CHEMISTRY

BOOKS - TARGET CHEMISTRY (HINGLISH)

SOLID STATE

Question

1. Which among the following solids is NOT soft ?

A. Sodium

B. Potassium

C. Copper

D. Phosphorus

Answer: C

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2. Diamond and graphite are the

A. Sulphur

B. Carbon

C. Calcium carbonate

D. silicon dioxide

Answer: B

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3. Solid which do not show the same physical properties in different directions are called:

A. Polymorphism

B. isomorphism

C. anisotropy

D. isotropy

Answer: C

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4. Which one is called pseudo solid?

A. amorphous

B. crystalline

C. Anisophous

D. isomorphous

Answer: A

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5. Amorphous solids are

A. Possesess sharp melting points

B. Exhibit anisotropy

C. do not undergo clean clevange when cut with knife

D. Possess orderly arrangement over long distances

Answer: C

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6. Amorphous substances show

(A) short and long range order

(B) short range order

(C) long range order(D) have no sharp $M.\,P$

A. (i) and (iii) are correct

B. (ii) and (iii) are correct

C. (iii) and (iv) are correct

D. (ii) and (iv) are correct

Answer: D

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7. Amorphous solids are classified as

    A. true solid substances

    B. Substaances with ordered internal structure

    C. super cooled liquids

    D. substances with definite melting point

Answer: C

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8. Crystalline solid are

A. Glass

B. Rubber

C. Plastic

D. Sugar

Answer: D

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9. Glass is a:

A. Supercooled liquid

B. crystalline solid

C. non-crystalline solid

D. Liquid crystal

Answer: A

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10. Yellow glass contains _____.

A. CuO

B. UO_2

C. CoO

D. Fe_2O_3

Answer: B

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11. What type of interactions hold together the molecules in a polar crystalline solid ?

A. Dipole-dipole interactions

B. London dispersion forces

C. hydrogen bonds

D. covalent bonds

Answer: A

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12. Which of the following is not a molecular

crystal?

A. HCI

B. H_2

C. CH_4

D. Ice

Answer: D

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13. The ionic radii depends upon in the following factors:

A. sizes of cations and anions

B. the charges on the ions

C. polarisability of anion

D. all of these

Answer: D

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14. What type of stoichiometric defecit is shoen by ZnS ?

A. ionic

B. Covalent

C. metallic

D. molecular

Answer: A

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15. A sea of electrons is present in _____ solids .

A. ionic

B. metallic

C. Non-polar molecular

D. Polar molecular

Answer: B

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16. Write a distinguishing feature of a metallic solid compared to an ionic solid.

A. C

B. Si

C. W

D. AgCl

Answer: C

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17. Covalent compounds have low melting

points because

A. Atoms as their strural units

B. molecules as structural units

C. ions held together by electrostatic

   forces

D. high melting points

Answer: A

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18. _____ solids are also called giant solids

or network solids .

A. Covalent

B. Molecular

C. Ionic

D. Metallic

Answer: A

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19. In which form are the carbon atoms in graphite arranged?

A. four

B. five

C. six

D. seven

Answer: C

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20. The hybridisation of carbon in diamond, graphite and acetylene are respectively

A. $sp. \ SP^2$

B. sp^3, Sp^2

C. sp^3, sp

D. sp^2, Sp^3

Answer: B

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21. C_{60} is aromatic allotrope of carbon containing

A. hexagons and octagons

B. pentagons and triangles

C. hexagons and pentagons

D. squares and quadrilaterals

Answer: C

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22. Crystals can be classified into ....basic crystal habits

A. 3

B. 7

C. 14

D. 4

Answer: B

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23. How many types of Bravais lattices can occur in crystalline solids?

A. 8

B. 12

C. 14

D. 9

Answer: C

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24. What are the correct axial distance and axial angles for rhombohedral system?

A. $a = b = c, \alpha = \beta = \gamma \neq 90°$

B. $a = b \neq c, \alpha = \beta = \gamma = 90°$

C. $a \neq b \neq c, \alpha = \beta = \gamma = 90°$

D. $a \neq b \neq c, \alpha = \beta = \gamma \neq 90°$

Answer: A

25. In a simple or primitive unit cell, what is the number of atoms per unit cell ?

A. 1

B. 2

C. 4

D. 6

Answer: A

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26. What is the two-dimensional coordination number of a molecule in square close-packed layer?

A. 2

B. 4

C. 6

D. 12

Answer: C

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27. In planar square close packing , each sphere is surrounded by _____.

A. six triangular holes

B. Four square shaped holes

C. six square shaped holes

D. four tetrahedral holes

Answer: B

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28. In a close packed array of N spheres, the number of tetrahedral holes are

A. 4N

B. N/2

C. 2N

D. N

Answer: C

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29. the number of tetrahedral voids per unit

cell in NaCl crystal is ....

A. 1

B. 2

C. 4

D. 8

Answer: D

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30. Position of octahedral voids in fcc structure is//are

A. A simple triangular void is surrounded by four spheres

B. A bi - triangular void is surrounded by four spheres

C. a bi - triangular void is surrounded by six spheres

D. a bi - triangular void is surrounded by eight spheres

Answer: C

31. The coordination number in hcp is

A. 10

B. 7

C. 2

D. 12

Answer: D

32. The packing efficiency of a two-dimensional square unit cell shown below is

L
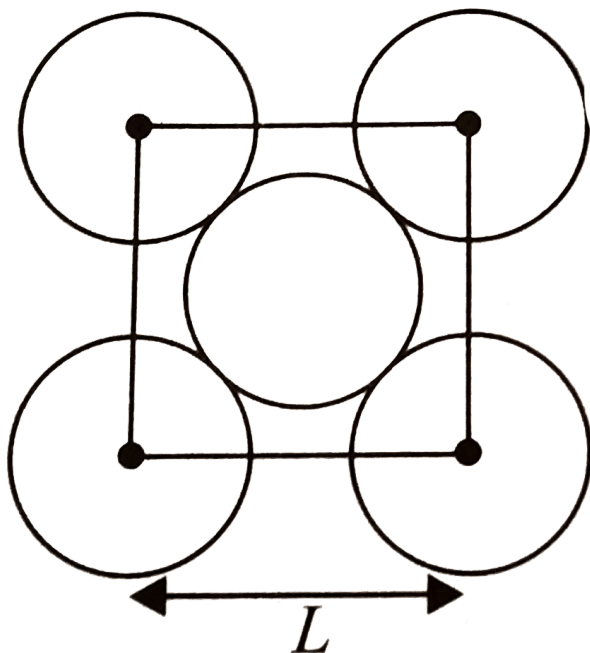
A. 52.4 %

B. 68.04 %

C. 74 %

D. 80 %

Answer: A

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33. The space occupied by b.c.c. arrangement is

approximately

A. 50 %

B. 68 %

C. 74 %

D. 56 %

Answer: B

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34. The maximum percentage of available volume that can be filled in a face centred cubic system by an atom is

A. 74 %

B. 68 %

C. 34 %

D. 26 %

Answer: A

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35. A solid is made of two element X and Y .The atoms Z are in CCP arrangement while the atoms X occupy all the terahedral sites .What is the formula of the compound ?

A. XZ

B. XZ_2

C. X_2Z

D. X_3Z

Answer: C

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36. A solide A^+B^- has the B^- ions arranged as below. If the A^+ ions occupy half of the tetrahedral sites in the structure. The formula
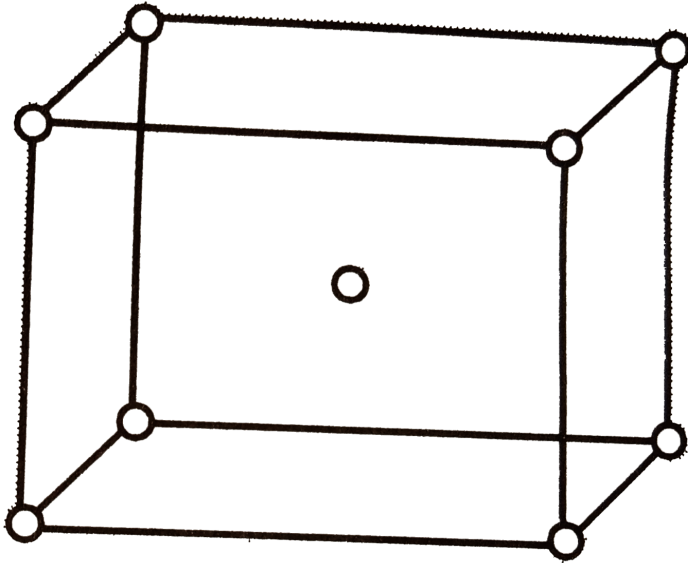
A. AB

B. A_2B

C. AB_2

D. AB_4

Answer: C

37. IF the radius ratio of cation to anion is in the range of 0.225 - 0.414 , then the coordination number of cation will be _____.

A. 2

B. 4

C. 6

D. 8

Answer: B

38. For tetrahedral co-ordination the radius ratio (r^+ / r^-) should be

A. $0.1414 - 0.732$

B. > 0.732

C. $0.155 - 0.225$

D. $0.225 - 0.414$

Answer: D

39. For cubic - coordination the value of ratio
is

    A. $0.732 - 1.000$

    B. $0.225 - 0.414$

    C. $0.000 - 0.225$

    D. $0.414 - 0.732$

Answer: A

40. In $CsCI$ lattice the coordination number of Cs ion is

A. 2

B. 4

C. 8

D. 12

Answer: C

41. In $NaCl$ lattice , the radius ratio is _____[

Given : $r_{Na^+} = 0.95\text{Å}, r_{Cl^-} = 1.81\text{Å}$]

A. 0.22

B. 0.46

C. 0.52

D. 0.47

Answer: C

42. For some crystals , the radius ratio for cation and anion is 0.525 its coordination number will be

A. 2

B. 4

C. 6

D. 8

Answer: C

43. How many chloride ions are there around sodium ion in sodium chloride crystal?

A. 8

B. 6

C. 4

D. 2

Answer: B

44. MgO has a structure of NaCl and TiCl has the structure of CsCl. What are the coordination number of ions in each (MgO and TiCl)

A. 4

B. 6

C. 10

D. 8

Answer: D

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45. For an ionic crystan of the type AB , the value of (limiting) earius ratio is 0.40 .The value suggest that the crystan struture should be

A. Octahedral

B. Tetrahedral

C. square planar

D. planar triangular

Answer: B

46. Define Frenkel and Schottky defects with examples.

A. strongly ionic compounds

B. compounds having high coordination number

C. compounds containing cations and anions of almost similar size

D. all the these

Answer: D

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47. Which has Frenkel defect ?

A. NaCl

B. KCl

C. CsCl

D. ZnS

Answer: D

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48. Which point defect lowers the density of a crystal?

A. Frenkel defect

B. schottky defect

C. substitution impurity defect

D. interstitial impurity defect

Answer: B

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49. Silicon is a _____ as it conducts

electricity better than ____ but not as efficient

as ____.

A. Conductor ,metals, non-metals

B. semiconductor , non-metals ,metals

C. semiconductor , metals,non-metals

D. conductor ,non-metals ,metals

Answer: B

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50. The space between the outermost filled

energy band and the next empty band is called

____.

A. Valence band

B. Conduction band

C. forbidden zone

D. hydride gap

Answer: C

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51. Germanium is an example of

A. an intrinsic semiconductor

B. a n-type semiconductor

C. a p-type semiconductor

D. insulator

Answer: A

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52. Which among the following is NOT a diamagnetic substance ?

A. Water

B. Sodium chloride

C. Oxygen

D. Benzene

Answer: C

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53. Maximum ferromagnetism is found in
_____.

A. Fe

B. Ni

C. Co

D. All of these

Answer: D

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54. Which of the following is FALSE regarding guoy's method ?

A. It is used for determining megnetic properties of a substance .

B. It involves weighing the substance in and out of magnetic field .

C. If a substance is diamagneic ,it weighs more in the magneitc field .

D. For a ferromagnetic substance , the extent of pull by the magnetic field is more compared to a paramagnetic substance .

Answer: C

55. Which one is called pseudo solid?

A. CaF_2

B. Glass

C. $NaCl$

D. Graphite

Answer: B

56. Find the INCORRECT statement.

A. iron is stringly ferromagnetic

B. schottky defect is a type of line defect

C. the coordination number of sphere in ABC ABC type of arrangement is 12.

D. Monoclinic unit cell exists in two types : simple and end -centred .

Answer: B

57. Find the number of Na^+ ions and Cl^- ions associated with each in a unit cell and $NaCl$.

A. 1

B. 4

C. 6

D. 8

Answer: B

58. Give an example each of a molecular solid and an ionic solid.

    A. Diamond

    B. LiF

    C. Li

    D. Silicon

Answer: B

59. For the various types of interactions , the CORRECT order of increasing strength is :

A. Covalent lt hydrogen bonding lt Van der Waals lt dipole

B. Van der Waals lt hydrogen bonding lt dipole - dipole lt hydrogen bonding lt

covalent

C. Van der Waals lt dipole - dipole lt hydrogen bonding lt covalent

D. Dipole -dipole lt van der Waals lt hydrogen bonding lt covalent

Answer: C

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60. Which of the following statements is TRUE ?

A. Solid changes into liquid on heating to its melting point

B. Liquid changes into gas ,On cooling to its Freezing point

C. Liquid changes into solid ,On heating to its boiling point

D. Solid changes into gas , on heating to its

melting point .

Answer: A

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61. Which one of the following allotropic forms

of carbon is isomorphous with crystalline

silicon?

A. NaF and MgO

B. K_2SO_4 and K_2SeO_4

C. $NaNO_3$ and $CaCO_3$

D. $NaCl$ and KCI

Answer: D

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62. Which among the following will show anisotropy ?

A. Glass

B. Barium chloride

C. Wood

D. Paper

Answer: B

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63. Which of the following statements is TRUE

?

A. Both rystalline and amorphous solids are isotropic .

B. Both crystalline and amorphous solids are anisotropic .

C. Crystalline solids are always isotropic and amorphous solids are anisotropic

D. Crystalline soleds are aniotropic and amorphous solids are anisotropic and amorphous solids are isotropic

Answer: D

64. Pyrex glass is obained by fusing together _____.

A. 60 to 80 % Al_2O_3 10 to 25% SiO_2 and

   ramininf amount of B_2O_3

B. 60 to 80% B_2O_3 , 10 to 25% Al_2O_3 and

   remaining amount of SIO_2

C. 60 to 80 % SiO_2, 10 to25 % B_2O_3 and

   remaining amount of Al_2O_3

D. 60 to 80 % SiO_2, 10to 25 % Al_2O_3 and reaming amount of B_2O_3

Answer: C

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65. Red Glass contains trace amount of _____.

A. Boron oxide

B. Al_2O_3 and Fe_2O_3

C. Gold and copper

D. Zinc and aluminium

Answer: C

66. Iodine is a solid at room temperature because

A. metallic

B. Ionic

C. Molecular

D. Covalent

Answer: C

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67. Solid CO_2 is an example of

A. non-polar molecular

B. Polar molecular

C. Covalent

D. metallic

Answer: A

68. The interparticle forces in solid hydrogen are

    A. Dipole -dipole interactions

    B. Covalent bonds

    C. Coordinate bonds

    D. London forces

Answer: D

69. LIF is a/ an _____ Crystal

    A. ionic

    B. metallic

    C. Covalent

    D. molecular

Answer: A

70. The metallic lustre of metals is due to :

A. Its high density

B. Its high polishing

C. Its chemical inertness

D. Presence of free electrons

Answer: D

71. In Which of the following substances the carbon atom is arranged in a regular tetrahedral struture?

A. Diamond

B. Benzene

C. Graphite

D. Carbon block

Answer: A

72. 1 Mole of buckminster fullerene contains

_____ Moles of carbon.

A. 0.6

B. 1.0

C. 6

D. 60

Answer: D

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73. $K_{33}C_{60}$ is a compound of potassium and fullerence ,It is _____ at 18 K .

A. A super conductor of electricity

B. A conductor of electricity

C. A semiconductor

D. an insulator

Answer: A

74. Cubic crystal has dimensions _____.

A. $a \neq b \neq c, \alpha, \beta = 90°, \gamma \neq 90°$

B. $a = b = c, \alpha = \beta = \gamma = 90°$

C. $a = b \neq c, \alpha = \beta = \gamma = 90°$

D. $a \neq b \neq C, \alpha \neq \beta \neq \gamma \neq 90°$

Answer: B

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75. Which of the following is an example of a body centred cubic unit cell ?

A. Sodium

B. Aluminium

C. Nickel

D. Copper

Answer: A

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76. The cubic close-packed structure is based on an fcc unit cell.

    A. 26 %

    B. 10 %

    C. 46 %

    D. 74 %

Answer: A

77. In which of the following the sphere of the succesive layers are exaclty above the sphere of the lower layers ?

A. Two dimensional AB AB type arrangement

B. Three dimensional ABAB type arrangement

C. Three dimensional AAAA type arrangement

D. three dimensional ABC ABC type arrangement

Answer: C

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78. The $ABCABC$ type packing is called ....

.

A. Hexagonal close packed structucture

B. simple cubic structure

C. Planar square close packed structure

D. Face - centred cubic structure

Answer: D

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79. The decreasing order of the size of void is

_____.

A. Cubic gt Octahedral gt Tetrahedral gt

Trigonal

B. Trigonal gt Tetrahedral gt Octahedral gt cubic

C. Trigonal gtOctahedral gt Trtrahedral gt cubic

D. Cubic gt tetrahedral gt Octahedral gt trigonal

Answer: A

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80. The formula for determination of density of unit cell is

A. $\dfrac{a^3 \times N_0}{z \times M} gcm^{-3}$

B. $\dfrac{z \times M}{a^3 \times N_0} gcm^{-3}$

C. $\dfrac{a^3 \times M}{z \times N_0} gcm^{-3}$

D. $\dfrac{M \times N_0}{a^3 \times z} gcm^{-3}$

Answer: B

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81. The fraction of total volume occupied by atoms in a simple cube is

A. $\dfrac{\pi}{4}$

B. $\sqrt{2}\dfrac{\pi}{8}$

C. $\sqrt{2}\dfrac{\pi}{6}$

D. $\dfrac{\pi}{6}$

Answer: D

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82. The density of KBr is $2.75 gcm^{-3}$. The length of the unit cell is 654 pm. Atomic mass of $K = 39$, $Br = 80$. Then what is true about the predicted nature of the solid?

A. Solid has face - centred cubic system with z=4

B. Solid has face - centred cubic system with z=1.

C. Solid has face - centred cubic stsyem with z=1

D. Solid has body -cented cubic system with

z=2

Answer: A

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83. Xenon crystallizes in the face-centred cubic lattice and the edge of the unit cell is 620 pm. What is the nearest neighbour distance and what is the redius of xenon atom?

A. $219.20 pm$

B. $438.5 pm$

C. 265.5 pm

D. 536.94pm

Answer: A

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84. A metallic element crystallizes in simple

cubic lattice. Each edge length of the unit cell

is 3 Å.The density of the element is $8g/cc$.

Number of unit cells in 108 g of metal is

A. 1.33×10^{20}

B. 2.7×10^{22}

C. 5×10^{23}

D. 2×10^{24}

Answer: C

85. If the density of NaCl $= 2.165 g cm^{-3}$ and the distance between Na^+ and Cl^- $=$ 281 pm,Avogadro's number is equal to

A. $7 \times 10^{23} mol^{-1}$

B. $8 \times 10^{23} mo^{-1}$

C. $6 \times 10^{23} mol^{-1}$

D. $4 \times 10^{23} mol^{-1}$

Answer: C

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86. Solid has a bcc structure . If the distance of closest approach between the two atoms is 1.73 Å . The edge length of the cell is

A. 200 pm

B. $\dfrac{\sqrt{3}}{\sqrt{2}}$pm

C. 142.2pm

D. $\sqrt{2}$ pm

Answer: A

87. A compound $CuCl$ has face $-$ centred cubic structure. Its density is $3.4 gcm^{-3}$. What is the length of unit cell ?

A. 5.783Å

B. 6.783Å

C. 7.783Å

D. 8.783Å

Answer: A

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88. At room temperature, sodium crystallized in a body $-$ centred cubic lattrice with $a = 4.24\text{Å}$. Calculate theoretical density of sodium (at wt. of $Na = 23$).

   A. $1.002 gcm^{-3}$

   B. $2.002 gcm^{-3}$

   C. $3.002 gcm^{-3}$

   D. $4.002 gcm^{-3}$

Answer: A

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89. An alloy of Cu, Ag and Au is found to have copper constituting the $c.\ c.\ p.$ lattice. If Ag atom occupy the edge centres and Au atom is present at body centre, the formula of this alloy is :

A. Cu_4Ag_2Au

B. Cu_4Ag_4Au

C. Cu_4Ag_3Au

D. $CuAgAu$
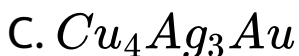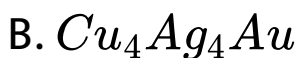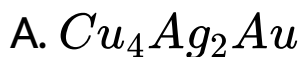
Answer: C

90. What is the simplest formula of a solid whose unit cell has the atom A at each corner, the atom B at each face centre and a atom C at the body centre.
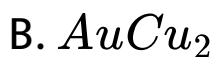
A. AB_2

B. A_2B

C. AB_3
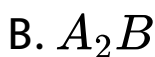
D. A_3B

Answer: C

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91. An alloy of copper and gold crystallizes in cubic lattic, in which the $Au-$ atoms occupy the lattice points at the corners of cube and $Cu-$ atoms occupy the centre of each face. The formula of this alloy is :
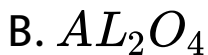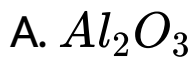
A. $AuCu$

B. $AuCu_2$

C. $AuCu_3$

D. Au_2Cu
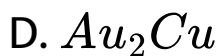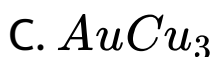
Answer: C

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92. In corrundum, oxid ions are arranged in $h.c.p.$ array and the aluminum ions occupy two $-$ thirds of octahedral voids. What is the formula of currundum ?
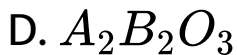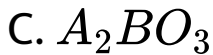
A. Al_2O_3

B. AL_2O_4

C. Al_2O_2

D. AlO_2
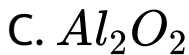
Answer: A

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93. In a solid ,oxide $\left(O^{2-}\right)$ ions are arranged in ccp, cations $\left(A^{3+}\right)$ occupy one -sixth of tetrahedral void and cations $\left(B^{3+}\right)$ occupy

one -third of the octahedral voids . What is the formula of the compound?

A. ABO_3

B. AB_2O_3

C. A_2BO_3

D. $A_2B_2O_3$

Answer: A

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94. Interstitial hole is called tetrahedral because:

A. 6

B. 8

C. 12

D. 4

Answer: D

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95. The strcture of MgO is similar to NaCl.

What is the co- ordination number of Mg?

A. 2

B. 4

C. 6

D. 8

Answer: C

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96. In the crystal of CsCl ,the nearest neighbours of each Cs ion are :

A. Six chloride ions

B. eight chloride ions

C. Six caseium ions

D. eight caseium ions

Answer: B

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97. In $CsCl$ the number of formula units per unit cell is

    A. $8Cs^+$ and ICI^-

    B. $1Cs^+$ and $6Cl^-$

    C. $1Cs^+$ and ICI^-

    D. $4Cs^+$ and $4Cl^-$

Answer: C

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98. The unit cell cube length for LiCl(just like NaCl structures) is 5.14Å. Assuming anion-anion contact, the ionic radius for chloride ion is:

    A. 1.815Å

    B. 2.8Å

    C. 3.8Å

    D. 4.815Å

Answer: A

99. Edge length of NaCl unti cell is 562 pm.

Then:

A. 190 Pm

B. 368 pm

C. 181 pm

D. 276 pm

Answer: C

100. KCl crystallises in the same type of lattice as does $NaCl$. Given that $r_{Na^+}/r_{Cl^-} = 0.55$ and $r_{K^+}/r_{Cl^-} = 0.74$. Calculate the ratio of the side of the unit cell of KCl to that of NaCl

A. 1.122

B. 1.224

C. 1.414

D. 0.732

Answer: A

101. In A^+B^- ions compound, radii of A^+ and B^- ions are 180 pm and 187 pm respectively. The crystal structure of this compound will be

    A. NaCl type

    B. CsCl type

    C. Zns type

D. B_2O_3 type

Answer: B

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102. Frenkel defect is caused due to

A. an ion missing from the normal lattice

site creating a vacancy

B. an extra positive ion occupying an

interstitial postive in the lattice

C. An extra negative ion occupying an interstitial postive in the lattice

D. The shift of a positive ion from its normal lattice site to an ion interstitial site

Answer: D

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103. Badn theory of metals is based on _____ .

A. Valence bond theory

B. moleculuar orbital theory

C. Crystal field theory

D. Ligand field theory

Answer: B

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104. Which of the following statements is

TRUE ?

A. In metals , the forbidden zone is very small and in insulators the forbidden zone is vary large .

B. Forbidden zone is very large in metals and insulators .

C. Forbidden zone is very small in metals and insulators.

D. In metals the forbidden zone is very large and in insulators , the forbidden zone is very small .

Answer: A

105. When suitable impurity is added to pure intrinsic semiconductor , the electrical conductivity _____ .

A. is enhanced

B. ramains same

C. decreases to a large extent

D. decreases slightly

Answer: A

106. Silicon doped with arsenic is an example

of :

    A. P - type semiconductor

    B. n-type semiconductor

    C. insulator

    D. intrisic semiconductor

Answer: B

107. Which of the following statements is TRUE ?

A. Paramagnetic substances are attracted by the magnetic field .

B. paramagnetic substances are strongly repelled by the magnetic field

C. Diamagnetic substances are neither attacted nor repelled by the magnetic field .

D. Diamagnetic substances are strongly attacted by the magnetic field .

Answer: A

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108. Which of the following represents ferromagnetism ?

A. ↑ ↑ ↑ ↑ ↑

B. ↑ ↓ ↑ ↓

C. ↑ ↑ ↑ ↓ ↓

D. ↑ ↑ ↑ ↓

Answer: A

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109. Which of the following is NOT ferromagnetic in nature ?

A. Ni

B. Co

C. CrO_2

D. O_2

Answer: D

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110. Lithium borohydride crystallizes in an orthorhombic system with 4 molecule per unit cell. The unit cell dimensions are $a = 6.8\text{Å}$, $b = 4.4\text{Å}$ and $c = 7.2\text{Å}$. If the molar mass is 21.76, calculate density of crystal.

    A. $0.6708g/cm^3$

    B. $1.6708g/cm^{-3}$

    C. $2.6708g/cm^{-3}$

    D. $16.708g/cm^3$

Answer: A

---

111. Point defects are present in _____.

    A. ionic solids

    B. Molecular silids

    C. amorphous solids

    D. liquids

Answer: A

112. At low temperature and high pressure , SO_2 freezes to form crystalline solid .which term best desribes the solid ?

A. ionic crystal

B. Covalent crystal

C. Metallic crystal

D. Molecular crystal

Answer: D

113. Quartz is a crystalline variety (purest form

) of

    A. Silca

    B. Sodium silium silicate

    C. Silicon carbide

    D. silicon

Answer: A

▶

114. The unit cell of a binary compound of A and B metals has a ccp structure with A atoms occupying the corners and B atoms occupying the centres of each faces of the cubic unit cell. If during the crystallisation of this alloy, in the unit cell two A atoms are missed, the overall composition per unit cell is :

A. AB_6

B. AB_4
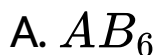
C. AB_8

D. A_6B_{24}

Answer: B

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115. The CORRECT statement in the following is

, _____.

   A. the ionic crystal of Ag Cl has schottky

     defect

B. the unit cell having crystal parameters ,

   haxagonal

C. In ionic compounds having Frenkel

   defect , the ratio $\dfrac{\gamma+}{\gamma-}$ is high

D. the coordination number of $Na(\,+\,)$ ion

   in $NaCl$ is 4

Answer: B

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116. In which of the following , the metals are CORRECTLY arranged in increasing order of packing efficeiency ?

A. $Cu < Ti < Po$

B. $Po < Cu < Ti$

C. $Cu < Po < Ti$

D. $Po < Ti < Cu$

Answer: D

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117. Potassium fluoride has $NaCl$ type structure .What is the distance between K' and F ions if cell edge is a cm?

A. 2a cm

B. a/2 cm

C. 4a cm

D. a/4 cm

Answer: B

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118. Among the following which crystal will be soft and has low melting point ?

A. Covlent

B. ionic

C. Metallic

D. Molecular

Answer: D

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119. A certain metal crystallises in a simple cubic struture .At a certain termperature , it arranges to give a body - centred structure .In this transition , the density of the metal _____.

A. Decreases

B. increases

C. remains unchanged

D. changes without a definite pattern

Answer: B

120. Which of the following is not a property of light?

A. Solids are always crysalline in narure .

B. Solids have high density and low compressibility

C. the diffusion of solids is vary slow

D. Solids have definite volume .

Answer: A

121. A crystalline solid

    A. changes abruptly from solid to liquid when heated

    B. has no definite melting point

    C. undergoes deformation of its geometry easily

    D. has an irregular 3-dimensional arrangements

Answer: A

122. The existence of a substance in more the one solid modifications is known as//or .Any compound having more than two cystal structures is called
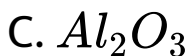
A. Polymorphism

B. isomorphism

C. anisotropy
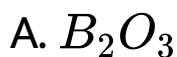
D. enantiomorphism

Answer: A

123. what is the chief constituent of pyrex glass ?

A. B_2O_3

B. SiO_2

C. Al_2O_3

D. Na_2O

Answer: B

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124. Which among the following solids is a non-polar solid ?

A. Hydrogen chloride

B. Sulphur dioxide

C. Water

D. Carbon dioxide

Answer: D

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125. What is the actual volume occupied by water molecules present in $20cm^3$ of water ?

A. $20cm^3$

B. $10cm^3$

C. $40cm^3$

D. $24.89 dm^3$

Answer: B

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126. Which of the following is NOT CORRECT for ionic crystals ?

A. They possess high melting point and boiling point .

B. All are electrolytes

C. Exhibit the property of isomorphism .

D. Exhibit directional properties of the bond .

Answer: D

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127. Diamond is an example of _____.

A. Solid with hydrogen bonding

B. electrovalent solid

C. covalent solid

D. glass

Answer: C

128. Which of the following is true for diamond

A. Diamond is a good conductor of electricity .

B. Diamond is soft .

C. Diamond is a bad conductor of heat .

D. Diamond is made up of C, H and O

Answer: C

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129. In graphics carbon atoms are joined togather due to

A. ionic bonding

B. van der Waals forces

C. metallic bonding

D. covalent bonding

Answer: D

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130. What is the hydridization of carbon atoms in fullerene ?

A. sp^3

B. sp

C. sp^2

D. dsp^3

Answer: C

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131. How many kinds of space lattices are possible in a crystal?

A. 7

B. 14

C. 32

D. 230

Answer: B

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132. Tetragonal crystal system has the unit cell dimensions:

A. $a = b = c$ and $\alpha = \beta = \gamma = 90°$

B. $a = b \neq c$ and $\alpha = \beta = \gamma = 90°$

C. $a \neq b \neq c$ and $\alpha = \beta = 90°$

D.

$$a = b \neq c \text{ and } \alpha = \beta = 90°, \gamma - \ = 120°$$

Answer: B

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133. The crystal system of a compound with unit cell dimensions a = 0.388 , b = 0.388 and c = 0.506 nm and $\alpha = \beta = 90°$ and $\gamma = 120°$ is

A. cubic

B. hexagonal

C. orthorhombic

D. rhombohedral

Answer: B

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134. The unit cell with crystallographic

dimensions

$a \neq b \neq c, \alpha = \beta = 90°$ and $\gamma = 90°$ is

_____.

A. triclinic

B. monoclinic

C. orthorhombic

D. tetragonal

Answer: B

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135. Which among the following metals crystallises as a simple cube ?

A. Polonium Iron

B. Iron

C. copper

D. Gold

Answer: A

136. The number of close neighbours in a body-centred cubic unti cell of monoatomic substance is,

A. 8

B. 6

C. 4

D. 2

Answer: A

137. Body -centred cubic lattice has a corrdination number of

A. 4

B. 8

C. 12

D. 6

Answer: B

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138. The number of atoms contained in one face -centred cubic unit cell of monoatomic substance is :

A. 1

B. 2

C. 4

D. 6

Answer: C

139. In a face centered cubic cell , an the face contributes in the unit cell

A. 1/4 part

B. 1/8 part

C. 1 part

D. 1/2 part

Answer: D

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140. Na and Mg crystallize in bcc- and fcc-type crystals, respectively, then the number of atoms of Na and Mg present in the unit cell of their respective crystal is

    A. 4 and 2

    B. 9 and 14

    C. 14 and 9

    D. 2 and 4

Answer: D

141. what is the difference between the number of atoms per unit cell in face - centred cube and body - centred cube ?

A. 2

B. 1

C. 4

D. 6

Answer: A

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142. Potassium crystallizes is a bcc lattice the coordination number of potassiium in potassium metal is

A. 0

B. 4

C. 6

D. 8

Answer: D

143. The intermetallic compounds $LiAg$ crystallises in cubic lattice in which both lithium and silver have coordination number of eight ,the crystal class is

A. simple cube

B. body centred cube

C. face -centred cube

D. none of these

Answer: B

---

144. An elementoccurring in the bcc structure has 12.08×10^{23} unit cells .The total number of atoms of the element in these cells will be

    A. 24.16×10^{23}

    B. 36.18×10^{23}

    C. 6.04×10^{23}

    D. 12.08×10^{23}

Answer: A

---

145. The number of octahedral sites per sphere in a fcc structure is :

A. 8

B. 4

C. 2

D. 1

Answer: D

146. The ratio of closed packed atoms to tetrahedral holes in cubic close packing is :

A. $1:1$

B. $1:2$

C. $1:3$

D. $2:1$

Answer: B

147. The interionic distance for cesium chloride crystal will be

A. a

B. $\dfrac{a}{2}$

C. $\dfrac{\sqrt{3}a}{2}$

D. $\dfrac{2a}{\sqrt{3}}$

Answer: C

---

148. The vacant space in bcc lattice unit cell is

A. 23 %

B. 32 %

C. 26 %

D. 48 %

Answer: B

149. AB crystallizes in a body centred cubic lattice with edge length a equal to $387pm$ .The distance between two oppositely charged ions in the lattice is :

A. 335pm

B. 250pm

C. 200 pm

D. 300pm

Answer: A

150. CsBr has bcc like structures with edge length 4.3Å. The shortest inter ionic distance in between Cs^+ and Br^- is:

A. 1.86Å

B. 3.72Å

C. 4.3Å

D. 7.44Å

Answer: B

151. In face centred cubic unit cell edge length is

A. $\dfrac{4}{\sqrt{3}}r$

B. $\dfrac{4}{\sqrt{2}}r$

C. $2r$

D. $\dfrac{\sqrt{3}}{2}r$

Answer: B

152. A metal crystallises in a face centred cubic structure. If the edge length of its unit cell is 'a' the closest approach between two atoms in metallic crystal will be

    A. 2a cm

    B. $2\sqrt{2}a$

    C. $\sqrt{2}a$

D. $\dfrac{a}{\sqrt{2}}$

Answer: D

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153. The edge length of a face-centred cubic

unit cell is $508 \pm$. If the radius of the cation is

$110 \pm$ the radius of the anion is

   A. 285 pm

   B. 398 pm

C. 144 pm

D. 618 pm

Answer: C

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154. The edge of unit of $FCCXe$ crystal is 620

pm .The radius of Xe atom is

A. $219.20 pm$

B. $235.16 pm$

C. $189.7pm$

D. $209.87pm$

Answer: A

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155. The edge - centred cubic unit cell , what is the volume occupied ?

A. $\dfrac{4}{3}\pi r^3$

B. $\dfrac{8}{3}\pi r^3$

C. $\dfrac{16}{3}\pi r^3$

D. $\dfrac{64r^3}{3\sqrt{3}}$

Answer: C

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156. If a stands for the edge length of the cubic system : simple cubic, body – centred cubic anf face – centred cubic, then the ratio of radii of the spheres in these systems will be respectively:

A. $\dfrac{1}{2}a : \dfrac{\sqrt{3}}{2}a : \dfrac{\sqrt{3}}{\sqrt{2}}a$

B. $1a : \sqrt{3}a : \dfrac{1}{2\sqrt{2}}a$

C. $\dfrac{1}{2}a : \dfrac{\sqrt{3}}{4}a : \dfrac{1}{2\sqrt{2}}a$

D. $\dfrac{1}{2}a : \sqrt{3}a : \dfrac{1}{\sqrt{2}}a$

Answer: C

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157. Sodium metal crystallises in body centred cubic lattic with cell edge 4.29Å .What is the radius of sodium atom ?

A. 1.86Å

B. 3.22Å

C. 5.72Å

D. 0.93Å

Answer: A

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158. The number of atoms in 100 g of an FCC crystal with density $d = 10g/cm^3$ and cell edge equal to 100 pm, is equal to

A. 4×10^{25}

B. 3×10^{25}

C. 2×10^{25}

D. 1×10^{25}

Answer: A

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159. An element (atomic mass $= 100g/mol$) having bcc structure has unit cell edge 400 pm .Them density of the element is

A. $10.376 g / cm^3$

B. $5.188 g / cm^3$

C. $7.289 g / cm^3$

D. $2.144 g / cm^3$

Answer: B

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160. A given metal crystalline 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 metal atom?

A. 40 pm

B. 127 pm

C. 80 pm

D. 108 pm

Answer: B

161. In orthorhombic , the value of a, b and c are respectively 4.2Å, 8.6Å and 8.3Å .Given the molecular mass of the solur is $155 gmmol^{-1}$ and that of density is $3.3gm/$ the number of formula unit per unit cell is

A. 2

B. 3

C. 4

D. 6

Answer: C

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

A. 527 pm

B. 264 pm

C. 154 pm

D. 352 pm

Answer: D

163. How many unit cells are present in a cube - shaped ideal crystal of NaCl of mass 1.00 g ? [atomic masses : Na =23,Cl-=35.5]

A. 1.28×10^{21} unit cells

B. 1.71×10^{21} units cells

C. 2.57×10^{21} units cells

D. 5.14×10^{21} unit cells

Answer: C

164. A metal has a fcc lattice.The edge length of the unit cell is 404 pm ,the density of the metal is $2.72 gcm^{-3}$. The molar mass of the metal is $(N_A,$ Avorgadro's constant $= 6.02 \times 10^{23} mol^{-1})$

A. $40 gmol^{-1}$

B. $30 gmol^{-1}$

C. $27 gmol^{-1}$

D. $20 gmol^{-1}$

Answer: C

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165. Which of the following statement is INCORRECT?

(a). $\frac{e}{m}$ ratio for canal rays is maximum for hydrogen ion.

(b). $\frac{e}{m}$ ratio for cathode rays is independent

of the gas taken.

(c). The nature of canal rays is dependent on the electrode material.

(d). The $\dfrac{e}{m}$ ratio for electron is expressed as $\dfrac{E^2}{2B^2V}$, when the cathode rays go undeflected under the influence of electric field (E), magnetic field (B) and V is potential difference applied across electrodes.

A. The coordination number of each type of ion in CsCl crystal is 8.

B. A metal that crystallizes in bcc structure has a coordintaion number of 12.

C. A unit cell of an ionic crystal shares some of its with other unit cells

D. The length of the unit cell in NaCl is 552 pm $\left(r_{Na^+} = 95 \pm , r_{Cl^-} = 181 \pm\right)$.

Answer: B

166. A crystal lattice with alternate $+ve$ and $-ve$ ions has radius ratio of 0.524 .Its coordination number is

A. 4

B. 3

C. 6

D. 12

Answer: C

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167. A solid compound contains X,Y and Z atoms in a cubic lattice with X atoms occupying the corners,Y atoms in the body centred positions and Z atoms at the centres of faces of the unit cell. What is the empirical formula of the compound

    A. XY_2Z_3

    B. XYZ_3

    C. $X_2Y_2Z_3$

    D. X_8YZ_6
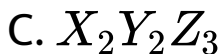
Answer: B

168. An ionic compound has a unit cell consisting of A ions at the corners of a cube and B ions on the centers of the faces of the cube .The empirical formula for this compound would be

A. A_2B

B. AB
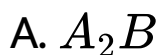
C. A_3B

D. AB_3

Answer: D

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169. A solid has a structure in which W atoms are located at the corners of a cubic lattice, O atom at the centre of edges, and Na atom at the centre of the cube. The formula for the compound is
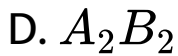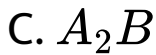
A. $NaWO_2$

B. $NaWO_3$

C. Na_2WO_3

D. $NaWO_4$

Answer: B

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170. A compound is formed by elements A and B. This crystallises in the cubic structure when atoms A are at the corners of the cube and

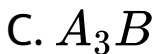atoms B are at the centre of the body.The simplest formula of the compound is

A. AB

B. AB_2

C. A_2B

D. A_2B_2

Answer: A

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171. A substance $A_x B_y$ crystallises in a face centred cubic (fcc) lattice in which atoms 'A' occupy each corner of the cube and atoms 'B' occupy the centres of each face of the cube identify the correct formula of the compound.
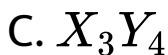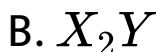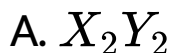
A. AB_3

B. $A_4 B_3$

C. $A_3 B$

D. composition cannot be specified

Answer: A

172. In a compound atoms of element Y form ccp lattice and those of element X occupy $2/3^{rd}$ of tetrahedral voids .The formula of the compound will be
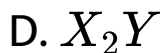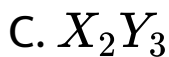
A. X_2Y_2

B. X_2Y

C. X_3Y_4

D. X_4Y_3

Answer: D

173. A compound is formed by two elements X and Y. Atoms of the element Y (as anion) make ccp and those of element X (as cation) occupy all the octahedral voids. What is the formula of the compound?
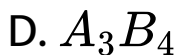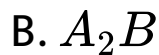
A. XY_2

B. XY

C. X_2Y_3

D. X_2Y

Answer: B

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174. In a solid AB having the $NaCl$ structure, A atom occupies the corners of the cubic unit cell. If all the face-centred atoms along one of the axes are removed, then the resultant stoichiometry of the solid is

A. AB_2

B. A_2B

C. A_4B_3

D. A_3B_4

Answer: D

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175. In the crystals of which of the following

ionic compounds would you expect maximum

distance between the centres of the cations and anion?

A. LiF

B. CsF

C. CsI

D. LiI

Answer: C

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176. If we know the ionic radius ratio in a crystal of ionic solid, what can be known of the following ?

A. Magnetic property

B. Nature of chemical bond

C. type of defect

D. Geometrical shape of crystal

Answer: D

177. The ionic radii of A^+ and B^- ions are 0.98×10^{-10} and $1.81 \times 10^{-10} m$ .The coordinatyion number of each ion in AB is

A. 8

B. 2

C. 6

D. 4

Answer: C

178. Among the following solids, Schottky defect is NOT observed in-

A. ZnS

B. $NaCl$

C. KCI

D. $CsCl$

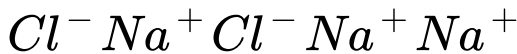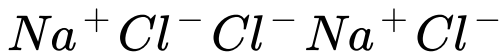**Answer: A**

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179. Which type of crystal defect is indicated by the diagram given below ?

$$Na^+ Cl^- Na^+ Cl^- Na^+ Cl^-$$

$$Cl^- Cl^- Na^+ Na^+$$

$$Na^+ Cl^- Cl^- Na^+ Cl^-$$

$$Cl^- Na^+ Cl^- Na^+ Na^+$$
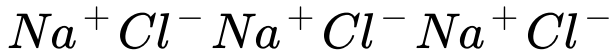
A. Frenkel defect

B. schottky defect

C. interstitial defect

D. Frenkel and schottky defects

Answer: B

180. Which type of solid crystals will conduct heat and electricity?

A. ionic

B. Covalent

C. Metallic

D. molecular

Answer: C

181. Which of the following shows electrical

conduction ?

A. Sodium

B. Potassium

C. Diamond

D. Graphite

Answer: D

182. To get n-type doped semiconductor, impurity to be added to silicon should have the following number of valence electrons

A. 1

B. 2

C. 3

D. 5

Answer: D

183. Doping silicon with boron produces a -

    A. n-type semiconductor

    B. p-type semiconductor

    C. metal

    D. insulator

Answer: B

184. A semiconductor of Ge can be made p-type by adding

A. Trivalent

B. Tetrahedral

C. pentavalent

D. divalent

Answer: A

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185. Select a ferromagnetic material from the

following

A. Dioxygen

B. Chromium (IV) oxide

C. Benzene

D. Dihydrogen monoxide

Answer: B

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186. In a crystal, the atoms are located at the position of

    A. Maximum potential energy

    B. minimum potential energy

    C. zero potential energy

    D. infinite potential energy

Answer: B

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187. Suppose the mass of a single Ag atoms is 'm' Ag metal crystallises in fcc lattice with unit cell edge length 'a' The density of Ag metal in terms of 'a' and 'm' is:

A. $\dfrac{4m}{a^3}$

B. $\dfrac{2m}{a^3}$

C. $\dfrac{m}{a^3}$

D. $\dfrac{m}{4a^3}$

Answer: A

188. Volume occupied by single CsCl ion pair in a crystal is $7.014 \times 10^{-23} cm^3$. The smallest Cs-Cs internuclear distance is equal to length of the side of the cube corresponding to Volume of one CsCl ion pair , the smallest Cs to Cs internuclear distance is nearly _____.

   A. 4.4Å

   B. 4.3Å

   C. 4Å

D. 4.5Å

Answer: C

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189. A crystalline solid XY_3 has ccp arrangement for its element Y. X occupies _____.

A. 66% of tetrahedral voids

B. 33% of tetrahedral voids

C. 66% of octahedral voids

D. 33% of octahedral voids

Answer: D

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190. Which metal among the following has the highest packing efficiency ?

A. Iron

B. Tungsten

C. Aluminium

D. Polonium

Answer: C

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191. The number of unit cells in $58.5g$ of $NaCl$

is nearly

    A. 6×10^{20}

    B. 3×10^{22}

C. 1.5×10^{23}

D. 0.5×10^{24}

Answer: C

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192. which of the following is not true about the ionic solids ?

A. In fused state , ionic solids do not conduct electricity.

B. In aqueous solution , ionic solids do not conduct electricity

C. In solids state , free electron are available

D. in solids state , ionic solids do not conduct electricity .

Answer: D

193. Which of the following unit cells is the most unsymmetrical ?

A. Orthorhombic

B. monoclinic

C. Triclinic

D. rhombohedral

Answer: C

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194. A metal has bcc structure and the edge length of its unit cell is 4.08 Å . The volume of the unit cell in cm^3 will be _____.

A. 6.6×10^{-24}

B. 6.79×10^{-23}

C. 2.81×10^{-23}

D. 6.02×10^{-24}

Answer: B

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195. An element crystallizes in a structure having fcc unit cell of an edge 100 pm . Calculate the density if 150 g of the element contains 18×10^{23} atoms .

A. $33.3 gcm^{-3}$

B. $333.3 gcm^{-3}$

C. $243.3 gcm^{-3}$

D. $153.3 gm^{-3}$

Answer: B

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196. Al (at . Wt . 26.98) crystallizes in the cubic d system with $a\infty 4.05$ Å . Its density is 2.7 g per cm^3 . Determine the cell type Calculate the radius of Al atom .

A. fcc 1.432Å

B. bcc 2.432 Å

C. bcc 1.432Å

D. fcc 2.432 Å

Answer: A

197. Calculate the density of silver metal having fcc unit cell with edge length 409 pm (at .Wt of Ag= 108 g mol^{-1}, $N_0 = 6.022 \times 10^{23} mol^{-1}$)

A. 8.3 gcm^3

B. 10 g cm^{-3}

C. 10.5gcm^{-3}

D. 12gcm^{-3}

Answer: C

198. The density of AgCl is 5.56 gcm^{-3} .Length of the unit cell is 555.2 pm . Then which of the following is TRUE about the predicted nature of the solid ?

    A. Solid has $z = 4$.

    B. Solid has $z = 3$

    C. solid has z=1

D. Solid has z=2

Answer: A

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199. In a solid between A and B atoms of A are arranged in ccp array and atoms of B occupy all the octahedral voids and half of the tetrahedral voids. The formula of the compound is

A. PQ_2

B. P_2Q

C. PQ

D. P_2Q_2

Answer: A

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200. In two dimensional AAAA type square close packed structure , the coordination number of the compound is ____.

A. 2

B. 4

C. 6

D. 12

Answer: B

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201. Copper has the fcc crystal structure .

Assuming an atomic radius of 130 pm for

copper atom (Cu = 63.54) , what is the length

of unit cell of Cu ? Find the density of Cu ?

A. $267.64 pm$, $8.54 gcm^{-3}$

B. $267.64 pm$, $5.48 gcm^{-3}$

C. $367.64 pm$, $9.24 gcm^{-3}$

D. $367.64 pm$, $8.54 gcm^{-3}$

Answer: D

202. Find the simplest formula of a solid containing A and B atoms ia cubic arrangement In which A occuples corner and B the centre of the faces of unit cell. If the side length is 5Å, estimate the density of the solid assuming atomic weights of A and B as 60 and 90, respectively.

A. $XY, 3.35g/cm^3$

B. $XY_3, 4.38g/cm^3$

C. $XY_3, 3.48g/cm^3$

D. XY_2, $2.48g/cm^3$

Answer: B

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203. A substance has density of 2 kg dm^{-3} and it crystallizes to fcc lattice with edge length equal to 700 pm . The molar mass of the substance is _____ .

A. $55.32g/mol$

B. $130 g/mol$

C. $103.3 g/mol$

D. $144 g/mol$

Answer: C

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204. Lithium iodide crystal has a face centred cubic unit cell . If the edge length of the unit cell is 550 pm , determine the ionic radius of I^- ion

A. 144.4 pm

B. $294.4 pm$

C. $194.4 pm$

D. $164.4 pm$

Answer: C

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205. When heated above $916°C$, 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. 0.918

B. 0.754

C. 1.916

D. 2.24

Answer: A

206. Ice has three dimensional crystal structure in which _____ of total volume is unoccupied

A. one half

B. one third

C. one fourth

D. one fifth

Answer: A

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207. Two crystalline solids X and Y are isomorphous . Which of the following is TRUE for these compounds ?

A. they have same molecular mass.

B. they have same atoms

C. they have different chemical properties

D. they have same crystal structure

Answer: D

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208. SiO_2 is a/an

A. CaO and B_2O_3

B. Na_2O and CaO

C. B_2O_3 and Fe_2O_3

D. Na_2O and CaO

Answer: D

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209. The radius of the Na^{2+} is $95pm$ and that of Cl^- ion is $181pm$. Predict the co-ordination number of Na^+ :

A. 4

B. 6

C. 8

D. 12

Answer: B

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210. Which is/are INCORRECT statement ?

A. Bress is an example of substitution impurity defect .

B. $NaCl(s)$ is insulator , silicon is semiconductor and silver is conductor

C. Density decreases in case of crystals with schottky defect

D. Frenkel defect is favoured in those ionic comoounds in which cations in which

cations and anions have almost equal

size.

Answer: D

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211. In $CsCl$ lattice the coordination number

of Cs ion is

A. equal to that of Cl^-, i.e, 6

B. equal to that of Cl^-, i.e., 5

C. not equal to that of Cl^-, i.e., 6

D. not equal to that of Cl^-, i.e., 8

Answer: B

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