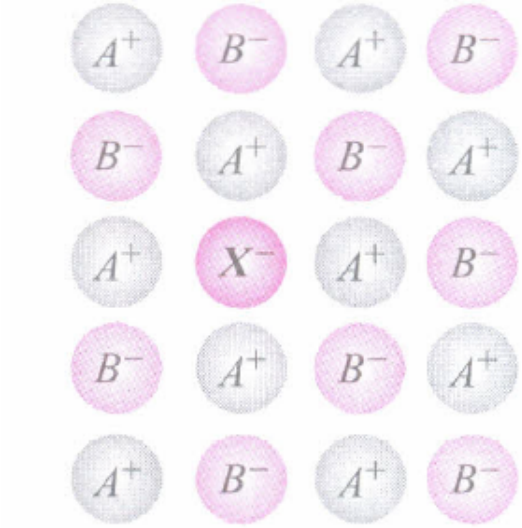
57. Graphite cannot be classified as _____ .

a) conducting solid b) network solid c) covalent solid d) ionic solid

58. Edge length of unit cell of chromium metal is 287 pm with bcc arrangement. The atomic radius is of the order

a) 124.27 pm b) 287 pm c) 574 pm d) 143.5 pm

59. In the following figure, the blank X is known as ___ and why?



a) Electron trap, because an electron is present here.

b) Metal deficient centre, since negative charge is present here.

c) F-centre, since it imparts colour to the crystal.

d) F-centre, since it is responsible for positive charge on the crystal

60. Monoclinic sulphur is an example of monoclinic crystal system. What are the characteristics of the crystal system?

a) $a \neq b \neq c, \alpha = \beta = \gamma = 90^o$ b) $a \neq b \neq c, \alpha \neq \beta \neq \gamma \neq 90^o$ c) $a = b \neq c, \alpha = \beta = \gamma = 90^o$

d) $a \neq b \neq c, \alpha = \beta = \gamma = 90^o, \beta \neq 90^o$

61. Which of the solids show the following properties?

(i) Electrical conductivity

(ii) Malleability

(iii) Ductility

(iv) Fairly high melting point

a) Ionic solids b) Covalent solids c) Metallic solids d) Molecular solids

62. A solid AB has a rock salt structure. If radius of cation A^+ is 120 pm, what is the minimum value of radius of B^- anion?
a) 120 pm b) 240 pm c) 290 pm d) 360 pm

63. The coordination number of metal crystallising in a hexagonal close packing is
a) 12 b) 4 c) 8 d) 6

64. An electron trapped in an anion site in a crystal is called
a) F-centre b) Frenkel defect c) Schottky defect d) interstitial defect

65. Lithium metal crystallizes in a body-centred cubic crystal. If the length of the side of the unit cell of lithium is 351pm, the atomic radius of lithium will be:
a) 151.8pm b) 75.5pm c) 300.5pm d) 240.8pm

66. Experimentally it was found that a metal oxide has formula $M_{0.98}O$. Metal M, is present as M^{2+} and M^{3+} in its oxide. Fraction of the metal which exists as M^{3+} would be:
a) 5.08% b) 7.01% c) 4.08% d) 6.05%

67. If NaCl is doped with 10^{-4} mol % of $SrCl_2$, the concentration of cation vacancies will be : ($N_A = 6.02 \times 10^{23}$ mol^{-1})
a) 6.02×10^{16} mol^{-1} b) 6.02×10^{17} mol^{-1} c) 6.02×10^{14} mol^{-1}
d) 6.02×10^{15} mol^{-1}

68. Match the column I with column II and mark the appropriate choice

Column-I(Structure)		Column II (Packing efficiency)	
A)	Simple cubic structure	(i)	68%
B)	Face centred cubic structure	(ii)	74%
C)	Body centred cubic structure	(iii)	52%

a) (A) → (iii), (B) → (ii), (C) → (i) b) (A) → (i), (B) → (ii), (C) → (iii
c) (A) → (ii), (B) → (i), (C) → (iii) d) (A) → (iii), (B) → (i), (C) → (ii)

69. A given metal crystallizes out with a cubic structure having edge length of 361 pm. If there are four metal atoms in one unit cell, what is the radius of one atom?
a) 80 pm b) 108 pm c) 40 pm d) 127 pm

70. In a face-centered cubic lattice, a unit cell is shared equally by how many unit cells?
a) 2 b) 4 c) 6 d) 8

71. The intermetallic compound LiAg crystallizes in cubic lattice in which both lithium and sliver have coordination number of eight. The crystal class is
    a) face-centred cube b) simple cube c) body-centred cube d) none of these
72. If we mix a pentavalent impurity in a crystal lattice of germanium, what type of semiconductor formation will occur?
    a) n-type semiconductor b) p-type semiconductor c) both (a) and (b)
    d) None of these
73. When electrons are trapped into the crystal in anion vacancy, the defect is known as
    a) Schottky defect b) Frenkel defect c) Stoichiometric defect d) F-centres
74. A compound MpXq has cubic close packing (eep) arrangement of X. Its unit cell structure shown below. The empirical formula of the compound is:
    a) MX b) MX_2 c) M_2X d) M_5X_{14}
75. Match the column I with column II and mark the appropriate choice.

Column-I (Radius ratio)		Column-II (Coordination number)	
A)	0.155 - 0.225	(i)	4
B)	0.225 - 0.414	(ii)	8
C)	0.414 - 0.732	(iii)	3
D)	0.732 - 1.0	(iv)	6

    a) (A)→ (i), (B)→ (ii), (C)→ (iv), (D)→ (iii)
    b) (A)→ (Ii), (B)→ (iv), (C)→ (i), (D)→ (iii)
    c) (A)→ (iv), (B)→ (iii), (C)→ (i), (D)→ (ii)
    d) (A)→ (iii), (B)→ (i), (C)→ (iv), (D)→ (ii)
76. Which of the following solids is not an electrical conductor?
    (I) $Mg_{(s)}$
    (II) $TiO_{(s)}$
    (III) $I_{2(s)}$
    (IV) $H_2O_{(s)}$
    a) (I) only b) (II) Only c) (III) and (IV) d) (II), (III) and (IV)
77. If 'a' stands for the edge length of the cubic systems: simple cubic, body centred cubic and face centred cubic, then the ratio of radii of the spheres in these system will be respectively

a) $\frac{1}{2}a : \frac{\sqrt{3}}{4}a, \frac{1}{2\sqrt{2}}a$ b) $\frac{1}{2}a : \sqrt{3}a, \frac{1}{\sqrt{2}}a$ c) $\frac{1}{2}a : \frac{\sqrt{3}}{4}a, \frac{\sqrt{3}}{2}a$ d) $1a : \sqrt{3}a, \sqrt{2}a$

78. If three elements X, Y and Z crystallise in a ccp lattice with X atoms at the corners, Y atoms at the cube centre and Z atoms at the edges, the formula of the compound will be
a) XYZ b) XYZ_2 c) XYZ_3 d) X_2Y_2Z

79. Lithium has a bee structure. Its density is 530 kg m^{-3} and its atomic mass is 6.94 g mol^{-1}. Calculate I the edge length of a unit cell of lithium metal? I (NA = 6.02 X 10^{23} mol^{-1})
a) 527 pm b) 264 pm c) 154 pm d) 352 pm

80. Which of the following is not true about the ionic solids?
a) Bigger ions form the close packed structure
b)
Smaller ions occupy either the tetrahedral or the octahedral voids depending upon their size
c) Occupation of all the voids is not necessary
d)
The fraction of octahedral or tetrahedral voids occupied depends upon the radii of the ions occupying the voids

81. Examples of few solids are given below. Find out the example which is not correctly matched.
a) Ionic solids - NaCl, ZnS b) Covalent solids - H_2, I_2
c) Molecular solids - $H_2O_{(s)}$ d) Metallic solids - Cu, Sn

82. The edge length of sodium chloride unit cell is 564 pm. If the size of Cl^- ion is 181 pm. The size ofNa^+ ion will be
a) 101 pm b) 181 pm c) 410 pm d) 202 pm

83. If a is the length of the side of a cube, the distance between the body centered atom and one corner atom in the cube will be :
a) $\frac{2}{\sqrt{3}}a$ b) $\frac{4}{\sqrt{3}}a$ c) $\frac{\sqrt{3}}{4}a$ d) $\frac{\sqrt{3}}{2}a$

84. Total volume of atoms present in a fcc unit cell of a metal with radius r is:
a) $\frac{12}{3}\pi r^3$ b) $\frac{16}{3}\pi r^3$ c) $\frac{20}{3}\pi r^3$ d) $\frac{24}{3}\pi r^3$

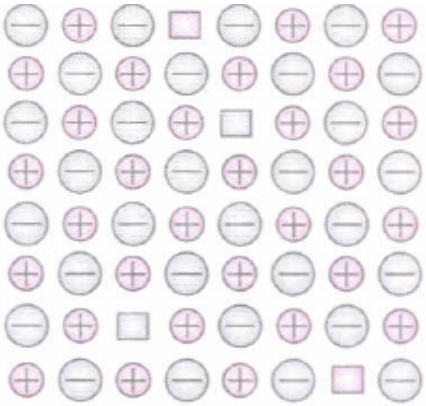
85. A metal crystallizes with a face-centered cubic lattice. The edge length of the unit cell is 408 pm.The diameter of the metal atom is
a) 288 pm b) 408 pm c) 144 pm d) 204 pm

86. In a Schottky defect,
    a) an ion moves to interstitial position between the lattice points
    b) electrons are trapped in a lattice site c) some lattice sites are vacant
    d) some extra cations are present in interstitial spaces
87. Assertion : Semiconductors are the solids with conductivities in the intermediate range from 10^{-6} to 10^{4} ohm^{-1} m^{-1}
    Reason: In case of semiconductors, the gap between the valence band and conduction band is small.
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false.
    d) If both assertion and reason are false
88. In NaCl structure,
    a) all octahedral and tetrahedral sites are occupied
    b) only octahedral sites are occupied c) only tetrahedral sites are occupied
    d) neither octahedral nor tetrahedral sites are occupied
89. The percentage of empty space in a body centred cubic arrangement is _____ .
    a) 74 b) 68 c) 32 d) 26
90. Solid X is a very hard solid which is electrical insulator in solid as well as in molten state and has extremely high melting point. What type of solid is it?
    a) Ionic solid b) Covalent solid c) Metallic solid d) Molecular solid
91. The density of mercury is 13.6 g/mL. The diameter of an atom of mercury assuming that each atom is occupying a cube of edge length equal to the diameter of the mercury atom is approximately:
    a) 3.01 Å b) 2.54 Å c) 0.29 Å d) 2.91 Å
92. The edge length of a face-centred unit cubic cell is 50g pm. If the radius of the cation is 100 pm, the radius of the anion is.
    a) 288 pm b) 398 pm c) 154 pm d) 618 pm
93. Iodine molecules are held in the crystals lattice by

a) London forces b) dipole-dipole interactions c) covalent bonds
d) coulombic forces

94. In the fluorite structure, the coordination number of Ca^{2+} ion is :
a) 4 b) 6 c) 8 d) 3

95. Which of the following defects is represented in the given figure?



a) Impurity defect b) Frenkel defect c) Schottky defect
d) Metal excess defect

96. What is the coordination number in a square close packed structure in two dimensions?
a) 2 b) 3 c) 4 d) 6

97. The appearance of colour in solid alkali metal halides is generally due to
a) Schottky defect b) Frenkel defect c) Interstitial position d) F-centres

98. Match the column I with column II and mark the appropriate choice

Column-I		Column-II	
A)	Fe in solid state	(i)	Electrolytic conductor
B)	NaCl in molten state	(ii)	p-type semiconductor
C)	CO_2 in solid state	(iii)	Electronic conductor
D)	Si doped with aluminium	(iv)	Non-polar insulator

a) (A) → (iv), (B) → (ii), (C) → (i), (D) → (iii)
b) (A) → (ii), (B) → (iii), (C) → (i), (D) → (iv)
c) (A)→ (iii), (B)→ (i), (C)→ (iv), (D)→ (ii)
d) (A) → (i), (B) → (iv), (C) → (iii), (D) → (ii)

99. The radii of Na^+ and cr ions are 95 pm and 181 pm respectively. The edge length of NaCI unit cell is
a) 276 pm b) 138 pm c) 552 pm d) 415 pm

100. Which is the incorrect statement?

a) $FeO_{0.98}$ has non-stoichiometric metal deficiency defect

b) Density decreases in case of crystals with Schottky's defect

c)

NaCl(s) is insulator, silicon is semiconductor, silver is conductor, quartz is piezoelectric crystal

d) Frenkel defect is a dislocation defect

101. An element crystallises in a structure having a fcc unit cell of an edge 200 pm. If 200 g of this element contains 24×10^{23} atoms then its density is:

a) 41.66 g cm^{-3} b) 313.9 g cm^{-3} c) 8.117 g cm^{-3} d) 400 g cm^{-3}

102. The conductivity of intrinsic semiconductors can be increased by adding a suitable impurity. This process is called (P). This can be done with an impurity which is (Q) rich or deficient as compared to the semiconductor. Such impurities introduce(R) defects in them. Electron rich impurities result in (S) type semiconductors while electron deficit impurities result in (T) type semiconductors

a)

P	Q	R	S	T
doping	proton	point	p	n

b)

P	Q	R	S	T
doping	electron	non-stoichiometric	p	n

c)

P	Q	R	S	T
energy gap	charged	impurity	n	p

d)

P	Q	R	S	T
doping	electron	electronic	n	p

103. A metal X crystallises in a face-centred cubic arrangement with the edge length 862 pm. What is the shortest separation of any two nuclei of the atom?

a) 406 pm b) 707 pm c) 862 pm d) 609.6 pm

104. Assertion: A tetrahedral void is surrounded by four spheres and an octahedral void is surrounded by six spheres.

Reason: The number of tetrahedral voids is double the number of close packed spheres and number of octahedral voids is equal to number of close packed spheres

a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

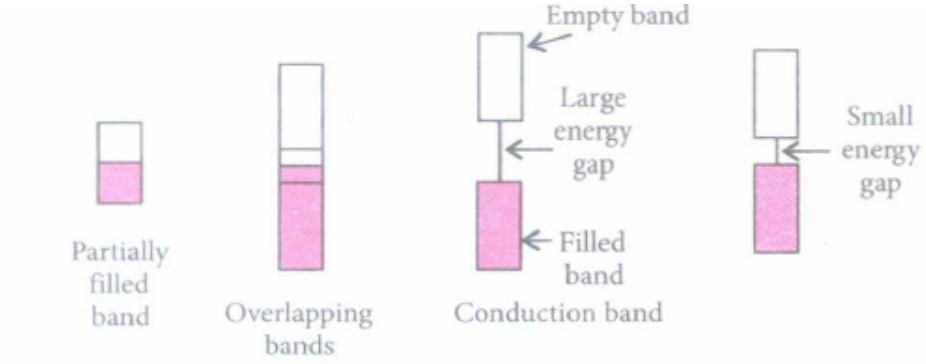
105. Assertion: Frenkel defect is also called dislocation defect.
Reason: Frenkel defect is shown by ionic substances in which cation and anion are of almost similar sizes.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

106. In *ABC ABC* packing if the number of atoms in the unit cell is n then the number of tetrahedral voids in the unit cell is equal to
a) n b) $n/2$ c) $n/4$ d) $2n$

107. A unit cell of sodium chloride has four formula units. The edge length of the unit cell is 0.564 nm. What is the density of sodium chloride?
a) 3.89 g cm^{-3} b) 3.89 g cm^{-3} c) 3 g cm^{-3} d) 1.82 g cm^{-3}

108. Which of the following statements is true about semiconductors?
a) Impurity of lower group creates n-type semiconductors.
b) Impurity of higher group creates p-type semiconductors
c) Extrinsic semiconductors are formed by doping impurity
d) Intrinsic semiconductors become conductors when temperature is raised

109. Three types of bands are shown in the figures given below showing the position of the valence band and conduction band. The figures A, B and C represent



a)

A	B	C
Non-Metal	Metal	Semiconductor

b)

A	B	C
Semiconductor	Insulator	Conductor

c)

A	B	C
Metal	Insulator	Semiconductor

d)

A	B	C
Insulator	Conductor	Semiconductor

110. Which of the following is an amorphous solid?
a) Graphite (C) b) Quartz glass (SiO_2) c) Chrome alum
d) Silicon carbide (SiC)

111. If the distance between $Na^+$and Cl in NaCl crystal is 265 pm, the edge length of the unit cell will be
a) 265 pm b) 795 pm c) 132.5 pm d) 530 pm

112. The edge length of fee cell is 508 pm. If radius of cation is 110 pm, the radius of anion is
a) 110 pm b) 220 pm c) 285 pm d) 144 pm

113. In the solid state, MgO has the same structure as that of sodium chloride. The number of oxygens surounding each magnesium in MgO is
a) 6 b) 1 c) 2 d) 4

114. A solid with high electrical and thermal conductivity from following is
a) Si b) Li c) NaCl d) Ice

115. Which of the following is a network solid?
a) $SO_{2(Solid)}$ b) I_2 c) Diamond d) $H_2O_{(Ice)}$

16. Assertion: Substances like Fe_3O_4 and $MgFe_2O_4$ lose ferrimagnetism on heating and become paramagnetic.
Reason: Magnetic moments of the domains in these substances are aligned in parallel and antiparallel directions in unequal numbers.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

17. An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is:
a) $\frac{4}{\sqrt{2}} \times 288\text{pn}$ b) $\frac{\sqrt{3}}{4} \times 288\text{pm}$ c) $\frac{\sqrt{2}}{4} \times 288\text{pm}$ d) $\frac{4}{\sqrt{3}} \times 288\text{pm}$

18. The fraction of the total volume occupied by the atoms present in a simple cube is
a) $\frac{\pi}{4}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{3\sqrt{2}}$ d) $\frac{\pi}{4\sqrt{2}}$

19. Which of the following oxides shows electrical properties like metals?
a) SiO_2 b) MgO c) $SO_{2(s)}$ d) CrO_2

20. Fill in the blanks by choosing the correct option. Metals often occur in --x condition. Individual crystals are randomly oriented so a metallic sample 8. may appear to be ~ even though a single crystal is___Z___.

a)

x	y	z
crystalline	isotropic	anisotropic

b)

x	y	z
polycrystalline	isotropic	anisotropic

c)

x	y	z
anisotropic	isotropic	crystalline

d)

x	y	z
crystalline	anisotropic	isotropic

21. The vacant space in bee lattice unit cell is :

a) 48% b) 23% c) 32% d) 26%

122. Which of the following solids is the structure of CsCl crystal?
a) Body centred cubic b) Simple cubic c) Face centred cubic
d) Edge centred cubic

123. Fill in the blanks by choosing an appropriate option. A sample of ferrous oxide has actual formula $Fe_{0.93}O_{1.00}$ In this sample (i) fraction of metal ions are Fe^{2+} ions. (ii) type of non-stoichiometric defect is present in this sample:

a)

(i)	(ii)
0.849	Metal deficiency

b)

(i)	(ii)
0.790	Metal deficiency

c)

(i)	(ii)
0.145	Metal excess

d)

(i)	(ii)
0.93	Vacancy defect

124. An element with atomic mass 100 has a bee structure and edge length 400 pm. The density of element is:
a) 10.37 g cm^{-3} b) 5.19 g cm^{-3} c) 7.29 g cm^{-3} d) 2.14 g cm^{-3}

125. The intermetallic compound LiAg crystallizes in a cubic lattice in which both lithium and silver atoms have coordination number of eight. To what crystal class does the unit cell belong
a) Simple cubic b) Face - centred cubic c) Body-centred cubic d) None

126. The sharp melting point of crystalline solids is due to
a)
a regular arrangement of constituent particles observed over a short distance in the crystal lattice
b)
a regular arrangement of constituent particles observed over a long distance in the crystal lattice
c) same arrangement of constituent particles in different directions
d) different arrangement of constituent particles in different directions

127. Structure of a mixed oxide is cubic close-packed (c.c.p). The cubic unit cell of mixed oxide is composed of oxide ions. One fourth of the tetrahedral voids are occupied by divalent metal A and the octahedral voids are occupied by a monovalent metal B. The formula of the oxide is:

a) ABO_2 b) A_2BO_2 c) $A_2B_3O_4$ d) AB_2O_2

28. Which of the following conditions favours the existence of a substance in the solid state?
a) High temperature b) Low temperature c) High thermal energy
d) Weak cohesive forces

29. Mark the incorrect pair from the following
a) Schottky defect - Equal number of cations and anions are missing
b)
Frenkel defect - Dislocation of cation from its normal site to an interstitial site
c) Impurity defect - $CdCl_2$ in AgCl crystal to create cationic vacancy.
d) Metal excess defect - $Fe_{0.93}O$

30. A crystal lattice with alternative +ve and -ve ions has radius ratio 0.524. The coordination number of lattice is
a) 4 b) 6 c) 8 d) 12

31. Iron exhibits bee structure at room temperature. Above 900°C, it transforms to fcc structure. The ratio of density of iron at room temperature to that at 900°C(assuming molar mass and atomic radii of iron remains constant with temperature) is :
a) $\frac{3\sqrt{3}}{4\sqrt{2}}$ b) $\frac{4\sqrt{3}}{3\sqrt{2}}$ c) $\frac{\sqrt{3}}{\sqrt{2}}$ d) $\frac{1}{2}$

32. Which of the following metal oxides is antiferromagnetic in nature?
a) MnO_2 b) TiO_2 c) NO_2 d) CrO_2

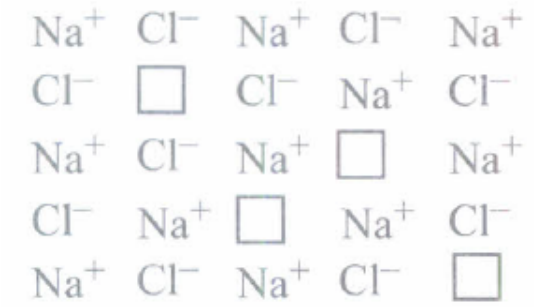
33. When molten zinc is converted into solid state it acquires hep structure. The number of nearest neighbours will be
a) 6 b) 12 c) 8 d) 4

34. The density and edge length values for a crystalline element with fcc lattice are 10 g cm^{-3} and 400 pm, respectively. The number of unit cells in 32 g of this crystal is:
a) 8×10^{23} b) 5×10^{22} c) 8×10^{22} d) 5×10^{23}

35. Assertion: SiC has higher melting point than NaCl.
Reason : SiC has stronger electrostatic forces of attraction.

a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

136. What type of crystal defect is shown in the figure given below?



a) Frenkel defect b) Schottky defect c) Interstitial defect
d) Cation excess defect

137. A crystal is formed by two elements X and Y in cubic structure. X atoms are at the corners of a cube while Y atoms are at the face centre. The formula of the compound will be
a) XY b) XY_2 c) X_2Y_3 d) XY_3

138. Which of the following will have metal deficiency defect?
a) NaCl b) FeO c) KCl d) ZnO

139. For orthorhombic system axial ratios are a ≠ b≠ c and the axial angles are:
a) $\alpha = \beta$= y ≠90° b) $\alpha = \beta = \gamma = 90°$ c) $\alpha = \gamma = 90°, \beta \neq 90°$ d) $\alpha \neq \beta \neq \gamma \neq 90°$

140. p-type semiconductors are formed when Si or Ge are doped with
a) group 14 elements b) group 15 elements c) group 13 elements
d) group 18 elements

141. In the cubic close packing, the unit cell has
a) 4 tetrahedral voids each of which is shared by four adjacent unit cells
b) 4 tetrahedral voids within the unit cell
c) 8 tetrahedral voids each of which is shared by four adjacent unit cells.
d) 8 tetrahedral voids within the unit cells

42. Match the column I with column II and mark the appropriate choice .
    a) (A)→(iii), (B)→(i), (C)→(ii), (D)→(iv),(E)→(v)
    b) (A)→(i), (B)→(ii), (C)→(iii), (D)→(iv), (E)→(v)
    c) (A)→(iv), (B)→(i), (C)→(iii), (D)→(ii), (E)→(v)
    d) (A)→(v), (B)→(iv), (C)→(iii), (D)→(ii), (E)→(i)

43. NaCl type crystal (with coordination no. 6: 6) can be converted into CsCl type crystal (with coordination no. 8: 8) by applying
    a) high temperature b) high pressure c) high temperature and high pressure
    d) low temperature and low pressure.

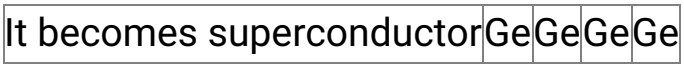
44. The correct statement regarding defects in crystalline solids is :
    a) Frenkel defects decrease the density of crystalline solids
    b) Frenkel defect is a dislocation defect
    c) Frenkel defect is found in halides of alkaline metals
    d) Schottky defects have no effect on the density of crystalline solids.

45. Which type of semiconductor is formed when germanium is doped in the gallium as indicated in the figure?
    a)

    b)

    c)

    d)



46. Assertion : Metals are good conductors of electricity.
    Reason: Metals conduct electricity in solid as well as in molten state.
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false.
    d) If both assertion and reason are false

47. A solid compound XY has NaCl structure. If the radius of the cations is 100 pm, the radius of the anion (Y)will be:
    a) 275.1 pm b) 322.5 pm c) 241.5 pm d) 165.7 pm

48. In CaF_2 type (fluorite structure) Ca^{2+} ions form _(A)_ structure and P- ions are present in all _(B)_ voids. The coordination number of Ca^{2+} is _(C)_ and F^- is _(D)_ (A), (B), (C) and (D) respectively are

a)

A	B	C	D
ccp	octahedral	8	4

b)

A	B	C	D
bcc	tetrahedral	4	8

c)

A	B	C	D
ccp	tetrahedral	8	4

d)

A	B	C	D
ccp	octahedral	4	8

49. Which of the following statements about the interstitial compounds is incorrect?
a) They are chemically reactive b) They are much harder then pure metal
c) They have higher melting points than the pure metal.
d) They retain metallic conductivity.

50. In NaCl is doped with 10 a mol % of $SrCl_2$, the concentration of cation vacancies will be (No = 6.02×10^{23} mol^{-1})
a) 6.02×10^{16} mol^{-1} b) 6.02×10^{17} mol^{-1} c) 6.02×10^{14} mol^{-1}
d) 6.02×10^{15} mol^{-1}

51. Which of the following statements is not correct about hexagonal close packing?
a) In hcp, atoms occupy 74% the available space
b) It is AB AB type packing in which third layer is aligned with the first layer.
c) Be, Mg, Mo etc. are found to have hcp structure
d) The coordination number is 6.

52. Which of the following does not represent radius of the atom correctly?
(i) Simple cubic cell: Radius = $\frac{a}{2}$
(ii) Pace centred cubic cell: Radius = $\frac{a}{3\sqrt{3}}$
(iii) Body centred cubic cell: Radius $\frac{\sqrt{3}}{4}a$
a) (i) b) (iii) c) (ii) d) (i) and (ii)

53. Which of the following arrangements shows schematic alignment of magnetic moments of antiferromagnetic substances?
a)  b)  c) 
d) 

54. Which of the following statements is not correct?
a) The number of carbon atoms in a unit cell df diamond is 4.
b) The number of Bravais lattices in which a crystal can be categorized is 14

c)

The fraction of the total volume occupied by the atoms in a primitive cell is 0.48.

d) Molecular solids are generally volatile

l 55. In the table given below, dimensions and angles of various crystals are given. Complete the table by filling the blanks.

Type of crystal	**Dimensions**	**Angles**
1. Cubic	a=b=c	$\propto=\beta=\vee=$p
2. Tetragonal	q	$\propto=\beta=\vee=90^0$
3. Orthorhombic	a≠b≠c	r
4. Hexagonal	s	$\propto=\beta=\vee=90^0$, $\vee=$t

a)

p	**q**	**r**	**s**	**t**
90^0	a=b≠c	$\propto=\beta=\vee=90^0$	a=b≠c	120^0

b)

p	**q**	**r**	**s**	**t**
120^0	a=b=c	$\propto=90^0$,$\beta=\vee=120^0$	a≠b≠c	90^0

c)

p	**q**	**r**	**s**	**t**
90^0	a≠b=c	$\propto=\beta=\vee=120^0$	a≠b≠c	90^0

d)

p	**q**	**r**	**s**	**t**
120^0	a≠b≠c	$\propto\neq\beta\neq\vee\neq90^0$	a≠b=c	120^0

l 56. Which of the following statements is not true?

a) Paramagnetic substances are weakly attracted by magnetic field.

b) Ferromagnetic substances cannot be magnetised permanently.

c)

The domains in antiferromagnetic substances are oppositely oriented with respect to each other.

d)

Pairing of electrons cancels their magnetic moment in the diamagnetic substances.

l 57. Percentage of free space in a body centred cubic unit cell is

a) 30% b) 32% c) 34% d) 28%

l 58. In calcium fluoride, having the fluorite structure, the coordination number for calcium ion (Ca^{2+}) and fluoride ion (F^-) are :

a) 4 and 2 b) 6 and 6 c) 8 and 4 d) 4 and 8

l 59. On doping Ge metal with a little of In or Ga, one gets:

a) p-type semi conductor b) n-type semi conductor c) insulator d) rectifier

60. Relationship between the atomic radius and the edge length of a body-centered cubic unit cell is
    a) r = a/2 b) $r = \sqrt{a/2}$ c) $r = \frac{\sqrt{3}}{4}a$ d) $r = \frac{3a}{2}$
61. Which of the following does not represent a type of crystal system?
    a) Triclinic b) Monoclinic c) Rhombohedral d) Isotropical
62. Pure silicon and germanium behave as
    a) conductors b) semiconductors c) insulators d) piezoelectric crystals.
63. Silicon doped with electron-rich impurity forms_____
    a) p-type semiconductor b) n-type semiconductor c) intrinsic semiconductor
    d) insulator
64. What type of stoichiometric defect is shown by ZnS?
    a) Schottky defect b) Frenkel defect c) Both Frenkel and Schottky defects
    d) Non-stoichiometric defect
65. If the radius of an octahedral void is r and radius of atoms in close packing is R, the relation between r and R is:
    a) r = 0.414R b) R = 0.414r c) r = 2R d) r = $\sqrt{2R}$
66. Lithium metal crystallises in a body centered cubic crystal. If the length of the side of the unit cell of lithiurr is 351 pm, the atomic radius of the lithium will be
    a) 15l.8 pm b) 75.5 pm c) 300.5 pm d) 240.8 pm
67. Assertion: In crystalline solids, the value of resistance is different in different directions.
    Reason: Crystalline solids are isotropic in nature.
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false.
    d) If both assertion and reason are false
68. In ccp arrangement the pattern of successive layers can be designated as
    a) AB AB AB b) ABC ABC ABC c) AB ABC AB d) ABA ABA ABA

69. The anionic sites occupied by unpaired electrons are called F-centres or colour centres. They impart (X) colour to the crystals of NaCl. Excess of lithium makes LiCl crystals (Y) and excess of potassium makes KCl crystals (Z). (X), (Y) and (Z) are
    a) yellow, green and pink respectively
    b) pink, yellow and violet (or lilac) respectively
    c) yellow, pink and violet (or lilac) respectively
    d) red, yellow and pink respectively.

70. The total number of tetrahedral voids in the face centred unit cell is_____
    a) 6 b) 8 c) 10 d) 12

71. Ionic solids conduct electricity in molten state but not in solid state because
    a)
    in molten state free ions are furnished which are not free to move in solid state
    b) in solid state ionic solids are hard, brittle and become soft in molten state
    c) all solids conduct electricity in molten state
    d) in solid state ions are converted to atoms which are insulators.

72. Crystalline CsCl has density 3.988 g cm^{-3}. The volume occupied by single CsCl ion pair in the crystal will be:
    a) 7.014×10^{-3} cm^3 b) 7.014×10^{-23} cm^3 c) 1.014×10^{-3} cm^3
    d) 1.542×10^{-5} cm^3

73. In which of the following structures coordination number for cations and anions in the packed structure will be same?
    a)
    Cl^- ions form fee lattice and Na^+ ions occupy all octahedral voids of the unit cell
    b)
    Ca^{2+} ions form fcc lattice and F^- ions occupy all the eight tetrahedral voids of the unit cell
    c)
    O2- ions formfee lattice and Na^+ ions occupy all the eight tetrahedral voids of the unit cell
    d)
    S^{2-} ions form fee lattice and Zn^{2+} ions go into alternate tetrahedral voids of the unit cell.

74. An element crystallises into a structure which may be described by a cubic type of unit cell having one atom on each corner of the cube and two atoms on one of its diagonals. If the volume of this unit cell is 24×10^{-24} cm and density of element is 7.2 g cm^{-3} the number of atoms present in 200 g of element is:
a) 3.5×10^{24} b) 5.7×10^{23} c) 6.3×10^{20} d) 1×10^{10}

75. AB crystallizes in a body-centred cubic lattice with edge length 'a' equal to 387 pm. The distance between two oppositely charged ions in the lattice is:
a) 335pm b) 250pm c) 200pm d) 300pm

76. Match the column I having type of lattice point and its contribution to one unit cell in column II and mark the appropriate choice

Column-I		Column-II	
A)	Corner	(i)	1
B)	Edge	(ii)	1/8
C)	Face center	(iii)	1/4
D)	Body center	(iv)	1/2

a) (A) → (ii), (B) → (i), (C) → (iii), (D) → (iv)
b) (A)→(ii), (B)→(iii), (C)→(iv), (D)→(i)
c) (A)→ (i), (B)→ (ii), (C)→ (iv), (D)→ (iii)
d) (A) → (iii), (B) → (iv), (C) → (i), (D) → (ii)

77. A ferromagnetic substance becomes a permanent magnet when it is placed in a magnetic field because
a) all the domains get oriented in the direction of magnetic field
b)
all the domains get oriented in the direction opposite to the direction of magnetic field
c) domains get oriented randomly
d) domains are not affected by magnetic field

78. Which of the following crystals does not exhibit Frenkel defect?
a) AgBr b) AgCl c) KBr d) ZnS

79. The lattice site in a pure crystal cannot be occupied by
a) molecule b) ion c) electron d) atom

80. For two isomorphous crystals A and B, the ratio of density of A to that of B is 1.6 while the ratio of the edge length of B to that of A is 2. If the molar mass of crystal B is 200 g mol, then that of crystal A is:
a) 240 g mor^{-1} b) 120 g mol^{-1} c) 80 g mol^{-1} d) 40 g mol^{-1}

81. The ability of a substances to assume two or more crystalline structures is called
a) Isomerism b) Polymorphism c) Isomorphism d) Amorphism

82. The correct order of the packing efficiency in different types of unit cells is _____.
a) fcc < bcc < simple cubic b) fcc > bcc > simple cubic
c) fcc < bcc > simple cubic d) bcc simple cubic

83. Which of the following statements is not true about the hexagonal close packing?
a) The coordination number is 12. b) It has 74% packing efficiency
c)
Tetrahedral voids of the second layer are covered by the spheres of the third layer
d)
In this arrangement spheres of the fourth layer are exactly aligned with those of the first layer.

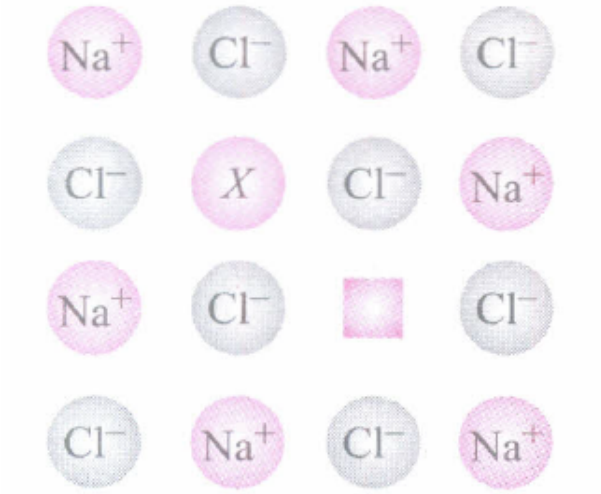
84. A cubic solid is made up of two elements P and Q. Atoms of P are present at the corners of the cube and atoms of Q are present at body centre. What is the formula of the compound and what are coordination numbers of P and Q?
a) PQ_2,6: 6 b) PQ,6: 6 c) P_2Q,6: 8 d) PQ, 8 : 8

85. Ionic solids, with Schottky defects, contain in their structure:

a) cation vacancies only b) cation vacancies and interstitial cations
c) equal number of cation and anion vacancies
d) anion vacancies and interstitial anions.

86. An element crystallising in body centred cubic lattice has an edge length of 500 pm. If its density is 4 g cm^{-3}, the atomic mass of the element (in g mol^{-1}) is (consider $N_A = 6 \times 10^{23}$)
a) 100 b) 250 c) 125 d) 150

87. In the given crystal structure what should be the cation X which replaces Na + to create a cation vacancy?



a) Sr^{2+} b) K^{+} c) Li^{+} d) Br^{-}

88. Schottky defect in crystals is observed when
a) an ion leaved its normal site and occupies an interstitial site
b) unequal number of cations and anions are missing from the lattice
c) density of the crystal is increased
d) equal number of cations and anions are missing from the lattice

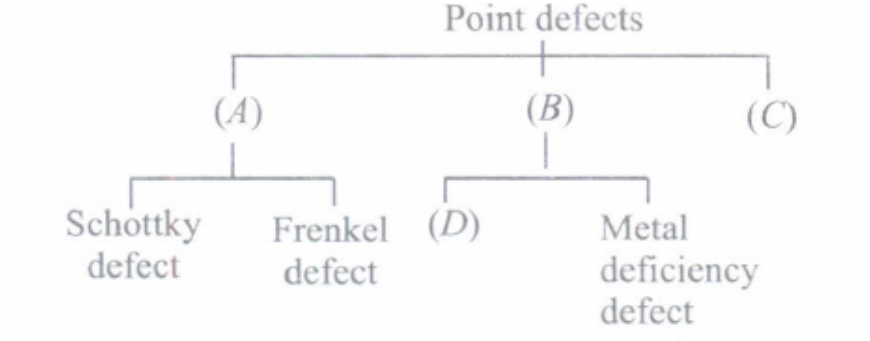
89. Which of the following statements is not true about amorphous solids?
a) On heating they may become crystalline at certain temperature
b) They may become crystalline on keeping for long time
c) Amorphous solids can be moulded by heating.
d) They are anisotropic in nature

90. In zinc blende structure
a) each S^{2-}ion is surrounded by six Zn^{2+}ions b) it has fcc structure
c) zinc ions occupy half of the tetrahedral sites
d) each Zn^{2+} ion is surrounded by six sulphide ions

91. The pure crystalline substance on being heated gradually first forms a turbid liquid at constant temperature and still at higher temperature turbidity completely disappears. The behaviour is a characteristic of substance forming
a) Allotropic crystals b) Liquid crystals c) Isomeric crystals
d) Isomorphous crystals

92. Which type of crystals contains more than one Bravais lattice?
a) Hexagonal b) Triclinic c) Rhombohedral d) Monoclinic

193. Identify A, B, C and D in the following flow chart:



a)

A	B	C	D
Impurity defects	Stoichiometric defects	Non-stoichiometric defects	Anion excess defects

b)

A	B	C	D
Stoichiometric defects	Non-stoichiometric defects	Impurity defects	Metal excess defects

c)

A	B	C	D
Non-stoichiometric defects	Stoichiometric defects	Impurity defects	Cation vacancy

d)

A	B	C	D
Impurity defects	Stoichiometric defects	Metal excess defects	Non-stoichiometric defects

194. The number of carbon atoms per unit cell of diamond unit cell is

a) 8 b) 6 c) 1 d) 4

195. The pyknometric density of sodium chloride crystal is 2.165×10^3 kg m^{-3} while its X-ray density is 2.17 g $\times 10^3$ kg m^{-3}. The fraction of unoccupied sites in sodium chloride crystal is:

a) 5.96×10^{-3} b) 5.96 c) 5.96×10^{-2} d) 5.96×10^{-1}

196. Assertion: Face centred cubic cell has 4 atoms per unit cell.
Reason : In fcc unit cell, there are 8 atoms at the corners and 6 atoms at face centres.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

197. What is the effect of Frenkel defect on the density of ionic solids?
a) The density of the crystal increases.
b) The density of the crystal decreases.
c) The density of the crystal remains unchanged.
d) There is no relationship between density of a crystal and defect present in it.

198. Which of the following is true about the value of refractive index of quartz glass?
a) Same in all directions b) Different in different directions
c) Cannot be measured d) Always zero

199. A solid compound XY has NaCl structure. If the radius of the cation is 100 pm, the radius of the anion (Y) will be :
a) 275.1 pm b) 322.5 pm c) 241.5 pm d) 165.7 pm

200. Assertion: Quartz glass is crystalline solid and quartz is an amorphous solid.
Reason: Quartz glass has long range order
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

201. The fcc crystal contains how many atoms in each unit cell?
a) 6 b) 8 c) 4 d) 5

202. Paramagnetic substances are magnetised in a magnetic field in the same direction. Paramagnetism is due to the presence of
a) one or more unpaired electrons b) all paired electrons
c) permanent spin and orbital motion
d) parallel and anti-parallel spins in equal number.

203. The fraction of total volume occupied by the atoms present in a simple cube is :
a) $\frac{\pi}{\sqrt[3]{2}}$ b) $\frac{\pi}{\sqrt[4]{2}}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}$

204. Assertion CsCl has body-centred cubic arrangement.
Reason: CsCl has one Cs^+ ion and 8 Cl^- ions in its unit cell.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false.
d) If both assertion and reason are false

205. Most crystals show good cleavage because their atoms, ions or molecules are :
a) weakly bonded together b) strongly bonded together
c) spherically symmetrical d) arranged in planes.

206. Silver halides generally show
a) Schottky defect b) Frenkel defect c) both Frenkel and Schottky defects
d) cation excess defect

207. To get a n-type semiconductor from silicon, it should be doped with a substance with valence_____
a) 2 b) 1 c) 3 d) 5

208. CsBr crystallises in a body-centred cubic lattice. The unit cell length is 436.6 pm. Given that the atomic mass of Cs = 133 and that of Br = 80 amu and Avogadro number being 6.02×10^{23} mol^{-1}, the density of CsBr is :
a) 4.25 g/cm^3 b) 42.5 g/cm^3 c) 0.425 g/cm^3 d) 8.25 g/cm^3

209. An element (atomic mass = 100 g/mol) having bcc structure has unit cell edge 400 pm. The density of element is:
a) 7.289 g/cm^3 b) 2.144 g/cm^3 c) 10.376 g/cm^3 d) 5.188 g/cm^3

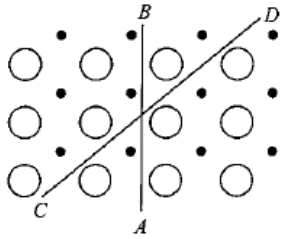
210. A crystalline structure has radius ratio (r_+ / r_-) in the range of 0.225 - 0.414. The coordination number and arrangement of anions around the cations are
a) 3, plane triangular b) 6, octahedral c) 4, tetrahedral d) 8, cubic

211. Cations are present in the interstitial sites in_____
a) Frenkel defect b) Schottky defect c) vacancy defect
d) metal deficiency defect

212. Which of the following is true about the charge acquired by p-type semiconductors?
a) positive b) neutral c) negative
d) depends on concentration of p impurity

213. In crystals of which one of the following ionic compounds would you expect maximum distance between centres of cations and anions?
a) CsI b) CsF c) LiF d) LiI

214. Study the figure of a solid given below depicting the arrangement of particles. Which is the most appropriate term used for the figure?



a) Isotropy b) Anisotropy c) Irregular shape d) Amorphous nature

215. Ferrimagnetism is observed when the magnetic moments of the domains in the substance are
a) oppositely oriented and cancel each other's magnetic moment.
b) aligned in parallel and anti-parallel directions in unequal numbers
c) randomly oriented and their magnetic moments get cancelled
d) in same direction and get aligned in a magnetic field