CHEMISTRY

BOOKS - MODERN PUBLICATION

SOLID STATE

Example

1. Classify the following as amorphours or crystalline solids:

Naphthalene

Teflon

Polyurethane

Benzoic acid

Potassium nitrate

Cellophane

Polyvinyl chloride

Fibre glass

Copper

Zinc sulphide.

Watch Video Solution

2. Classify the following solids as ionic, metallic, molecular, network (covalent) or amorphous:

Tetraphosphorus decaoxide(P_4O_{10})

Graphite

SiC

Brass

Rubidium

I_2

Ammonium phosphate,$(NH_3)_3PO_4$

LiBr

Si

Plastics

P_4

Solid CO_2.

Watch Video Solution

3. A compound formed by two elements A and B crystallizers in the cubic structure. Atomic B are present at the corners of the cube and atoms A at the centre of opposite faces. What is the formula of the compound ?

Watch Video Solution

4. If three elements P, Q and R crystalline in a cubic solid lattice with P atoms of the corners, Q atoms at the cube centres and R atoms at the centre of the edges, then write the formula of the compound.

Watch Video Solution

5. Sodium crystallizes in i bcc unit cell. CalCulate the approximate no. of unit cells in 9.2 grams of sodium. (Atomic mass of Na = 23 u).

Watch Video Solution

6. Tungsten cystallizes in body centred cubic unit cell. If edge of the unit cell is 316.5 pm, what is the radius of the tungsten atom?

Watch Video Solution

7. Aluminium crystallises in a cubic close packed structure. Its metallic radius is 125 pm.

What is the length of the side of the unti cell ?

Watch Video Solution

8. The radius of Na^{+} ion is 95 pm and that of Cl^{-} ion is 181 pm. Predict whether the coordination number of Na^{+} ion is 6 or 4.

Watch Video Solution

9. Br^{-} ions from a close packed structure. If the radius of Br^{-} ion is 195 pm, calculate the radius of the cation that just fits into the tetrahedral hole. Can a cation having a radius of 82 pm be slipped into the octahedral hole of the crystal $A^{+}Br^{-}$?

Watch Video Solution

10. A compound is formed by two elements P and Q. Atoms of Q make hcp lattice and those of the element P (as cations) occupy all the tetrahedral voids. What is the formula of the compound?

Watch Video Solution

11. Atoms of element B form hcp lattice and those of the element A occupy 2/3rd of tetrahedral voids. What is the formula of the compound formed by the elements A and B?

Watch Video Solution

12. In a cubic close packed structure of mixed oxides, the lattice is made up of oxide ions, one eigth of the tetrahedral voids are occupied by divalent ions (A^{2+}) while one half of octrahedral voids are occupied by trivalent ions (B^{3+}). What is the formula of the oxide?

Watch Video Solution

13. The mineral spinel has the moleculr formula $MgAl_2O_4$. In this oxide ions are present in ccp arrangement, Mg^{2+} ions occupy the tetrahedral voids while Al^{3+} ions occupy the octahedral voids. Calculate the percentage of

tetrahedral voids occupied by Mg^{2+} ions.

Watch Video Solution

14. The mineral spinel has the moleculr formula $MgAl_2O_4$. In this oxide ions are present in ccp arrangement, Mg^{2+} ions occupy the tetrahedral voids while Al^{3+} ions occupy the octahedral voids. Calculate the percentage of

octahedral voids occupied by Al^{3+} ions.

Watch Video Solution

15. In a crystalline solid, anions Y^{-} are arranged in ccp. Cation X^{+} are equally distributed between octahedral and tetrahedral voids. If all the octahedral voids are occupied, what is the formula of the compond?

Watch Video Solution

16. In a face centred lattice of X and Y, X atoms are present at the corners while Y atoms are at face centres

What is the formula of the compound?

Watch Video Solution

17. In a face centred lattice of X and Y, X atoms are present at the corners while Y atoms are at face centres

What should be the formula of the compound if:

one of the X atoms is missing from a corner in each unit cell.

Watch Video Solution

18. In a face centred lattice of X and Y, X atoms are present at the corners while Y atoms are at face centres

What should be the formula of the compound if:

two atoms of X are missing from the corner?

Watch Video Solution

19. In a face centred lattice of X and Y, X atoms are present at the corners while Y atoms are at face centres

What should be the formula of the compound if:

one of the X atoms from a corner is replaced by Z atoms (also monovalent)?

Watch Video Solution

20. In a normal spinel structure O^{2-} ions form fcc packing and 1/8 of the tetrahedral sites are occupied by divalent metal, A^{2+} ions and half of the octahedral sites are occupied by trivalent metal B^{3+} ions, what is the ratio of the tetrahedral/octahedral sites: occupied in spinel structure.

Watch Video Solution

21. What are the primitive and non-primitive unit cells ?

Watch Video Solution

22. Name the crystal system in which all the three axes are of equal length which are inclined at the same angle but the angle is not equal to 90°,

Watch Video Solution

23. In a close packed structure there are N- spheres, how many tetrahedral voids are associated with them ?

Watch Video Solution

24. In a close packed structure, there are M- spheres, how many octahedral voids are associated with them ?

Watch Video Solution

25. If 'a' stands for edge length of the cubic systems, simple cubic, body centred cubic and face centred cubic then the ratio of the radii of he spheres in these systems will be respectively.

Watch Video Solution

26. What is meant by the term 'coordination number' ?

Watch Video Solution

27. What is the coordination number of atoms.

In a cubic close packed structure ?

Watch Video Solution

28. What is the co-ordination nnmber of atoms

in a body centered cnbic structure ?

Watch Video Solution

29. The ions of NaF and MgO all have the same number of electrons and the intermolecular distances are about the same (235pm and 215pm). Why then they are the melting points of NaF and MgO so different $(992^\circ C \text{ and } 2642^\circ C)$?

Watch Video Solution

30. Name the

most unsymmetrical crystal system.

Watch Video Solution

31. Potassium dichromate belongs to which crystal system?

Watch Video Solution

32. How many atoms can be assigned to its unit cell if an element forms

a body centred cubic cell?

Watch Video Solution

33. How many atoms can be assigned to its unit cell if an element forms

a body centred cubic cell?

Watch Video Solution

34. What is the co-ordination number in hcp and ccp ?

Watch Video Solution

35. Which network solid is an exceptionally good conductor of electricity?

Watch Video Solution

36. In the body centered unit cell, the lattice point are present at the:

Watch Video Solution

37. Pick out the odd onces from the following sets:

Sulphur, Argon, Solid CO_2.

Watch Video Solution

38. Pick out the odd onces from the following sets:

SiC, Quartz, BaO, Graphite.

Watch Video Solution

39. What is the two dimensional co-ordination number of a molecule in

A square packed layer ?

Watch Video Solution

40. Solid which is very hard, electrical insulator in solid as well as in molten state and melts at extremely high temperature. What type of solid is it ?

Watch Video Solution

41. What type of solids are electrical conductors, malleable and ductile ?

Watch Video Solution

42. How many octahedral voids are there are in 1 mole of a compound having cubic closed packed structure?

Watch Video Solution

43. The number of atoms present in a fcc unit cell is

Watch Video Solution

44. Rohit went to Jaipur with a school trip to visit some historical places. He and his friends observed that some old glass objects looked milky and windows pane of old buildings were looking slightly thicker at the bottom than at the top.

Answer the following questions

Under what conditions could quartz be converted into glass?

Watch Video Solution

45. An ionic compound AB_2 possesses CaF_2 type crystal structure. Write the coodinations numbers of A^{2+} and B^- ions in crystals of AB_2.

Watch Video Solution

46. Write down the formula of sodium oxide

Watch Video Solution

47. If three elements P, Q and R crystalline in a cubic solid lattice with P atoms of the corners, Q atoms at the cube centres and R atoms at the centre of the edges, then write the formula of the compound.

Watch Video Solution

48. Both diamond and rhombic sulphur are covalent solids but the latter has very low melting point than the former. Explain why?

Watch Video Solution

49. Write two differences between ionic solids and metallic solids.

Watch Video Solution

50. Write a distinguishing feature of metallic solids.

Watch Video Solution

51. What is the difference between glass and quartz. While both are made up of SiO_4 tetrahedra.

Watch Video Solution

52. What difference in behavious between the glass and sodium chloride would you except to observe if you break off a piece of either cube?

Watch Video Solution

53. KF has ccp structure. Calculate the radius of the unit cell if the side of the cube or edge length is 400 pm. How many F^{-} ions and octahedral voids are there in the unit cell?

Watch Video Solution

54. What is the relationship between the edge length (a) of the unit cell and radius (r) of an atom in a face centred unit cell?

Watch Video Solution

55. Why is glass considered a super cooled liquid.

Watch Video Solution

56. An element having bcc geometry has atomic mass 50. Calculate the density if unit cell edge length is 290 pm.

Watch Video Solution

57. Copper cystalizes in a face centred cubic lattice. Calculate the number of unit cells in 12g of copper (atomic mass of copper =63.5u).

Watch Video Solution

58. Sodium has a b.c.c. structure with nearest neighbour distance 365.9 pm, calculate its density. (Atomic mass of sodium = 23)

Watch Video Solution

59. A metal having atomic mass 50 g mol^{-1} has a body centred cubic crystal structure.

The density of the metal is 596 g cm^{-1}. Find the volume of unit cell ?

Watch Video Solution

60. The density of chromium metal is 7.2g cm^{-3}. If the unit cell is cubic with edge length of 289 pm, determine the type of unit cell. Atomic mass of Cr = 52 a.m.u., $N_0 = 6.02 \times 10^{23}\text{mol}^{-1}$.

Watch Video Solution

61. An element with molar mass 2.7×10^{-2} kg mol^{-1} forms a cubic unit cell with edge length 405 pm. If its density is $2.7 \times 10^3\ kgm^{-3}$, what is the nature of the cubic unit cell ?

Watch Video Solution

62. An element having a density $11.2 \mathrm{g \, cm}^{-3}$ forms a fcc lattice with edge of 4×10^{-3} cm. Calculate the atomic mass of the element.

Watch Video Solution

63. An element has a body-centred cubic (bbc) structure with a cell edge of 288 pm. The density of the element is $7.2 \frac{g}{c} m^3$. How many atoms are present in 208 g of the element?

Watch Video Solution

64. An element E crystallizes in boyd centred cubic structure. If the edge lengh of the cell is $1.469 \times 10^{-10} m$ and the denstiy is

$19.3gcm^{-3}$, calculate the atomic mass of this element. Also calculate the radius of an atom of the element.

Watch Video Solution

65. Calculate the value of Avogadro's number from the following data Density of $NaCl = 2.165\text{g cm}^{-3}$. Distance between Na^{+} and Cl^{-} in NaCl crystal = 281 pm.

Watch Video Solution

66. The compound CuCl has fcc structure like ZnS. Its density is $3.4gcm^{-3}$. What is the length of the edge of the unit cell?

Watch Video Solution

67. An element A crystallines in fcc structure. 200 g of this element has 4.12×10^{24} atoms. The density of A is $7.2gcm^{-3}$. Calculate the edge length of the unit cell.

Watch Video Solution

68. Niobium crystallizes in a body centred cubic structure. If density is 8.55 gcm^{-3}, calculate atomic radius of niobium, given that its atomic mass is 92.9μ.

Watch Video Solution

69. KF has NaCl structure. What is the distance between K^{+} and F^{-} if density is $2.48gcm^{-3}$?

Watch Video Solution

70. Aluminium crystallises in a cubic close packed structure. Its metallic radius is 125 pm.

What is the length of the side of the unti cell ?

Watch Video Solution

71. Aluminium crystallises in .a cubic close packed structure. Its metallic radius is 125 pm.

How many unit cell are there in 1.00 cm3 of aluminium ?

Watch Video Solution

72. Silver has atomic mass 108 a.m.u. and density 10.5 g cm^{-3} If the edge length of its unit cell is 409 pm, identify the type of unit cell. Also calculate the radius of an atom of silver.

Watch Video Solution

73. Silver metal crystallise with a face centred cubic .lattice. The length of unit cell is found to be $4.077 \times 10^{-8} cm$. Calculate the atomic radius and density of silver (Atomic mass of Ag= 108 u, $NA = 6.02x10^{23} mol^{-1}$.

Watch Video Solution

74. The density of lead is $11.35 gcm^{-3}$ and the metal crystallines with fcc unit cell. Estimate the radius of lead atom.(At. Mass of lead= $207 gmol^{-1}$ and $N_A = 6.02 \times 10^{23} mol^{-1}$).

Watch Video Solution

75. Lithium borohydride $(LiBH_4)$ crystallizes in an orthorhombic system having 4 molecules per unit cell. The unit dimesions are:

$a = 6.81\overset{\circ}{A}, b = 4.43\overset{\circ}{A}$ and $c = 7.17\overset{\circ}{A}$. Cacluate the density of the crystal (At. Mass of Li=7, B=11, H=1u).

Watch Video Solution

76. Iron crystallizes in several forms. At 1185 K, the body centred cubic α form of iron changes to the face centred cubic γ form of iron. Assuming that the distance between the nearest neighbours is the same in two forms at the transition temperature, calculate the ratio of the density of α form to that of γ form at the transistion temperature.

Watch Video Solution

77. KCl crystallizes int the same type of lattic as done NaCl . Given that $r_{Na^+} / r_{Cl^-} = 0.50$ and $r_{Na^+} / r_{K^+} = 0.70$, Calcualte the ratio of the side of the unit cell for KCl to that for NaCl:

Watch Video Solution

78. KCl crystallizes int the same type of lattic as done NaCl . Given that $r_{Na^+}/r_{Cl^-}=0.50$ and $r_{Na^+}/r_{K^+}=0.70$, Calcualte the ratio of the side of the unit cell for KCl to that for NaCl:

Watch Video Solution

79. If NaCl is doped with 10^{-3} mol% of $SrCI_2$ what is the concentration of cation vacancies?

Watch Video Solution

80. Analysis shows that nickel oxide has the formula $Ni_{0.98}O$. What fractions of the nickel exist as Ni^{2+} and Ni^{3+} ions ?

Watch Video Solution

81. Calculate the number of atoms in 34 mole of Cl.

Watch Video Solution

82. A metal crystallizes in a face centred cubic unit cell with a=0.560nm. Calculate the density of the metal if contains 0.1% Schottky defects. (Atomic mass of metal = $40 g mol^{-1}$).

Watch Video Solution

83. By X-ray diffraction method, the unit cell edge length of sodium chloride is found to be 562.6 pm. The density of NaCl is observed to be $2.158 g cm^{-3}$.

Predict the type of defect present in the crystal.

Watch Video Solution

84. By X-ray diffraction method, the unit cell edge length of sodium chloride is found to be 562.6 pm. The density of NaCl is observed to be $2.158 gcm^{-3}$.

Predict the type of defect present in the crystal.

Watch Video Solution

85. Why are solids rigid ?

Watch Video Solution

86. Why do solids have a definite volume ?

Watch Video Solution

87. Classify the following as amorphours or crystalline solids:

Naphthalene

Teflon

Polyurethane

Benzoic acid

Potassium nitrate

Cellophane

Polyvinyl chloride

Fibre glass

Copper

Zinc sulphide.

Watch Video Solution

88. Why is glass considered a super cooled liquid.

Watch Video Solution

89. Refractive index of a solid is observed to have the same value along all directions. Comment on the nature of this solid. Would it show cleavage property?

Watch Video Solution

90. Classify the following solids in different categories based on the nature of intermolecular forces operating in them:

Potassium sulphate, tin, benzene, urea, ammonia, water, zinc sulphide, graphite, rubidium, argon, silicon carbide.

Watch Video Solution

91. Solid which is very hard, electrical insulator in solid as well as in molten state and melts at extremely high temperature. What type of solid is it ?

Watch Video Solution

92. Ionic solids conduct electricity in the molten state but not in the solid state. Explain.

Watch Video Solution

93. What type of solids are electrical conductors, malleable and ductile ?

Watch Video Solution

94. Give the significance of a ' lattice point

Watch Video Solution

95. Name the parameters that characterize a unit cell.

Watch Video Solution

96. Distinguish between :

Hexagonal and monoclinic unit cells.

Watch Video Solution

97. Distinguish between :

Face-centred and end-centred unit cells.

Watch Video Solution

98. Explain how much portion of an atom located at

Corner

Watch Video Solution

99. Explain how much portion of an atom located at body center of cubic unit cell is part of its neighbouring cell.

Watch Video Solution

100. What is the two dimensional co-ordination number of a molecule in

A square packed layer ?

Watch Video Solution

101. A compound forms hexagonal close packed structure. What is· the total number of voids in 0.5 mol of it? How many .of these are tetrahedral voids ?

Watch Video Solution

102. A compound is formed by two elements M and N. The elements N forms ccp and M atom occupy 1/3 of the tetrahedral voids. What is the formula of the compound?

Watch Video Solution

103. Which of the following lattices has the highest packing efficiency ?

i) Simple cubic

ii) body centred cubic

iii) hexagonal close packed lattice

Watch Video Solution

104. An element with molar mass 2.7×10^{-2} kg mol^{-1} forms a cubic unit cell with edge length 405 pm. If its density is 2.7×10^3 kgm^{-3}, what is the nature of the cubic unit cell ?

Watch Video Solution

105. What type of defect can arise when a solid is heated ? Which physical property is affected by it and in what way ?

Watch Video Solution

106. What type of stoichiometric defect is shown by ZnS?

Watch Video Solution

107. What type of stoichiometric defect is shown by

AgBr

Watch Video Solution

108. Explain how vacancies are introduced in an ionic solid when a cation of higher valence is added as an impurity in it.

Watch Video Solution

109. Ionic solids, which have anionic vacancies due to metal excess defect, develop colour. Explain with the help of a suitable example.

Watch Video Solution

110. A Group 14 element is to be converted into n-type semiconductor by doping it with a suitable impurity. To which group should this impurity belong ?

Watch Video Solution

111. What type of substances would make better permanent magnets, ferromagnetic or ferrimagnetic. Justify your answer.

Watch Video Solution

112. Define the term amorphous. Give a few examples of amorphous solids.

Watch Video Solution

113. What makes a glass different from a solid such as quartz ? Under what conditions could quartz be converted into glass ?

Watch Video Solution

114. Classify each of the following solids as ionic, metallic, molecular, network or amorphous

Tetra phosphorus decoxide(P_4O_{10})

Graphite

Brass

Ammonium phosphate$(NH_4)_3PO_4$

SiC

Rb

I_2

LiBr

P_4

Si

Plastic.

Watch Video Solution

115. What is meant by the term 'coordination number' ?

Watch Video Solution

116. What is meant by the term coordination numbr?

IN a cubic close packed structure.

Watch Video Solution

117. What is meant by the term coordination numbr?

in a body centred cubic structure.

Watch Video Solution

Watch Video Solution

118. How can you determine the atomic mass of an unknown metal if you know its density and the dimensions of its unit cell ? Explain your answer.

Watch Video Solution

119. Stability of a crystal is reflected in the magnitude of its melting point. Comment

Watch Video Solution

120. How will you distinguish between the following pairs of term ? Hexagonal close packing and cubic close packing in three dimensions.

Watch Video Solution

121. How will you distinguish between the following pair of terms:

Crystal latttice and unit cell.

Watch Video Solution

122. How will you distinguish between the following pairs of term ?

Tetrahedral void and octahedral void.

Watch Video Solution

123. How many latttice points are there in one unit cell of each of the following lattice?

face centered cubic.

Watch Video Solution

124. How many lattice point are there in one unit cell of each of the following lattices ?

face-centred tetragonal

Watch Video Solution

125. How many lattice point are there in one unit cell of each of the following lattices ?

body-centred cubic

Watch Video Solution

126. Explain :

The basis of similarities and differences between metallic and ionic crystal.

Watch Video Solution

127. Explain :

Ionic crystals are hard and brittle.

Watch Video Solution

128. Calculate tbe packing efficiency of a metal crystal for a simple cubic lattice.

Watch Video Solution

129. Calculate the efficiency of packing in case of a metal crystal for body centred cubic lattice.

Watch Video Solution

130. Calculate the efficiency of packing in case of a metal crystal for face centred cubic lattice.

Watch Video Solution

131. Silver crystallines in fcc lattice. If edge length of the cell is $4.077 \times 10^{-8} cm$ and density is $10.5 gcm^{-3}$. Calculate the atomic mass of silver.

Watch Video Solution

132. A cube solid is made up of two elements P and Q. Atoms Q are present at the corners of the cubic and atom P at the body centre. What is the formula of the compound ? What are the co-ordination numbers of P and Q ?

Watch Video Solution

133. Niobium crystallizes in a body centred cubic structure. If density is 8.55 gcm^{-3}, calculate atomic radius of niobium, given that its atomic mass is 92.9μ.

Watch Video Solution

134. If the radius of the octahedral void is r and the radius of the atoms in the packing is R, derive relationship between r and R.

Watch Video Solution

135. Copper crystallizes into a fcc lattice with edge length 3.61×10^{-8} cm. Show that the calculate density is in agreement with is measured value of 8.92 g cm^{-3}. (At mass of copper = 63.5)

Watch Video Solution

136. Analysis shows that nickel oxide has the formula $Ni_{0.98}O$. What fractions of the nickel exist as Ni^{2+} and Ni^{3+} ions ?

Watch Video Solution

137. Describe the two main types of semiconductors.

Watch Video Solution

138. Non-stoichiometric cuprous oxide (Cu_2O) can be prepared in the laboratory. In this oxide, copper to oxygen ratio is sloghtly less than 2 : 1 can you account for the fact that this substance is p-type semiconductor

Watch Video Solution

139. Ferric oxide crystallizes in a hexagonal close pakced array of oxide ions with two out of every three octahedral holes occupied by ferric ions. Derive the formula of the ferric oxide.

Watch Video Solution

140. Identify each of the following as being a p-type and n-type semi-conductor.

Ge doped with In

Watch Video Solution

141. Classify each of the following as being either a p-type or n -type semiconductor:

B doped with Si

Watch Video Solution

142. Gold (atomic radius=0.144nm) crystallises in a face-centred unit cell what is the length of a side of the cell?

Watch Video Solution

143. In terms of band theory, what is the difference: between a conductor and an insulator

Watch Video Solution

144. In terms of band theory, what is the difference: between a condutor and a semiconductor?

Watch Video Solution

145. Explain the following terms with suitable examples:

Schottky defect.

Watch Video Solution

146. Explain the following terms with suitable examples:

Frenkel defect.

Watch Video Solution

147. Explain the following terms with suitable examples :

Interstitials (P.S.E.B. 2008)

Watch Video Solution

148. Explain the following terms with suitable examples :

F-centres (P.B.E.B. 2003)

Watch Video Solution

149. Aluminium crystallises in a cubic close packed structure. Its metallic radius is 125 pm.

What is the length of the side of the unti cell ?

Watch Video Solution

150. Aluminium crystallises in .a cubic close packed structure. Its metallic radius is 125 pm.

How many unit cell are there in 1.00 cm3 of aluminium ?

Watch Video Solution

151. If NaCl is doped with 10^{-3} mol% of $SrCI_2$ what is the concentration of cation vacancies?

Watch Video Solution

152. Explain the following with suitable examples: Ferromagnetism

Watch Video Solution

153. Explain the following with suitable examples: paramagnetism.

Watch Video Solution

154. Explain the following with suitable examples: ferrimagnetism.

Watch Video Solution

155. Explain the following with suitable examples:

antiferromagnetism.

Watch Video Solution

156. Explain the following with suitable examples. 12-16 and 13-15 group compounds.

Watch Video Solution

157. Why are liquids and gases categorised as fluids?

Watch Video Solution

158. What are soluble and insoluble substance?

Watch Video Solution

159. Inspite of long range order in the arrangement of particles why are the crystals usually not perfect?

Watch Video Solution

160. Three faces of a fair dice are yellow, two faces red and one blue.The dice is tossed three times. The probability that the colours yellow, red and blue appear in the, second and third toss respectively, is

Watch Video Solution

161. Why is FeO(s) not formed in stoichiometric compostion?

Watch Video Solution

162. Why does white ZnO(s) becomes yellow upon heating?

Watch Video Solution

163. Why does conductivity of a semiconductor increase with rise in temperature?

Watch Video Solution

164. Explain why does conductivity of germanium crystals increase on doping with gallium.

Watch Video Solution

165. In a compound, nitrogen atoms make cubic close packed lattice and metal atoms (M) occupy one-third of the tetrahedral voids present. Determine the formula of the compound formed by M and N?

Watch Video Solution

166. Which of crystalline or amorphous substance is isotropic?

Watch Video Solution

167. Both diamond and rhombic sulphur are covalent solids but the latter has very low melting point than the former. Explain why?

Watch Video Solution

168. Rohit went to Jaipur with a school trip to visit some historical places. He and his friends observed that some old glass objects looked milky and windows pane of old buildings were looking slightly thicker at the bottom than at the top.

Answer the following questions

Under what conditions could quartz be converted into glass?

Watch Video Solution

169. Can cubc lattice have end centred unit cell?

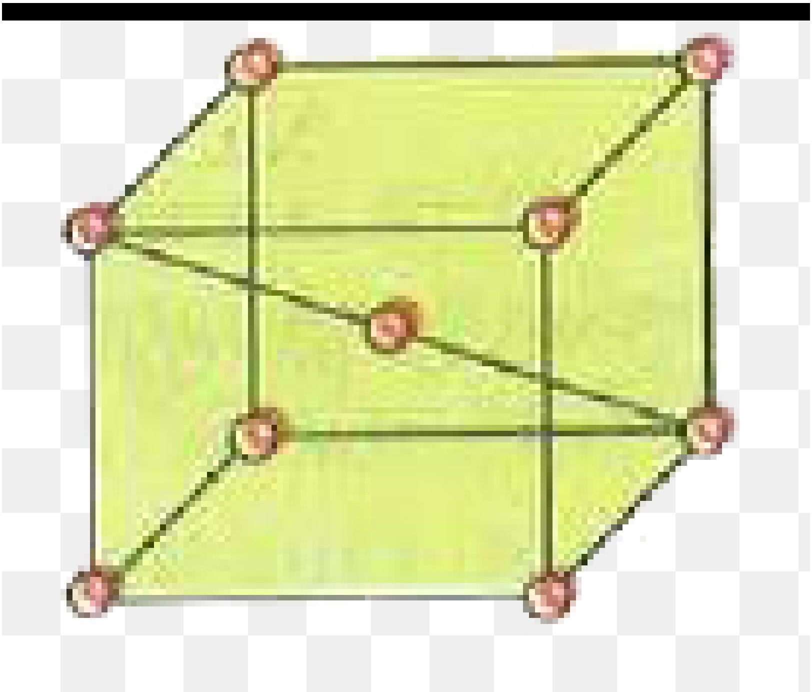
Watch Video Solution

170. Silver iodide crystallizes in the cubic close packed zinc sulphide structure. Assuming that ions occupy the lattice points, what fraction of the tetrahedral sites is occupied by Ag^{+} ions?

Watch Video Solution

171. An element 'X' has bcc lattice as shown below:

The unit cell length a is 306pm

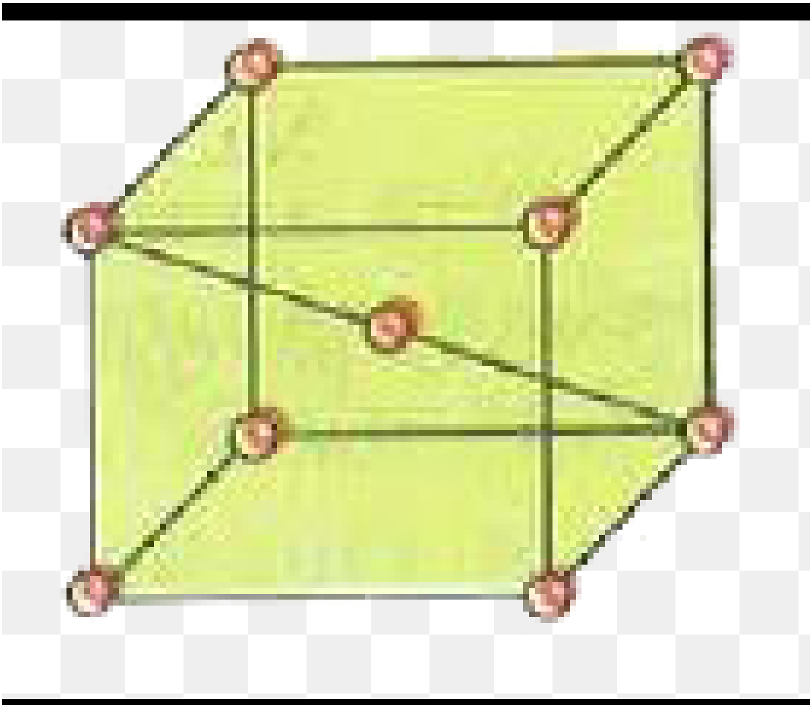


What is the distance between nearest neighbours?

Watch Video Solution

172. An element 'X' has bcc lattice as shown below:

The unit cell length a is 306pm



What is the distance between nearest neighbours?

Watch Video Solution

173. For a cubic crystal, the face diagonal is $4.25\overset{\circ}{A}$. Calculate the face length?

Watch Video Solution

174. In an atomic bcc lattie what fraction of edge is not covered by atoms?

Watch Video Solution

175. A face centred cubic lattice of a single type of atoms has same defects and it one corner and one face centre is left unoccupied per unit cell. Calculate the packing fraction of such solid.

Watch Video Solution

176. The CsCl has cubic sturcute of Cl^{-} ions in which Cs^{+} ion is present in the body centre of the cube. Its density is $3.99gcm^{-3}$. Calculate the length of the edge of unit cell.

Watch Video Solution

177. The CsCl has cubic sturcute of Cl^{-} ions in which Cs^{+} ion is present in the body centre of the cube. Its density is $3.99gcm^{-3}$. Calculate the length of the edge of unit cell.

Watch Video Solution

178. The CsCl has simple cubic sturcute and Its density is $3.99gcm^{-3}$. Calculate the edge length of unit cell.

Watch Video Solution

179. A metal crystallines into two cubic phases, face centred cubic (fcc) and body centred cubic (bcc), whose unit cell lengths are $3.5\overset{\circ}{A}$ respectively. Calculate the ratio of densities of fcc and bcc.

Watch Video Solution

180. There are 6 marbles in a box with numbers from 1 to 6 marked on each of them. What is the probability of drawing a marble with number 4?

Watch Video Solution

181. A compound AB has rock salt type structure. The formula weight of AB is 6.023 Y amu and the closest A-B distance is $Y^{\frac{1}{3}}$ nm, where Y is an arbitrary number.

Find the density of the lattices.

Watch Video Solution

182. A compound AB has rock salt type structure. The formula weight of AB is 6.023 Y amu and the closest A-B distance is $Y^{\frac{1}{3}}$nm, where Y is an arbitrary number.

If the density of lattice is found to be $20kgm^{-3}$ predict the type of defect.

Watch Video Solution

Exercise

1. A unit cell consists of a cube in which there are A atoms at the corners and B atoms at the face centres and A atoms are missing from two corners of the each unit cell. What is the simplest formula of the compound ?

Watch Video Solution

2. A compound X and Y crystallises in the cubic structure in which Y atoms are at the corners and X atoms are at the alternate faces of the cube. Find the formulate of the compound.

Watch Video Solution

3. Gold cystallises in the face cubic lattice. Calculate the approximate number of unit cells in 2 mg of gold. (atomic mass of gold=197u).

Watch Video Solution

4. Xenone crystallizes in the face centred cubic lattice and the edge of the unit cell is 620 pm. What is the nearest neighbour distance and radius of xenon atom?

Watch Video Solution

5. The length of the unit cell edge of a body centred cubic metal crystal is 352 pm. Calculate the radius of an atom of the crystal?

Watch Video Solution

6. Calculate the atomic radius of elementary silver which crsytallises in face centred cubic lattice with unit cell edge length $4.086 \times 10^{-10} m$.

Watch Video Solution

7. A solid has a structure in which W atoms are present at the corners of the cubic unit cell, O atoms are located at the cube edges and Na atoms are present at cube centres. What is the formula of the compound?

Watch Video Solution

Watch Video Solution

8. Tungsten crystallizes in a body centred cubic lattice. Calculate the number of unit cells in 1.5 g of tungsten. Atomic mass of tungsten = 184μ.

Watch Video Solution

9. Copper cystalizes in a face centred cubic lattice. Calculate the number of unit cells in 12g of copper (atomic mass of copper =63.5u).

Watch Video Solution

10. Gold (atomic radius=0.144nm) crystallises in a face-centred unit cell what is the length of a side of the cell?

Watch Video Solution

11. In a face centred cubic arangement of A and B atoms, A atoms occupy the corners and B atoms occupy the face centres of the unit cell. If one of the atoms is missing from the corner in each unit cell, what is the simplest formulat of the compound?

Watch Video Solution

12. The atomic radii of Cs^{+} and Cl^{-} are $1.69\overset{\circ}{A}$ and $1.81\overset{\circ}{A}$ respectively. Predict the coordination number of Cs^{+} ion and structure of CsCl?

Watch Video Solution

13. A solid has NaCl structure. If the radius of cation A is 100 pm. What is the radius of anion B ?

Watch Video Solution

14. If the radius of Br^- ions is 0.182 nm, how large a cation can fit in each of the tetrahedral hole?

Watch Video Solution

15. A compound is formed by two elements X and Y. Atoms of the element Y (as anions) make ccp and those of the element X (as cations) occupy all the octahedral voids. What is the formula of the compund?

Watch Video Solution

16. A compound is formed by two elements in M and N. The element N forms ccp and atoms of M occupy 1/3rd of tetrahedral voids.

What is the formula of the compound ?

Watch Video Solution

17. In a crystalline solid, anions Y are arranged in ccp arrangement. Cations X are equally distributed between tetrahedral and octahedral voids. If all the octahedral voids are occupied. What is the formula of the solid?

Watch Video Solution

18. In a solid, oxide ions are aranged in ccp. One sixth of the tetrahedral voids and occupied by the cations A and one third of the octahedral voids and occupied by the cations B. what is the formula of the compound?

Watch Video Solution

19. In corrundum, oxide ions are arranged in hcp arrangement and the aluminium ions occupy 2/3 of the octahedral voids. What is the formula of corrudum?

Watch Video Solution

20. An element crystallines in a f.c.c lattice with cell edge of 400 pm. The denstiy of the element is $7gcm^{-3}$. How many atoms are present in 280 g of the element?

Watch Video Solution

21. A unit cell of sodium chloride has four atoms units per unit cell. The edge length of unit cell is 0.564 nm. Find out the density of sodium chloride.

Watch Video Solution

22. Tungsten has body centred cubic lattice. Each edge of the unit is 316 pm and density of the metal is $19.35 \mathrm{g\,cm}^{-3}$. How many atoms are present in 50 g of the metal ?

Watch Video Solution

23. CsCl has body centred cubic lattice with the lengh of a side of a unit cell 412.1 pm and aluminium is face centred cubic lattice with length of the side of unit cell 405 pm. Which of the two larger density? (Atomic mass of Cs=132.9, Cl=29.9).

Watch Video Solution

24. Silver has atomic mass 108 a.m.u. and density 10.5 g cm^{-3} If the edge length of its unit cell is 409 pm, identify the type of unit cell.

Also calculate the radius of an atom of silver.

Watch Video Solution

25. Iron has a body centred cubic unit cell with the cell dimension of 286.65 pm. Density of iron ·is 7.87 g cm^{-3} Use this information to calculate Avogadro's number. (Atomic mass of Fe= 56.0 u)

Watch Video Solution

26. Gold (atomic radius=0.144nm) crystallises in a face-centred unit cell what is the length of a side of the cell?

Watch Video Solution

27. An element (at mass 60) havind FCC structure has a density of 6.23g cm^{-3}. What is the edge length of the unit cell ?

Watch Video Solution

28. An element with density 10 g cm^{-3} forms a cubic unit cell with edge length of 3×10^{-8} cm.What is the nature of the cubic unit cell if the atomic mass of the element is 81 g mol^{-1}

Watch Video Solution

29. Lead (II) sulphide crystals has NaCl structure. What is its density ? The edge length of its unit cell is 500 pm. (Atomic mass of Pb = 207 = S = 32).

Watch Video Solution

30. Formula mass of NaCl is $58.45 g mol^{-1}$ and density of its pure form is $2.167 g cm^{-3}$. The average distance between adjacent sodium and chloride ions in the crystal is $2.814 \times 10^{-8} cm$. Calculate the Avogadro number.

Watch Video Solution

31. Copper crystallizes into a fcc lattice with edge length 3.61×10^{-8} cm. Show that the calculate density is in agreement with is measured value of 8.92 g cm^{-3}. (At mass of copper = 63.5)

Watch Video Solution

32. Crystalline CsBr has a body centred cubic structure. Calculate the unit cell edge length if the density of CsBr crystal is $4.24 gcm^{-3}$. (atomic masses: cs=133, Br=80).

Watch Video Solution

33. Silver has atomic mass 108 a.m.u. and density 10.5 g cm^{-3} If the edge length of its unit cell is 409 pm, identify the type of unit cell. Also calculate the radius of an atom of silver.

Watch Video Solution

34. What is the distance between Na^{+} and Cl^{-} ions in NaCl crystal if the density is $2.165gcm^{-3}$. $Molar mass of NaCl = 58.5gmol^{-1}, (N_A = 6.02 \times 10^{23} mol^{-1})$.

Watch Video Solution

35. A compound AB crystallines in bcc lattice with unit cell edge length of 380 pm. Calculate

the distance between oppositely charged ions in the lattice.

Watch Video Solution

36. A compound AB crystallines in bcc lattice with unit cell edge length of 380 pm. Calculate

raduis of A^{+} if radius of B^{-} is 175 pm.

Watch Video Solution

37. Thallium chloride TICl crystallines in either a simple cubic lattice or a face centred cubic lattice of Cl^{-} ions with Tl^{+} ions in the holes. If the density of the solid is $7.00 gcm^{-3}$ and edge of the unit of cell is $3.85 \times 10^{-8} cm$. What is the unit cell geometry(Atomic mass of Tl=208.37 and of Cl=35.5).

Watch Video Solution

38. Caesium chlorde cystallised as cubic lattices and has a density of $4.0 gcm^{-3}$. Calculate the length of the edge of the unit cell of caesium chloride.($Molar mass of CsCl = 168.5 gmol^{-1}$).

Watch Video Solution

39. Calculate the density of silver which crystallines in the face centred cubic structure. The distance between the nearest silver atoms in this structure is 287 pm. ($Molar mass of silver = 107.87 gmol^{-1}$).

Watch Video Solution

40. Calculate the Avogadro number from the following data of AB, when AB has NaCl type structure :

Density of $AB = 2.48 \text{g cm}^{-3}, m = 58 \text{g mol}^{-1}$

Distance between A^+ and B^- in AB = 2.69 pm.

Watch Video Solution

41. Copper crystallizes into a fcc lattice with edge length 3.61×10^{-8} cm. Show that the calculate density is in agreement with is measured value of 8.92 g cm^{-3}. (At mass of copper = 63.5)

Watch Video Solution

42. Chromium crystallizes in a body centred cubic lattice whose density is $7.20 \frac{g}{c} m^3$. The length of the edge of the unit cell is 288.4 pm. Calculate the Avogadro number (atomic mass of chromium=52).

Watch Video Solution

43. An element 'X' with an atomic mass of 60/g mol has density of $6.23 \mathrm{g\,cm}^{-1}$. If the edge length of its unit cell is 400 pm, identity the type of cell. Also calculate the radius of an atom of this element.

Watch Video Solution

44. The composition of a simple of Wustrie is $Fe_{0.03}O$. What is the percentage of iron present as Fe^{3+} in total iron?

Watch Video Solution

45. Analysis shows that metal oxide has formnla $M_{0.96}O_{1.00}$ What fractions of the metal exist as M^{2+} and M^{3+}

Watch Video Solution

46. Fe_3O_4 is ferrimagnetic at room temperature but at 850K it becomes::

Watch Video Solution

47. Name any one solid in which both Frenkel and Schottky defects occur.

Watch Video Solution

48. What is the effect of temperature on the conductivity of metals and semi metals?

Watch Video Solution

49. What is a solar cell ? How does it work ? Write its one use.

Watch Video Solution

50. Why is Frenkel defect not found in pure alkali metal halides ?

Watch Video Solution

51. p-type semiconductor is obtained by doping silicon with Indium(In).(Yes/No)

Watch Video Solution

52. What is the effect of presence of Schottky defects on the density of the crystal?

Watch Video Solution

53. Examine the given defective crystal?

A^+	B^-	A^+	B^-	A^+
B^-	0	B^-	A^+	B^-
A^+	B^-	A^+	0	A^+
B^-	A^+	B^-	A^+	B^-

Answer the following questions:

What type of stoichiometric defect is shown by the crystal?

Watch Video Solution

54. Examine the given defective crystal?

A^+	B^-	A^+	B^-	A^+
B^-	0	B^-	A^+	B^-
A^+	B^-	A^+	0	A^+
B^-	A^+	B^-	A^+	B^-

Answer the following questions:

How is the density of the crystal affected by this defect?

Watch Video Solution

55. Identify each of the following as being a p-type and n-type semi-conductor.

Ge doped with In

Watch Video Solution

56. Classify each of the following as being either a p-type or n -type semiconductor:

B doped with Si

Watch Video Solution

57. Name a substance which on the addition to AgCl causes cations vacancy in it.

Watch Video Solution

58. Which point defect lowers the density of crystal ?

Watch Video Solution

59. How does the resistivity of

a conductor and

a semiconductor vary with temperature? Give reason for each case.

Watch Video Solution

60. Name the non-stoichimetric point defect responsible for colour in alkali metals halides.

Watch Video Solution

61. $CaCl_2$ will introduce Schottky defect when added to AgCl crystal. Explain.

Watch Video Solution

62. Why does ZnO appear golden yellow at high temperature? Explain.

Watch Video Solution

63. The electrical conductivity of metal decreases with rise in temperature, while that of a semiconductor increases. Explain

Watch Video Solution

64. What is the effect of Frenkel stuctural defect on the electrical conductivity of a crystalline solid?

Watch Video Solution

65. Why is Frenkel defect not found in pure alkali metal halides ?

Watch Video Solution

66. Write main differences between the properties of white phosphorus and red phosphorus.

Watch Video Solution

67. Why does LiCl acquire pink colour when heated in Li vapours?

Watch Video Solution

68. True or false

Tetragonal and orthorhomic crystal systems have same axial angles?

Watch Video Solution

69. True or false

In a fcc unit cell, the distance along one of the faces of the unit cell is 2.828 times the radius of the atoms.

Watch Video Solution

70. True or false

In a face centred cubic systems, number of atoms at faces is 4.

Watch Video Solution

71. True or false

Copper crystallises in a fcc lattice. If radius of copper atoms is 130 pm, then the edge length of the unit of the cell will be 450.32pm.

Watch Video Solution

72. True or false

The percentage of vacant space in bcc unit cell and simple cubic unit cell are 26% and 32% respectively.

Watch Video Solution

73. Number of atoms per unit cell in fcc and bcc unit cells are 4 and 2 respectively.

Watch Video Solution

74. True or false

For bcc metallic unit cell, the edge length (a) and radius of atom are related as: $a = \frac{4}{\sqrt{3}} r$.

Watch Video Solution

75. State weather it is True or False

The formula for finding the surface area of the sphere is $\frac{4}{3}\pi r^3$.

Watch Video Solution

76. True or false

The two ions A^+ and B^- have radii 90 and 200 pm respectively. In close paked crystal of a compound AB, the coordination number of A^+ is 4.

Watch Video Solution

77. What are the coordination number of Na^+ and Cl^- ions in NaCl?

Watch Video Solution

78. Which point defect lowers the density of crystal ?

Watch Video Solution

79. True and False: Seal is a mammal live wholly in water.

Watch Video Solution

80. Write the structure of benzal chloride

Watch Video Solution

81. Mark true or false FCC has four atoms per unit cell

Watch Video Solution

82. STATEMENT -1 : Antiferromagnetic subatance becomes paramagentic on heating to

hight temperture .

STATEMENT -2 : Heating results in spins of electrons becoming random .

Watch Video Solution

83. Fill ups

The number of atoms for primitive unit cell is................for body centred cubic unit cell is..............and for face centred cubic unit cell is.............. .

Watch Video Solution

84. Electrical conductance of metals decreases with increase in temperature.

Watch Video Solution

85. Fill ups

The substance which are strongly attracted by the magnetic field and show permanent magnetism even when magnetic field is removed are called ....substances.

Watch Video Solution

86. What is the formula of a Compound in which the element Y forms hcp lattice and atoms of X occupy 2/3 rd of tetrahedral voids?

Watch Video Solution

87. A Group 14 element is to be converted into n-type semiconductor by doping it with a suitable impurity. To which group should this impurity belong ?

Watch Video Solution

88. What is electrical conductivity in ionic solids due to ?

Watch Video Solution

89. Fill ups

The coordination number of each sphere in hcp is..............in ccp is............and in bcc packing is............. .

Watch Video Solution

90. Fill ups

The packing fraction of a simple unit cell is................... .

Watch Video Solution

91. Fill ups

The empty space in hcp is..............and that in the bcc packing is.............. .

Watch Video Solution

92. In a body centred cubic structure, the space occupied to about

Watch Video Solution

93. The number of octahedral void in bcc structure is:

A. 0

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

94. Fill ups

In a body centre cubic arrangement....................atoms along the body diagonal touch each other.

Watch Video Solution

95. Name any one solid in which both Frenkel and Schottky defects occur.

Watch Video Solution

96. Fill ups

If there is a large energy gap between the filled valence band and empty conduction band, the subtance acts as ....

Watch Video Solution

97. Fill ups

In a body centred crystal of an element, the ratio of edge of the unit cell to the radius of the atoms is..................

Watch Video Solution

98. Cow's milk is yellowish in colour because of the presence of

Watch Video Solution

99. Choose the correct options:

Lithium, sodium, potassium and rubidium cystallize in the bcc/fcc structure.

Watch Video Solution

100. Name the

most unsymmetrical crystal system.

Watch Video Solution

101. Choose the correct statement.

Watch Video Solution

102. The number of tetrahedral and octahedral holes in a hexagonal primitive unit cell are respectively:

Watch Video Solution

103. Choose the correct options:

In a crystalline solid, anions B are arranged in a ccp. Cations A and equally distributed between octahderal and tetrahedral voids. If all the octahedral voids are occupied, the formula of the compound is $A_2B \,/\, A_3B$.

Watch Video Solution

104. In the body centered cubic unit cell and simple unit cell, the radius of atoms in terms of edge length (a) of the unit cell is respectively:

Watch Video Solution

105. True or false

hcp arrangement has 6 atoms per unit cell.

Watch Video Solution

106. Choose the correct options:

$CdCl_2$ added to AgCl crystal will introduce schottky defect/ Frenkel defect.

Watch Video Solution

107. Choose the correct options:

Ferrimagnetism/ ferromagnetism arises due to unequal number of domains in opposite direction resulting in net magnetic moment.,

Watch Video Solution

108. Name the compound which can show both Schottky and Frenkel defect.

Watch Video Solution

109. A n-type semiconductor is:

Watch Video Solution

110. Mark the correct options

Watch Video Solution

111. Crystalline solids are anistropic in nature. What does this statement mean?

Watch Video Solution

112. Define a unit cell.

Watch Video Solution

113. In a close packed structure there are N- spheres, how many tetrahedral voids are associated with them ?

Watch Video Solution

114. In a close packed structure, there are M- spheres, how many octahedral voids are associated with them ?

Watch Video Solution

115. Why is Frenkel defect not found in pure alkali metal halides ?

Watch Video Solution

116. What is the co-ordination number in hcp and ccp ?

Watch Video Solution

117. Why Frenkel defect does not change the density of AgCl crystal ?

Watch Video Solution

118. What is meant by point defects in crystal?

Watch Video Solution

119. What is meant by 'doping' in a semiconductor?

Watch Video Solution

120. What is the radius of ratio $\left(\frac{r^{+}}{r^{-}}\right)$ for an ion to occupy: tetrahedral void.

Watch Video Solution

121. What type of point defect is produced when AgCl is doped with $CdCl_2$?

Watch Video Solution

122. What is the effect of Frenkel stuctural defect on the electrical conductivity of a crystalline solid?

Watch Video Solution

123. Why Frenkel defect does not change the density of AgCl crystal ?

Watch Video Solution

124. What are Alkenyl Halides? give examples?

Watch Video Solution

125. Define co-ordination number

Watch Video Solution

126. What is the effect of temperature on electrical conductivity of a semiconductor?

Watch Video Solution

127. What type of substances exhibit anti-ferromagnetism?

Watch Video Solution

128. Name an impurity which when added to pure silicon makes it n-type semiconductor.

Watch Video Solution

129. How does the electrolytic conductance vary with temperature ?

Watch Video Solution

130. What is the relationship between the edge length (a) of the unit cell and radius (r) of an atom in a face centred unit cell?

Watch Video Solution

131. Which point detect in crystals of a solid does not change the density of the solid?

Watch Video Solution

132. How do ferromagnetism arise ?

Watch Video Solution

133. How do ferromagnetism arise ?

Watch Video Solution

134. In a close packed structure there are N- spheres, how many tetrahedral voids are associated with them ?

Watch Video Solution

135. Write two differences between ionic solids and metallic solids.

Watch Video Solution

136. How many latttice points are there in one unit cell of each of the following lattice?

face centered cubic.

Watch Video Solution

137. How many lattice point are there in one unit cell of each of the following lattices ?

body-centred cubic

Watch Video Solution

138. Identify each of the following as being a p-type and n-type semi-conductor.

Ge doped with In

Watch Video Solution

139. Identify each of the following as being a p-type and n-type semi-conductor.

Si doped with As

Watch Video Solution

140. How many atoms are there in a unit cell of a metal crystallizing in fcc structure?

Watch Video Solution

141. What type of stoichiometruc defect is shown in AgCl?

Watch Video Solution

Watch Video Solution

142. What type of substances would make better permanent magnets, ferromagnetic or ferrimagnetic. Justify your answer.

Watch Video Solution

143. A compound is formed by two elements M and N. The elements N forms ccp and M atom occupy 1/3 of the tetrahedral voids. What is the formula of the compound?

Watch Video Solution

144. What are the coordination number of Na^{+} and Cl^{-} ions in NaCl?

Watch Video Solution

145. Name the substance which on treatment with chlorine yields bleaching powder.

Watch Video Solution

146. Which point defect lowers the density of crystal ?

Watch Video Solution

147. Choose the correct options:

When silicon is doped with arsenic, n-type/ p-type semiconductor is produced.

Watch Video Solution

148. What type of interactions hold the molecules together in a polar molecular solid?

Watch Video Solution

149. Which stoichiometric defect in crystals increases the density of a solid?

Watch Video Solution

150. What is n-type semiconductor ?

Watch Video Solution

151. What is an intrinsic Semi-conductor ?

Watch Video Solution

152. What is the formula of a Compound in which the element Y forms hcp lattice and atoms of X occupy 2/3 rd of tetrahedral voids?

Watch Video Solution

153. Close packing is maximum in the crystal which is

A. bcc

B. fcc

C. simple cubic

D. end centred cubic

Answer:

Watch Video Solution

154. In a solid lattice the cation has left a lattice site and is located at an interstitial position, the lattice defect is

A. n-type

B. p-type

C. Frenkel defect

D. Schottky defect

Answer:

Watch Video Solution

155. The cordination number of a metal crystallising in a hexagonal close-packed structure is:

A. 12

B. 4

C. 8

D. 10

Answer:

Watch Video Solution

156. In the primitive cubic unit cell, the atoms are present at the:

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

157. In the body centered unit cell, the lattice point are present at the:

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

158. The crystal system of a compound with unit cell parameter,

A. a=b=c, $\alpha = \beta = \gamma = 90^\circ$

B. $a = b \neq c, \alpha = \beta = \gamma = 90^{\circ}$

C. $a \neq b \neq c, \alpha = \beta = \gamma = 90^{\circ}$

D. $a = b \neq c, \alpha = \beta = 90^{\circ}, \gamma = 120^{\circ}$

Answer:

Watch Video Solution

159. The apperance of colour in solid alkeli metal halide is generally due to

A. Schottky defect

B. Frenkel defect

C. F-centre

D. Interstitial postion.

Answer:

Watch Video Solution

160. Which of the following statements is correct in the body centred type of cubic structure of ionic compound?

A. 0.74

B. 0.2

C. 0.68

D. 52,4%

Answer:

Watch Video Solution

161. The device used for producing electric current is called:

A. Ferroelectricity

B. Anti ferroelectricity

C. Pyroelectricity

D. Piezoelectricity

Answer:

Watch Video Solution

162. When unpaired electron is trapped in anion vacancy, then crystal with such a defect is id to have

A. Schottky defect

B. F-centre

C. Frenkel defect

D. Non-Stoichiometric defect

Answer:

Watch Video Solution

163. Which of the following is a molecular solid?

A. Rock salt

B. Quartz

C. Ice

D. Diamond

Answer:

Watch Video Solution

164. The empty space within hcp arrangement is

A. 0.34

B. 0.476

C. 0.32

D. 0.26

Answer:

Watch Video Solution

165. The number of tetrahedral voids per atom in a crystal lattice is................... .

A. 4

B. 2

C. 6

D. 8

Answer:

Watch Video Solution

166. The unit cell with parameter $\alpha = \beta = \gamma = 90^\circ$ and $a = b \neq c$ is

A. monoclinic

B. triclinic

C. cubic

D. tetragonal

Answer:

Watch Video Solution

167. What are the coordination number of Na^+ and Cl^- ions in NaCl?

A. 2

B. 3

C. 6

D. 4

Answer:

Watch Video Solution

168. Explain the Schottky defects in crystals.

A. cation vacancies only

B. cation vacancies and interstitial cations

C. anion vacancies and interstitial anions

D. equal number of cation and anion vacancies.

Answer:

Watch Video Solution

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

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

Silicon that has been dopend with group - 15 elements is called :

A. 2

B. 3

C. 1

D. 5

Answer:

Watch Video Solution

170. On doping germanium metal with a little of indium, one gets

A. p-type semiconductor

B. n-type semiconductor

C. insulator

D. rectifier

Answer:

Watch Video Solution

171. The number of types of spaces lattices possible in a crystal are.................... .

Watch Video Solution

172. The number of tetrahedral voids per atom in a crystal lattice is.................. .

Watch Video Solution

173. Glass is.......................type of solid.

Watch Video Solution

174. Name the consituents of blood and state the functions of each.

Watch Video Solution

175. What do you understand by the term space lattice and 'unit cell'?

Watch Video Solution

176. Explain with the help of diagram the terms:

angle of dip at a given place.

Watch Video Solution

177. Give important differences between crystalline and amorphous solids.

Watch Video Solution

178. Why does white ZnO(s) becomes yellow upon heating?

Watch Video Solution

179. $CaCl_2$ will introduce Schottky defect when added to AgCl crystal. Explain.

Watch Video Solution

180. If the radius of the octahedral void is r and the radius of the atoms in the packing is R, derive relationship between r and R.

Watch Video Solution

181. What do you understand by imperfections in ionic crystals ?

Name the type of imperfections which occur in ionic crystals.

Watch Video Solution

182. What is the coordination number of atoms.

In a cubic close packed structure ?

Watch Video Solution

183. What is the co-ordination nnmber of atoms

in a body centered cnbic structure ?

Watch Video Solution

184. What is the radius of ratio $\left(\frac{r^+}{r^-}\right)$ for an ion to occupy: tetrahedral void.

Watch Video Solution

185. What is the radius of ratio $\left(\frac{r^+}{r^-}\right)$ for an ion to occupy: octahedral void.

Watch Video Solution

186. What are the consequences of Schottky defects ?

Watch Video Solution

187. Write two main differences between Schottky and Frenkel defect.

Watch Video Solution

188. Distinguish between n-type and p-type semiconductors.

Watch Video Solution

189. What are the consequences of metal excess defects ?

Watch Video Solution

190. What is electrical conductivity in ionic solids due to ?

Watch Video Solution

191. Name the types of semicondcutors produced when germanium is doped separately with boron and arsenic. Which one of the better semiconductor and why?

Watch Video Solution

192. Explain Schottky defect in sodium chloride crystal?

Watch Video Solution

193. Explain the behaviour of semiconductors and insulators on the basis of energy bands in solids.

Watch Video Solution

194. Calculate tbe packing efficiency of a metal crystal for a simple cubic lattice.

Watch Video Solution

195. What is Frenkel defect? Give an example.

Watch Video Solution

196. On the basis of conductivity, how can the solid be classified? What is the conductivity due to each case?

Watch Video Solution

197. In terms of band theory, what is the difference: between a conductor and an insulator

Watch Video Solution

198. In terms of band theory, what is the difference: between a condutor and a semiconductor?

Watch Video Solution

199. Why is Frenkel defect not found in pure alkali metal halides ?

Watch Video Solution

200. Expalin the following

Anti-Ferromagnetic substances have unpaired electron but their dipole moment is zero.

Watch Video Solution

201. Explain the following with suitable examples:

paramagnetism.

Watch Video Solution

202. Explain the following terms with suitable examples:

Frenkel defect.

Watch Video Solution

203. Describe the two main types of semiconductors.

Watch Video Solution

204. What is the difference between ferromagnetic and paramagnetic substances ?

Watch Video Solution

205. The number of atoms present in a fcc unit cell is

Watch Video Solution

206. Explain the following terms with suitable examples:

Schottky defect.

Watch Video Solution

207. Explain the following terms with suitable examples:

Frenkel defect.

Watch Video Solution

208. What are the consequences of metal excess defects ?

Watch Video Solution

209. Explain the following terms

Compound

Watch Video Solution

210. The correct statement regarding defects in solids is

Watch Video Solution

211. What are F-centres ?

Watch Video Solution

212. From molecular view point, discuss the temperature dependence of susceptibility for diamagnetism, paramagnetism and ferromagnetism.

Watch Video Solution

213. Distinguish between conductor, insulator and semiconductor on the basis of their energy bands.

Watch Video Solution

214. Why Frenkel defect does not change the density of AgCl crystal ?

Watch Video Solution

215. Why does conductivity of a semiconductor increase with rise in temperature?

Watch Video Solution

216. Describe the two main types of semiconductors.

Watch Video Solution

217. Sodium crystallizes in i bcc unit cell. CalCulate the approximate no. of unit cells in 9.2 grams of sodium. (Atomic mass of Na = 23 u).

Watch Video Solution

218. What are metal deficiency defects ?

Watch Video Solution

219. Explain the metal excess defects due to extra cation in the interstitial sites

Watch Video Solution

220. What is crystal lattice or space lattice ? Give significance of lattice point.

Watch Video Solution

221. For a value of radius ratio between 0.732-1.0, what is the coordination number and geometry of the crystal.

Watch Video Solution

222. What is the difference between ferromagnetic and paramagnetic substances ?

Watch Video Solution

223. Tungsten crystallizes in a body centred cubic lattice. Calculate the number of unit cells in 1.5 g of tungsten. Atomic mass of tungsten = 184μ.

Watch Video Solution

224. A unit cell of sodium chloride has four atoms units per unit cell. The edge length of unit cell is 0.564 nm. Find out the density of sodium chloride.

Watch Video Solution

225. Write two main differences between Schottky and Frenkel defect.

Watch Video Solution

226. Number of atoms present per unit cell in NaCl

Watch Video Solution

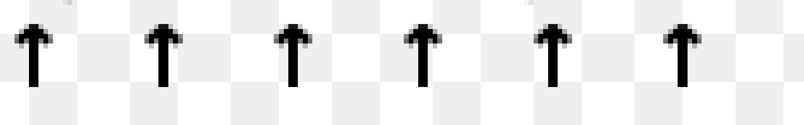
227. Calculate the density of NaCl if edge length of Nacl unit cell is 564 pm. $\left(Molar mass of NaCl = 58.5 g mol^{-1}\right)$

Watch Video Solution

228. What type of semiconductor is obtained when silicon is doped with boron?

Watch Video Solution

229. What type of magnetism is shown in the following alignment of magnetic moments?



Watch Video Solution

230. What type of point defect is produced when AgCl is doped with $CdCl_2$?

Watch Video Solution

231. Every substance has some magnetic properties associated with it. How will you account for the following magnetic properties?

Paramagnetic property.

Watch Video Solution

232. Every substance has some magnetic properties associated with it. How will you accound for the following magnetic properties?

Ferromagnetic property.

Watch Video Solution

233. Examine the given defective crystal

A^+	B^-	A^+	B^-	A^+
B^-	0	B^-	A^+	B^-
A^+	B^-	A^+	0	A^+
B^-	A^+	B^-	A^+	B^-

Answer the following questions:

What type of stoichiometric defect is shown by the crystal?

Watch Video Solution

234. Examine the given defective crystal

A^+	B^-	A^+	B^-	A^+
B^-	0	B^-	A^+	B^-
A^+	B^-	A^+	0	A^+
B^-	A^+	B^-	A^+	B^-

Answer the following questions:

What type of ionic substances show such defect?

Watch Video Solution

235. Explain the following terms with suitable examples :

F-centres (P.B.E.B. 2003)

Watch Video Solution

236. Explain the following

Doping.

Watch Video Solution

237. Give one difference between crystalline and amorphous solids.

Watch Video Solution

238. How can you distinguish between crystal lattice and unit cell.

Watch Video Solution

239. Why the Schottky defect and Frenkel defects are called as Thermodynamic or intrinsic defects ?

Watch Video Solution

240. Calculate the density of the copper crystals which crystallises in fcc structure arrangement with edge with length of $3.61 \times 10^{-8} cm$.

Watch Video Solution

241. Define centre of mass.

Watch Video Solution

242. Write down difference between ferromagnetism and antiferromagnetism.

Watch Video Solution

243. Write two differences between crystal lattice and unit cell.

Watch Video Solution

244. The number of atoms per unit cell in BCC is

Watch Video Solution

245. The number of atoms present in a fcc unit cell is

Watch Video Solution

246. Explain the electrical properties of solids?

Watch Video Solution

247. Amorphous solids

Watch Video Solution

248. Define radius ratio.

Watch Video Solution

249. Write two main differences between Schottky and Frenkel defect.

Watch Video Solution

250. Give one difference between crystalline and amorphous solids.

Watch Video Solution

251. Calculate tbe packing efficiency of a metal crystal for a simple cubic lattice.

Watch Video Solution

252. Which of the following is a molecular solid?

A. Diamond

B. Graphite

C. Ice

D. Quartz

Answer:

Watch Video Solution

253. Can cubc lattice have end centred unit cell?

Watch Video Solution

254. Presence of excess sodium makes NaCl crystal coloured. Explain on the basis of the crystal defects.

Watch Video Solution

255. How many atoms can be assigned to its unit cell if an element forms

a body centred cubic cell?

Watch Video Solution

256. How many atoms can be assigned to its unit cell if an element forms

face centred cubic cell?

Watch Video Solution

257. Give reason:

What is the difference between phosphorus doped and gallium doped silicon semiconductors?

Watch Video Solution

258. Which point defect lowers the density of crystal ?

Watch Video Solution

259. Some of the very old glass objects appear slightly milky instead of being transparent.

Watch Video Solution

260. Explain the following with suitable examples: Ferromagnetism

Watch Video Solution

261. Explain the following with suitable examples:

paramagnetism.

Watch Video Solution

262. Explain the following with suitable examples:

ferrimagnetism.

Watch Video Solution

263. How do you metallic and ionic substances differ in conducting

electricity?

Watch Video Solution

264. How can you determine the atomic mass of an unknown metal if you know its density and the dimensions of its unit cell ? Explain your answer.

Watch Video Solution

265. What is the effect of presence of Schottky defects on the density of the crystal?

Watch Video Solution

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

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

Silicon that has been dopend with group - 15 elements is called :

Watch Video Solution

267. Calculate tbe packing efficiency of a metal crystal for a simple cubic lattice.

Watch Video Solution

268. What type of point defect is produced when AgCl is doped with $CdCl_2$?

Watch Video Solution

269. What type of semiconductor is obtained when silicon is doped with boron?

Watch Video Solution

270. What type of non-stoichimetric point defect is responsible for the pink colour of LiCl?

Watch Video Solution

271. What type of stoichiometric defect is shown by ZnS?

Watch Video Solution

272. How will you distinguish between the following pairs of term ? Tetrahedral void and octahedral void.

Watch Video Solution

273. How will you distinguish between the following pair of terms: Crystal latttice and unit cell.

Watch Video Solution

274. Write the type of magnetism observed when the magnetic moments are oppositely aligned and cancel out each other?

Watch Video Solution

275. Which point defect does not lowers density of a crystal.

Watch Video Solution

276. Potassium iodide has cubic unit cell with cell edge of 705pm. The density of KI is $3.12gcm^{-3}$. How many K^{+} and I^{-} ions are contained in the unit cell?

Watch Video Solution

277. The unit of an element of atomic mass 96 and density $10.3 gcm^{-3}$ is a cube with edge length of 314 pm. Find the structure of the crystal lattice (simple cubic, FCC or BCC)

(Avagadro's constant, $N_0 = 6.023 \times 10^{23} mol^{-1}$).

Watch Video Solution

278. Rubidium (atomic mass 85.5) crystallizes in a body centred cubic lattice with density of $1.51 gcm^{-3}$. If the radius of rubidium atom is 248 pm, calculate Avagadro number.

Watch Video Solution

279. An elements crystallizes in a face centered cubic lattice and the edge of the unit cell is 0.559nm. The density is $3.19 g / cm^3$. What is the atomic mass?

Watch Video Solution

280. KCl and NaCl have fcc lattice. Calculate the ratio of density of NaCl to that of KCl if the ratio of the edge of NaCl to that of KCl is 0.875.

Watch Video Solution

281. Lithium metal has body centred cubic structure. Its density is $0.53gcm^{-3}$ and its molar mass is $6.94gmol^{-1}$. Calculate the volume of a unit cell of lithium metal.

Watch Video Solution

282. Iron has a body centred cubic unit cell with the cell dimension of 286.65 pm. Density of iron ·is 7.87 g cm^{-3} Use this information to

calculate Avogadro's number. (Atomic mass of Fe= 56.0 u)

Watch Video Solution

283. An element crystallizes in a structure having fcc unit cell of edge 300 pm. Calculate its density if 180 g of this element contain 3.708×10^{24} atoms.

Watch Video Solution

284. An element $(density 7.2 g cm^{-3})$ crystallizes in a body centred cubic structure having its unit cell edge length $2.88 \overset{\circ}{A}$. Calculate the number of atoms present in 156 g of the element.

Watch Video Solution

285. Silver crystallines in fcc lattice. If edge length of the cell is $4.077 \times 10^{-8} cm$ and density is $10.5 gcm^{-3}$. Calculate the atomic mass of silver.

Watch Video Solution

286. What is the distance between Na^{+} and Cl^{-} ions in NaCl crystal if the density is $2.165 gcm^{-3}$. $Molar mass of NaCl = 58.5 gmol^{-1}, (N_A = 6.02 \times 10^{23} mol^{-1})$.

Watch Video Solution

287. Iron has a body centred cubic unit cell with the cell dimension of 286.65 pm. Density of iron ·is 7.87 g cm^{-3} Use this information to calculate Avogadro's number. (Atomic mass of Fe= 56.0 u)

Watch Video Solution

288. Silver crystallises with face centred cubic unit cells. Each side of the unit cell has a length of 409 pm. What is the radius of an atom of silver ? (Assu!'le that each face atom is touching the four corner atoms)

Watch Video Solution

289. Tungsten crystallizes in a body centred cubic lattice. Calculate the number of unit cells in 1.5 g of tungsten. Atomic mass of tungsten = 184μ.

Watch Video Solution

290. The well known mineral fluorite is chemically clacium fluoride. Its is known that in one unit cell of this mineral there are 4 Ca^{2+}

ions and $8F^{-}$ ions and that of Ca^{2+} ions are arranged in a fcc lattice. The F^{-} ions fill all the tetrahedral holes in the face centred cubic lattice of Ca^{2+} ions. the edge of hte unit cell is $5.46 \times 10^{-8} cm$ in length. the density of the solid is $3.18 gcm^{-3}$. use this information to calculate the Avagadro's number. (Molar mass of $CaF_2 = 70.08 gmol^{-1}$).

Watch Video Solution

291. Copper crystallizes with face centred cubic unit cell. If the radius of copper atom is 127.8 pm, calculate the density of copper metal. (Atomic mass of Cu=63.55 u and Avagadro's number, $N_A = 6.02 \times 10^{23} mol^{-1}$).

Watch Video Solution

292. CsBr crystallizes in a body centred cubic latice. The unit cell length is 436.6 pm. Given that the atomic mass of Cs=133 and that of Br=80 amu and Avagadro number being $6.022 \times 10^{23} mol^{-1}$. The density of CsBr is

Watch Video Solution

293. Aluminium crystallises in a cubic close packed structure. Its metallic radius is 125 pm.

What is the length of the side of the unti cell ?

Watch Video Solution

294. An element with density 10 g cm^{-3} forms a cubic unit cell with edge length of 3×10^{-8} cm.What is the nature of the cubic unit cell if the atomic mass of the element is 81 g mol^{-1}

Watch Video Solution

295. An element crystallines in a f.c.c lattice with cell edge of 400 pm. The denstiy of the element is $7gcm^{-3}$. How many atoms are present in 280 g of the element?

Watch Video Solution

296. Raman and Rajan were studying the properties of solids. A solid 'X' showed same physical properties (thermal conductivity and refractive index) in all directions while another solid 'Y' showed differrent physical properties in different directions. Raman classified the solid 'X' as crystalline and solid 'Y' as amorphous. Rajan did not agree with Raman's classification. Answer the following questions

Whom do you favour, Raman or Rajan and why?

Watch Video Solution

Watch Video Solution

297. Raman and Rajan were studying the properties of solids. A solid 'X' showed same physical properties (thermal conductivity and refractive index) in all directions while another solid 'Y' showed differrent physical properties in different directions. Raman classified the solid 'X' as crystalline and solid 'Y' as amorphous. Rajan did not agree with Raman's classification. Answer the following questions

What is the natme of the property exhibited by solid 'X'?

Watch Video Solution

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

Watch Video Solution

299. Choose the correct options:

When silicon is doped with arsenic, n-type/ p-type semiconductor is produced.

Watch Video Solution

300. What type of semiconductor is obtained when silicon is doped with boron?

Watch Video Solution

301. Distinguish between n-type and p-type semiconductors.

Watch Video Solution

302. Diamond and Graphite are two allotropic forms of carbon. Both are covalent solids. These two froms have different structures and hence differ in physical properties. Both have their own importance in being used in everyday life. Diamond is popularly used in jewellery and graphite is extensively used as electrodes in many industrial processes. Answer the following questions

Which of the allotropes is a good conductor of electricity.

Watch Video Solution

303. Diamond and Graphite are two allotropic forms of carbon. Both are covalent solids. These two froms have different structures and hence differ in physical properties. Both have their own importance in being used in everyday life. Diamond is popularly used in jewellery and graphite is extensively used as electrodes in many industrial processes. Answer the following questions

How many atoms are there in a unit cell of diamond?

Watch Video Solution

304. Diamond and Graphite are two allotropic forms of carbon. Both are covalent solids. These two froms have different structures and hence differ in physical properties. Both have their own importance in being used in everyday life. Diamond is popularly used in jewellery and graphite is extensively used as electrodes in many industrial processes. Answer the following questions

Which of the allotropes is a good conductor of electricity.

Watch Video Solution

305. Rohit went to Jaipur with a school trip to visit some historical places. He and his friends observed that some old glass objects looked milky and windows pane of old buildings were looking slightly thicker at the bottom than at the top.

Answer the following questions

Is glass crystalline or amorphous?

Watch Video Solution

306. What is the difference between glass and quartz. While both are made up of SiO_4 tetrahedra.

Watch Video Solution

307. Rohit went to Jaipur with a school trip to visit some historical places. He and his friends observed that some old glass objects looked milky and windows pane of old buildings were looking slightly thicker at the bottom than at the top.

Answer the following questions

Under what conditions could quartz be converted into glass?

Watch Video Solution

308. Some of the very old glass objects appear slightly milky instead of being transparent.

Watch Video Solution

309. Rohit went to Jaipur with a school trip to visit some historical places. He and his friends observed that some old glass objects looked milky and windows pane of old buildings were looking slightly thicker at the bottom than at the top.

Answer the following questions

Under what conditions could quartz be converted into glass?

Watch Video Solution

310. The number of atoms in bcc arrangement is

A. 1,2

B. 2,4

C. 4,2

D. 2,1

Answer:

Watch Video Solution

311. An element with density 10 g cm^{-3} forms a cubic unit cell with edge length of 3×10^{-8} cm.What is the nature of the cubic unit cell if the atomic mass of the element is 81 g mol^{-1}

Watch Video Solution

312. If edge of a bcc crystal of an element is a cm, number, then density of the crystal is

A. $\frac{4M}{a^3 N_0}$

B. $\frac{2N}{Ma^3}$

C. $\frac{2M}{N_0 a^3}$

D. $\frac{Ma63}{2N_0}$

Answer:

Watch Video Solution

313. What is the radius of ratio $\left(\frac{r^+}{r^-}\right)$ for an ion to occupy: tetrahedral void.

A. 0.155-0.225

B. 0.225-0.414

C. 0.414-0.732

D. 0.732-1

Answer:

Watch Video Solution

314. A compound formed by two elements A and B crystallizers in the cubic structure. Atomic B are present at the corners of the cube and atoms A at the centre of opposite faces. What is the formula of the compound ?

A. AB_3

B. A_2B

C. AB_2

D. A_2B_2

Answer:

Watch Video Solution

315. STATEMENT -1 : In NaCl structure , Na^{+} ion occupy octahedral holes and Cl^{-} ions occupy ccp.

STATEMENT -2 : The distance of the nearest neighours in NaCl structure is $a/2$ where a

is the edge length of the cube .

A. 12

B. 6

C. 8

D. 4

Answer:

Watch Video Solution

316. What is the co-ordination number in hcp and ccp ?

A. 6,6

B. 12,6

C. 8,6

D. 12,12

Answer:

Watch Video Solution

317. Which of the following is not true

A. InSb

B. GaAs

C. CdSe

D. AlP

Answer:

Watch Video Solution

318. the Number of atoms per unit cell in fcc and bcc unit cells are 4 and 2 respectively explain.

Watch Video Solution

319. An element with molar mass 2.7×10^{-2} kg mol^{-1} forms a cubic unit cell with edge length 405 pm. If its density is 2.7×10^{3} kgm^{-3}, what is the nature of the cubic unit cell ?

A. body centred

B. primitive

C. edge centred

D. face centred

Answer:

Watch Video Solution

320. If the alignment of mangnetic moments in a substance is 'in-a compensatory way so as to give zero net magnetic moment, then the substance is said to be

A. ferromagnetism

B. anti ferrromagnetism

C. ferrimagnetism

D. diamagnetism

Answer:

Watch Video Solution

321. Calculate the mass of 2.5 mole of naphthalene.

Watch Video Solution

322. An alloy of copper silver and gold is found it have copper constituting the ccp lattice. If silver atoms occupy the edge cebtres and gold is present at body centre, the alloy will have the formula:

A. Cu_4, Ag_2, Au

B. Cu_4, Ag_4, Au

C. Cu_4, Ag_3, Au

D. $Cu, AgAu$

Answer:

Watch Video Solution

323. Fe_3O_4 is ferrimagnetic at room temperature but at 850K it becomes::

A. diamagnetic

B. ferromagnetic

C. non-magnetic

D. paramagnetic

Answer:

Watch Video Solution

324. An example of body centred cube is

A. sodium

B. magnesium

C. zinc

D. copper

Answer:

Watch Video Solution

325. The packing fraction for a body centred cube is

A. 0.42

B. 0.54

C. 0.68

D. 0.74

Answer:

Watch Video Solution

326. In the body centered cubic unit cell and simple unit cell, the radius of atoms in terms of edge length (a) of the unit cell is respectively:

A. $r = \frac{a}{\sqrt{2}}$

B. $r = \frac{a}{2}$

C. $r = \frac{a}{2}\sqrt{2}$

D. $r = \frac{\sqrt{3}a}{4}$

Answer:

Watch Video Solution

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

A. A_2BO_4

B. AB_2O_4

C. A_2B_4O

D. A_4B_2O

Answer:

Watch Video Solution

328. The most unsysmmetrical and symmeterical systems are, respectively:

A. tetragonal, cubic

B. triclinin, cubic

C. rhombhedral, hexagonal

D. orthorhombic, cubic

Answer:

Watch Video Solution

329. The unit cell with parameter $\alpha = \beta = \gamma = 90^\circ$ and $a = b \neq c$ is

A. cubic

B. triclinic

C. hexagonal

D. tetragonal

Answer:

Watch Video Solution

330. The number of atoms present in a hexagonal close-packed unit cell is:

A. 4

B. 6

C. 8

D. 12

Answer:

Watch Video Solution

331. In corrundum, oxide ions are arranged in hcp arrangement and the aluminium ions occupy 2/3 of the octahedral voids. What is the formula of corrudum?

A. $1/2$

B. $1/8$

C. $1/6$

D. $1/4$

Answer:

Watch Video Solution

332. A minetal of titanium is found to contain calcium ions at the corners, oxygen atoms at the face centres and titanium atoms at the centre of the cube. The oxidation state of titanium in the mineral is

A. 1

B. 3

C. 4

D. 2

Answer:

Watch Video Solution

333. The number of tetrahedral and octahedral holes in a hexagonal primitive unit cell are respectively:

A. 8,4

B. 6,12

C. 2,1

D. 12,6

Answer:

Watch Video Solution

334. In an atomic bcc lattie what fraction of edge is not covered by atoms?

A. 0.124

B. 0.134

C. 0.876

D. 0.5

Answer:

Watch Video Solution

335. A Metal crystallizes in fcc lattice and the edge of the unit cell is 620 pm. The radius of metal atom is

A. 285.5 pm

B. 310 pm

C. 219.2 pm

D. 438.6 pm

Answer:

Watch Video Solution

336. In which of the following structures, the anion has maximum coordination number?

A. NaCl

B. ZnS

C. CaF_2

D. Na_2O

Answer:

Watch Video Solution

337. In a face centered cubic arrangement of A and B atoms whose A atoms are at the corner of the unit cell and B atoms at the face centers. One of the B atoms missing from one of the face in unit cell. The simplest formula of compounding is:

A. P_2Q_3

B. P_4Q

C. P_4Q_5

D. PQ_4

Answer:

Watch Video Solution

338. In which of the following pair, both the crystals are not of the same type

A. Ice,solid CO_2

B. NaCl, BaO

C. SiC, diamond

D. Mg, Ar

Answer:

Watch Video Solution

339. Which of the following statements is not true about crystalline solids?

A. Polar molecular solids have higher enthapies of vaporisation than those of non polar molecular.

B. Graphite, though covalent solid is a good conductor of electricity

C. Ionic solids are conductors in molten state

D. Non-plar molecular solids have London forces between the consituents and have higher melting points than polar molecular solids.

Answer:

Watch Video Solution

340. What is the ratio by mass of Na and Cl in sodium chloride (NaCl) ?

Watch Video Solution

341. The crystal system of a compound with unit cell dimensions $\alpha = 0.387, b = 0.387$ and $c = 0.504$ nm and $\alpha = \beta = 90^\circ$ and $\gamma = 120^\circ$ is

A. cubic

B. hexagonal

C. orhorhombic

D. rhombohedral

Answer:

Watch Video Solution

342. If three elements P, Q and R crystalline in a cubic solid lattice with P atoms of the corners, Q atoms at the cube centres and R atoms at the centre of the edges, then write the formula of the compound.

A. ABC

B. ABC_2

C. ABC_3

D. ABC_4

Answer:

Watch Video Solution

343. An element crystallize in fcc lattice and edge length of unit cell is 400 pm. If density of unit cell is $11.2 gcm^{-3}$, then atmomic mass of the element is

A. 215.6

B. 431.2

C. 107.8

D. 98.6

Answer:

Watch Video Solution

344. How many orbitals are present in f subshell.

Watch Video Solution

345. An element (at mass 60) havind FCC structure has a density of $6.23 \mathrm{g\ cm}^{-3}$. What is the edge length of the unit cell ?

A. 300pm

B. 250pm

C. 400pm

D. 160pm

Answer:

Watch Video Solution

346. The number of atoms per unit cell in BCC is

A. 1

B. 4

C. 2

D. 3

Answer:

Watch Video Solution

347. Copper crystallizes with face centred cubic unit cell. If the radius of copper atom is 127.8 pm, calculate the density of copper metal. (Atomic mass of Cu=63.55 u and Avagadro's number, $N_A = 6.02 \times 10^{23} mol^{-1}$).

A. $10.71 gcm^{-3}$

B. $4.93 gcm^{-3}$

C. $8.9 gcm^{-3}$

D. $11.2 gcm^{-3}$

Answer:

Watch Video Solution

348. Ferrous oxide has a cubie structure and edge length of the uint cell is 5.0Å . Assuming the density o ferrous oxide to be $3.84g/cm^3$, the no. Of Fe^{2+} and O^{2-} ions present in each unit cell be : (use $N_A = 6 \times 10^{23}$):

A. 1

B. 2

C. 4

D. 6

Answer:

Watch Video Solution

349. In a face centred cubic unit cell what is the volume occupied?

A. 2

B. 4

C. 6

D. 8

Answer:

Watch Video Solution

350. The apperance of colour in solid alkeli metal halide is generally due to

A. Schottky defect

B. Frenkel defect

C. Interstitial position

D. F-centres

Answer:

Watch Video Solution

351. CsBr crystallizes in a body centred cubic latice. The unit cell length is 436.6 pm. Given that the atomic mass of Cs=133 and that of Br=80 amu and Avagadro number being $6.022 \times 10^{23} mol^{-1}$. The density of CsBr is

A. $0.425 gcm^{-3}$

B. $8.25 gcm^{-3}$

C. $4.25 gcm^{-3}$

D. $42.5 gcm^{-3}$

Answer:

Watch Video Solution

352. If NaCl is doped with 10^{-3} mol% of $SrCI_2$ what is the concentration of cation vacancies?

A. `6.02xx10^16mol^-1

B. $6.02 \times 10^{23} mol^{-1}$

C. $6.02 \times 10^{14} mol^{-1}$

D. $6.02 \times 10^{15} mol^{-1}$

Answer:

Watch Video Solution

353. The fraction of volume occupied by atoms in a primitive cubic unit cell is nearly:

A. $\frac{\pi}{3\sqrt{2}}$

B. $\frac{\pi}{4\sqrt{2}}$

C. $\frac{\pi}{4}$

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

Answer:

Watch Video Solution

354. If a is the length of the side of a cube, the distance between the body centred atom and one corner atom in the cube will be

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. $\frac{1}{2}a, \frac{\sqrt{3}}{2}a, \frac{\sqrt{2}}{2}a$

D. $1a, \sqrt{2}a, \sqrt{2}a$

Answer:

Watch Video Solution

355. Lithium forms body centred cubic structure. The length of the side is unit cell is 351 pm. Atomic radius of lithium will be

A. 151.8 pm

B. 75.5 pm

C. 300.5pm

D. 240.5pm

Answer:

Watch Video Solution

356. The number of octahedral sites per sphere in fcc structure is

A. 1

B. 3

C. 2

D. 4

Answer:

Watch Video Solution

357. A Metal crystallizes in fcc lattice and the edge of the unit cell is 620 pm. The radius of metal atom is

A. 288 pm

B. 408 pm

C. 144 pm

D. 204 pm

Answer:

Watch Video Solution

358. An element crystallize in fcc lattice and edge length of unit cell is 400 pm. If density of unit cell is $11.2 gcm^{-3}$, then atmomic mass of the element is

A. 215.6

B. 431.2

C. 107.8

D. 98.6

Answer:

Watch Video Solution

359. The number of atoms present in a fcc unit cell is

A. 6

B. 1

C. 4

D. 8

Answer:

Watch Video Solution

360. If a is the length of the side of a cube, the distance between the body centred 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. $\frac{\sqrt{3}}{2}a$

Answer:

Watch Video Solution

361. The vacant space in bcc lattice unit cell is

A. 0.23

B. 0.32

C. 0.26

D. 0.48

Answer:

Watch Video Solution

362. The correct statement regarding defects in crystslline solids is

A. Frenkel defect is a dislocation defect.

B. Frenkel defect is found in halides of alkaline earth metals

C. Schottky defects have no effect on the density of crystaline solids

D. Frenkel defects decrease the density of crystalline solids.

Answer:

Watch Video Solution

363. A given metal crystallines out with a cubic structure having edge lengh is 361 pm. If there are four metal atoms in one unit cell, what is the radius of one atom?

A. 80pm

B. 108 pm

C. 40 pm

D. 127 pm

Answer:

Watch Video Solution

364. Density of Li crystal is $0.53g/cm^3$. The edge length of Li unit - call is 3.5Å . Find out the number of Li atoms in a unit cell . $\left(N_A = 6.0 \times 10^{23}\text{mol}^{-1}, M = 6.94g\text{mol}^{-1}\right)$

A. 527 pm

B. 264 pm

C. 154 pm

D. 352 pm

Answer:

Watch Video Solution

365. The ionic radii of A^{+} and B^{-} are 1.7Å and 1.8Å respectively . Find the co-ordination number of A^{+}

Watch Video Solution

366. In calcium fluoride, having the fluorite structure, the coordination numbers for calcium ion and fluoride ion are

A. 4 and 2

B. 6 and 6

C. 8 and 4

D. 4 and 8

Answer:

Watch Video Solution

367. A crystalline solid has a cubic structure in which tungsten atoms are located at the cubic corners of the unit cell., oxygen atoms at the ege of te cube and sodium atom at the cube centre. The molecular formula of the compound is

A. Na_2WO_3

B. $NaWO_4$

C. $NaWO_3$

D. Na_2WO_4

Answer:

Watch Video Solution

368. If AgI crystallizes in zinc blende structure with I^- ions at lattice points, what fraction of tetrahedral voids is occupied by

Ag^+ ions?

A. 25%

B. 50%

C. 100%

D. 75%

Answer:

Watch Video Solution

369. Total number of tetrahedral and octahedral voids in 0.5 mol of a compound forming hcp structure are:

A. 6.022×10^{23}

B. 3.011×10^{23}

C. 0.033×10^{23}

D. 4.516×10^{23}

Answer:

Watch Video Solution

370. Which one of the following compound exhibits Schottky defect?

A. NaCl

B. AgCl

C. ZnS

D. AgI

Answer:

Watch Video Solution

371. A solid is formed by two elements P and Q. The element Q forms cubic close packing and atoms of P occupy two third of tetrahedral voids. The formula of the compound is

A. PQ_3

B. P_3Q

C. P_4Q_3

D. P_3Q_2

Answer:

Watch Video Solution

372. The mass percentage of iron present as Fe(III) in $Fe_{0.93}O_{1.0}$ is

A. `8.3%

B. 9.6%

C. 11.5%

D. 17.7 %

Answer:

Watch Video Solution

373. The fraction of volume occupied by atoms in a face centered cubic unit cell is:

A. $\frac{24}{3}\pi r^3$

B. $\frac{12}{3}\pi r^3$

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

D. $\frac{20}{3}\pi r^3$

Answer:

Watch Video Solution

374. In a compound atoms of element Y form ccp lattioce and those of element X occupy 2/3rd of tetrahedral voids. The formula of the compound will be

A. X_3Y_4

B. X_4Y_3

C. X_2Y_3

D. X_2Y

Answer:

Watch Video Solution

375. The edge length of the face centred cubic cell of an ionic substance is 508 pm. If the radius of the cation is 110 pm, the radius of the anion is

A. 618 pm

B. 144 pm

C. 288 pm

D. 398 pm

Answer:

Watch Video Solution

376. Percentage of free space in cubic close packed structure and in body centred packed structure are respectively

A. 32% and 48%

B. 48% and 26%

C. 32% and 26 %

D. 26% and 32%

Answer:

Watch Video Solution

377. In a face centred cubic lattice, atom A occupies the corner positions an atom B occupies the face centre postions. If one from atom of B is missing from one of the face centred points, the formula of the compound is

A. A_2B

B. AB_2

C. A_2B_3

D. A_2B_5

Answer:

Watch Video Solution

378. Copper crystallizes in fcc lattice with a unit cell edge of 361 pm. The radius of copper atom is

A. 108 pm

B. 128 pm

C. 157 pm

D. 181 pm

Answer:

Watch Video Solution

379. Lithium forms body centred cubic structure. The length of the side is unit cell is 351 pm. Atomic radius of lithium will be

A. 300 pm

B. 240 pm

C. 152 pm

D. 75 pm

Answer:

Watch Video Solution

380. Experimentally it was found that a metal oxide has formula $M_{0.98}O$. Metal M is present in M^{2+} and M^{3+} in its oxide. Fraction of the metal which exists as M^{3+} would be

A. 0.0508

B. 0.0701

C. 0.0408

D. 0.0605

Answer:

Watch Video Solution

381. CsCl crystallises in body centred cubic lattice. If 'a' is its edge length then which is the following expression is correct?

A. $r_{Cs^{+}} . r_{Cl^{-}} = \sqrt{3}a$

B. $r_{Cs^{+}} . r_{Cl^{-}} = 3a$

C. $r_{Cs^{+}} . r_{Cl^{-}} = \frac{3a}{2}$

D. $r_{Cs^{+}} . r_{Cl^{-}} = \frac{\sqrt{3}}{2}a$

Answer:

Watch Video Solution

382. Sodium metal crystallizes in a body centre cubic lattice with a unit cell edge $4.29\overset{\circ}{A}$. The radius of sodium atom is approximately

A. $5.72\overset{\circ}{A}$

B. $0.93\overset{\circ}{A}$

C. $1.86\overset{\circ}{A}$

D. $3.22\overset{\circ}{A}$

Answer:

Watch Video Solution

383. Which of the following compound is metallic and ferromagnetic?

A. TiO_2

B. CrO_2

C. VO_2

D. MnO_2

Answer:

Watch Video Solution

384. A ionic compound is expected to have tetrahedral structure if r_c / r_a:

A. 0.155 to 0.225

B. 0.732 to 1

C. 0.414 to 0.732

D. 0.225 to 0.414

Answer:

Watch Video Solution

385. A solid compound contains X,Y and Z atoms in a cubic lattice with X atom occupying the corners, Y atoms in the body centred postion 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:

Watch Video Solution

386. KCl cryatalline in the same type of lattice as does NaCl. Given that $\frac{r_{Na^+}}{r_{Cl^-}} = 0.55$ and $\frac{r_K^+}{r_{Cl^-}} = 0.74$, calculate the ratio of the side of the unit cell for KCl to that of NaCl.

A. 1.123

B. 0.8981

C. 1.414

D.

Answer:

Watch Video Solution

387. Number of unit cells in 4 g of X which crystallises in bcc pattern is $(N_A = Avagadro's law)$

A. $0.1N_A$

B. $2 \times 0.1 N_A$

C. $\frac{0.1}{2} N_A$

D. $2 \times N_A$

Answer:

Watch Video Solution

388. The white ZnO turns yeellow on heating because of

A. Frenkel defect

B. Metal ecesss defect

C. Metal deficiency defect

D. Schottky defect

Answer:

Watch Video Solution

389. CsCl has coordination number ratio

A. 0.25416666666667

B. 0.33888888888889

C. 0.16944444444444

D. none of these

Answer:

Watch Video Solution

390. Radius ratio of an ionic compound is 0.93. The structure of the above ionic compound is of

A. NaCl type

B. CsCl type

C. ZnS type

D. none of these

Answer:

Watch Video Solution

391. Coordination number of cations in rock salt structure of NaCl is

A. 4

B. 6

C. 8

D. 9

Answer:

Watch Video Solution

392. In face centre cubic lattice, a unit cell is shared equally by how many unit cell?

A. 4

B. 6

C. 2

D. 8

Answer:

Watch Video Solution

393. Potassium dichromate belongs to which crystal system?

A. tetragonal, cubic

B. Orthothombic

C. Triclinic

D. Hexagonal

Answer:

Watch Video Solution

394. Which of the following is used as a piezoelectric material?

A. silicons

B. Graphite

C. Silica gel

D. Kieselguhr

Answer: Quartz

Watch Video Solution

395. Suppose the mass of a singel Ag atom is 'm'. Ag metal crystallizes in fcc lattice with unt cell of length 'a'. The density of Ag metal in terms of 'a' and 'm' is

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

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

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

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

Answer:

Watch Video Solution

396. The unit cell with crystallographic dimenstions $a \neq b \neq c$, $\alpha = \gamma = 90^\circ$ and $\beta \neq 90^\circ$ is

A. monoclinic

B. tetragonal

C. triclinic

D. orthorhombic

Answer:

Watch Video Solution

397. Ionic solids with Schottky defects may contain in their structure

A. cation vacancies only

B. cation vacancies and interstitial cations

C. equal number of cation and anion vacancies

D. vacancies and interstitial anions

Answer:

Watch Video Solution

398. In a face centred cubic unit cell what is the volume occupied?

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

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

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

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

Answer:

Watch Video Solution

399. An element crystallising in body centred cubic lattice has an edge length of 500 pm. If its density is $4gcm^{-3}$, the atomic mass of the element is

A. 100

B. 250

C. 125

D. 150

Answer:

Watch Video Solution

400. The contribution of a particle at the edge centre of a particular unit cell is

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. 1

D. $\frac{1}{8}$

Answer:

Watch Video Solution

401. In a solid 'AB' having NaCl structure,'A' atoms occupy the corners of the cubic unit cell. If the face centred atoms along one of the axes are removed, then the resultant stiochiometry of the solid is:

A. AB_2

B. A_2B

C. A_4B_3

D. A_3B_4

Answer:

Watch Video Solution

402. In which of the following crystals alternate tetrahedral voids are occupied?

A. NaCl

B. ZnS

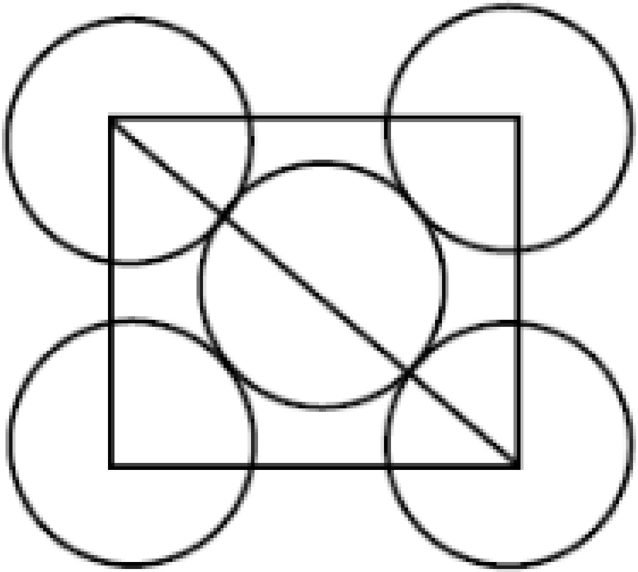
C. CaF_2

D. Na_2O

Answer:

Watch Video Solution

403. The packing efficiency of the two dimensional square unit cell shown is



A. 39.27%

B. 68.02%

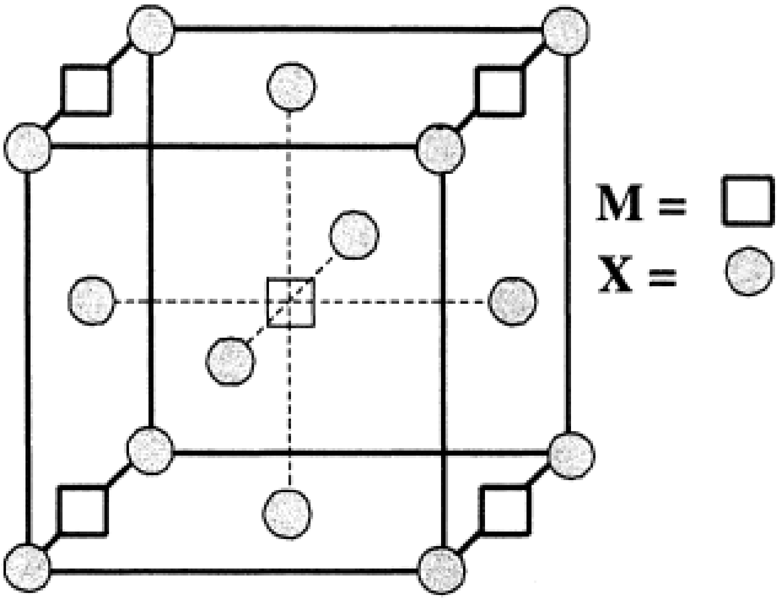
C. 74.05%

D. 78.54%

Answer:

Watch Video Solution

404. A compound M_pX_q has cubic close packing arrangement of X. its unit cell structure is shown below. The empirical formula of the compound is



A. MX

B. MX_2

C. M_2X

D. M_5X_{14}

Answer:

Watch Video Solution

405. If the unit cell of a mineral has cubic close packed array of oxygen atoms with m fraction of octahedral holes occupied by aluminium ions and n fraction of tetrahedral holes occupied by magnesium ions, m and n, respectively, are

A. $\frac{1}{2}, \frac{1}{8}$

B. $1, \frac{1}{4}$

C. $\frac{1}{2}, \frac{1}{2}$

D. $\frac{1}{4}, \frac{1}{8}$

Answer:

Watch Video Solution

406. Which of the following statement is not true about the hexagonl close packing?

A. It has 26% empty space

B. In this arangement third layer is identical to the first layer.

C. The coordinates number in this arrangement is 6.

D. It is a closely packed as body centred cubic packing.

Answer:

Watch Video Solution

407. Which of the following statements are correct?

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

B. A metal that crystallises in bcc structure has coordination number 12.

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

D. The length of the unit cell in NaCl is 552 pm

Answer:

Watch Video Solution

408. In which of the following structures, the coordination number of both the ions are same?

A. Cesium chloride

B. Sodium chloride

C. Zinc sulphate

D. Sodium oxide

Answer:

Watch Video Solution

409. Which of the following is not correct for Frenkel defect in crystals?

A. It is due to equal number of cations and anions missing from lattice sites.

B. It has no effect no density of the crytal

C. It occurs in crystals where the difference in the size of cations and anions is small.

D. Silver halides show Frenkel defect

Answer:

Watch Video Solution

410. The coordination number of eight for cation is found in

A. CsCl

B. NaCl

C. CaF_2

D. Na_2O

Answer:

Watch Video Solution

411. Which of the following system do not give correct descrptin of axial length and axial angles?

A. Hexagonal: $a = b \neq c, \alpha = \beta = 90^\circ, \gamma = 120^\circ$

B. Tetragonal: $a=b\neq c, \alpha=\beta=90^{\circ}, \gamma\neq 90^{\circ}$

C. Monoclinic: $a\neq b\neq c, \alpha=\beta=\gamma\neq 90^{\circ}$

D. Cubic: a=b=c, $\alpha=\beta=\gamma=90^{\circ}$

Answer:

Watch Video Solution

412. The correct statement regarding defects in solids is

A. Frenkel defect is usually favoured by an very small difference in the sizes of the cation and anion

B. Frenkel defect is a dislocation defect

C. Traping of an electron int e lattice leads to the formation of F-centre

D. Schottky defect have no effet on the physical properties of solids.

Answer:

Watch Video Solution

413. With respect to graphite and diamond, which of the statements given is correct?

A. Graphite is harder than diamond.

B. Graphite has higher electrical conductivity than diamond

C. Graphite has higher thermal conductivity that diamond.

D. Graphite has higher C-C bond order than diamond.

Answer:

Watch Video Solution

414. Which type of defects are present in AgBr and ZnS crystal systems?

A. Frenkel and Schottky

B. Schottky and Frenkel

C. Frenkel and Frenkel

D. Schottky and Schottky

Answer:

Watch Video Solution

415. The correct statement cubic close packed in three dimensional structure?

A. the number of the nearest neighbours of an atom present in the top most layer is 12.

B. the efficiecny of atom pakcing is 74%

C. the number of octahedral and tetrahedral voids per atom are 1, 2 respectively.

D. the unit cell length is $2\sqrt{2}$ times the radius of the atom.

Answer:

Watch Video Solution

416. Define the following term- Crop

Watch Video Solution

417. In the crystalline solids the smallest repeating part in the lattice is known as unit cell. The unit cells are described as simple (points at all corners), body centred (points at all the corners and it the centre), face centred (points at all the corners and centre of all faces), and end centred (points at all hte corners and centres of two opposite and faces) unit cells. In two common tyupes of packing ccp and hcp, 26% of space is left unoccupied in the form of interstitial sites. For the stable ionic crystalline structures, there is difinite radius ratio limit for a cation to fit perfectly in the lattice of anions, called radius ratio rule. This also defines the coordination number of an ion, which is the number of nearest neighbours of opposite charges. This depeds upon the ratio of radii of two types of ions, r_(+)//r_(-). This ratio for coordination numbers 3,4,6,and 8 is respectively 0.155 - 0.225, 0.225 - 0.414, 0.414 - 0.732 and 0.732 - 1 respectively.

The ionic radii of K^+ ,Rb^+ and Br^- are 137, 148 and 195 pm. The coordination number of cation in RbBr and KBr structures and respectively

A. 0.205 nm

B. 0.290 nm

C. 0.145 nm

D. 0.578 nm

Answer:

Watch Video Solution

418. In a cubic lattice of XYZ, X atoms are present at all corners except one corner whic is occupied by Y atoms. Z atoms are present at face centre. the formula of the compound is

A. X_8YZ_{24}

B. XYZ_3

C. $X_7Y_{24}Z$

D. X_7YZ_{24}

Answer:

Watch Video Solution

419. Can cubc lattice have end centred unit cell?

A. 8,6

B. 6,4

C. 6,8

D. 4,6

Answer:

Watch Video Solution

420. The number of atoms per unit cell in BCC is

A. $4:1$

B. $1:1$

C. $2:1$

D. $1:4$

Answer:

Watch Video Solution

421. Density of a unit cell is same as the density of the substance. If the density of the substance is known, number of atoms or dimensions of the unit cell can be calculated . The density of the unit cell is related to its mass(M), no. of atoms per unit cell (Z), edge length (a in cm) and Avogadro number N_A as :

$$\rho = \frac{Z \times M}{a^3 \times N_A}$$

The number of atoms present in hte 100 g of a bcc crystal $(density = 12.5 g cm^{-3})$ having cell edge 200 pm is

A. $2.40 g cm^{-3}$

B. $40 g cm^{-3}$

C. $4 g cm^{-3}$

D. $24 g cm^{-3}$

Answer:

Watch Video Solution

422. Density of a unit cell is same as the density of the substance. If the density of the substance is known, number of atoms or dimensions of the unit cell can be calculated . The density of the unit cell is related to its mass(M), no. of atoms per unit cell (Z), edge length (a in cm) and Avogadro number N_A as :

$$\rho = \frac{Z \times M}{a^3 \times N_A}$$

A metal X has a body centred cubic crystal strucute. the density of the metal s $4.2 gcm^{-3}$. The volume of unit cell is

A. 1×10^{25}

B. 1×10^{24}

C. 2×10^{24}

D. 2×10^{26}

Answer:

Watch Video Solution

423. Density of a unit cell is respresented as

$$\rho = \frac{\text{Effective no. of atoms (s)} \times \text{Mass of a unit cell}}{\text{Volume of a unit cell}} = \frac{Z.\,M}{N_A.\,a^3}$$

where , mass of unit cell =mass of effectuive no . of atoms(s) or ion (s).

M= At . mass// formula

N_A= Avogadro' s no . $\Rightarrow 6.0323 \times 10^{23}$

a= edge lemght of unit cell

Silver crystallizes in a fcc lattice and has a density of $10.6 g / cm^3$. What is the length of a edge of the unit cell ?

A. $8.2 \times 10^{-23} cm^3$

B. $4.75 \times 10^{-23} cm^3$

C. $3.86 \times 10^{23} cm^3$

D. $3.86 \times 10^{-23} cm^3$

Answer:

Watch Video Solution

424. In hexagonal system of crystals, a frequently encountered arrangement of atoms is described as a hexagonal prism. Here, the top and bottom of the cell are regular hexagons and three atoms are sandwiched in between them. A space -filling model of this structure, called hexagonal close-packed (HCP), is consituted of a sphere on a flat surface surrouneded in the same plane by six identical spheres as closely possible. Three sphere are then palces over the first layer so that they touch each other and represent second layer is covered with third layer that is identical to the bottom layer in relative position. Assume radius of enery sphere to be r.

The empty space in this hcp unit cell is

A. 4

B. 6

C. 12

D. 17

Answer:

Watch Video Solution

425. In hexagonal system of crystals, a frequently encountered arrangement of atoms is described as a hexagonal prism. Here, the top and bottom of the cell are regular hexagons and three atoms are sandwiched in between them. A space -filling model of this structure, called hexagonal close-packed (HCP), is consituted of a sphere on a flat surface surrouneded in the same plane by six identical spheres as closely possible. Three sphere are then palces over the first layer so that they touch each other and represent second layer is covered with third layer that is identical to the bottom layer in relative position. Assume radius of enery sphere to be r.

The empty space in this hcp unit cell is

A. $24\sqrt{2}r^3$

B. $16\sqrt{2}r^3$

C. $12\sqrt{2}r^3$

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

Answer:

Watch Video Solution

426. A compound forms hexagonal close packed structure. What is· the total number of voids in 0.5 mol of it? How many .of these are tetrahedral voids ?

A. 0.74

B. 0.476

C. 0.32

D. 0.26

Answer:

Watch Video Solution

427. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: In any time ionic solid with Schottky defects, the number of positive and negative ions are same.

Reason: Equal number of cation and anion vacancies are present.

Watch Video Solution

428. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: ZnS is a tetrahedral arrangement.

Reason:In ZnS, S^{2-} ions form cubic close packed structure.

Watch Video Solution

429. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a)

Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: In CsCl structure, the coordination number of Cs^+ ion is 8.

Reason: Cl^- ions in CsCl have body centred cubic arrangement.

Watch Video Solution

430. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: In ZnO the excess Zn^{2+} ions are present interstitial sites.

REason: Metal excess crystals have either missing cation or anin in intertitial site.

Watch Video Solution

431. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: FeO is non-stoichiometric with $Fe_{0.95}O$.

Reason: Some Fe^{2+} ions are replaced by Fe^{3+} as $3Fe^{2-} = 2Fe^{3+}$ to maintain electircal neutrally.

Watch Video Solution

432. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: In CaF_2, F^- ions occupy all the tetrahedral sites.

Reason: The number of Ca^{2+} is double the number of F^- ions.

Watch Video Solution

433. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: Size of cation is larger in tetrahedral voids than in octahedral void.

Reason: The cations occupy more space than anions in crystal close packing.

Watch Video Solution

434. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: In Frenkel defect no density of hte crytalline solid does not change.

Reason: In Frenkel defect no cation or anion leaves the crystal.

A. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.

B. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.

C. (c) Assertion is is CORRECT but reason is INCORRECT.

D. (d) The Assertion is INCORRECT but reason is CORRECT.

Answer:

Watch Video Solution

435. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: In Frenkel defect no density of hte crytalline solid does not change.

Reason: In Frenkel defect no cation or anion leaves the crystal.

Watch Video Solution

436. The questions given below consist of an assertion and the reason. Use the following key to choose the appropriate answer. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion. (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.(c) Assertion is is CORRECT but reason is INCORRECT. (d) If assertion is INCORRECT but reason is CORRECT. (e)If both assertion and reason are INCORRECT.

Assertion: Frenkel and Schottky defects are stoichiometric defects

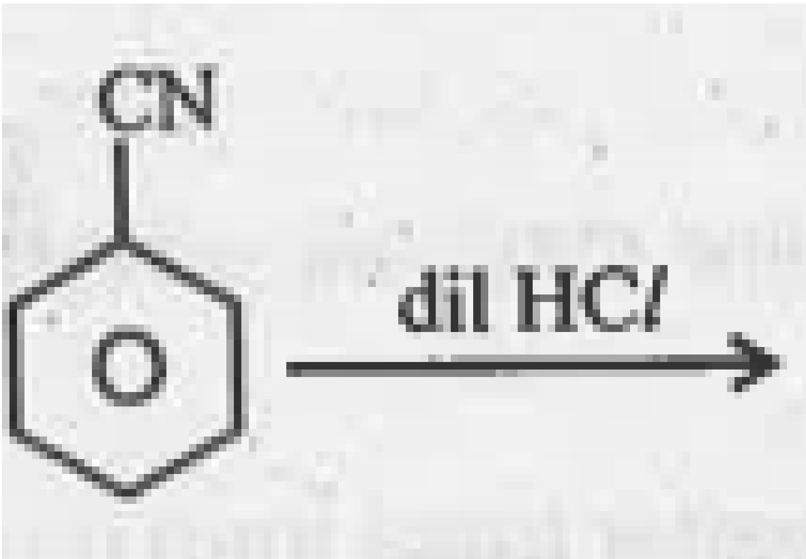
REason:Both defects change the density of the crystalline solid.

Watch Video Solution

437. Fill in the blanks- Paddy and maize crops are grown in the months from _____ to____.

Watch Video Solution

438. Complete the reaction



Watch Video Solution

439. Match the entries of column I with appropriate entries of column II.

Compound	Magnetic property
(A) NaCl	(p) Ferrimagnetic
(B) MnO	(q) Paramagnetic
(C) $CrCl_3$	(r) Ferromagnetic
(D) CrO_2	(s) Diamagnetic
(E) $MgFe_2O_4$	(t) Antiferromagnetic

	A	B	C	D	E
(a)	p	r	q	t	s
(b)	t	q	r	p	s
(c)	r	t	q	p	s
(d)	s	t	q	r	p
(e)	s	r	t	q	p

Watch Video Solution

440. Match the reactions given in Column I with the statements given in Column II.

Column I	Column II
(a) Ammonolysis	(i) Amine with lesser number of carbon atoms.
(b) Gabriel phthalimide synthesis	(ii) Detection test for primary amines.
(c) Hoffmann Bromamide reaction	(iii) Reaction of phthalimide with KOH and R—X.
(d) Carbylamine reaction	(iv) Reaction of alkylhalides with NH_3.

Watch Video Solution

441. Silver $(a \rightarrow micweight = 108 gmol^{-1})$ has a density of $10.5 gcm^{-3}$. The number of silver atoms on a surface of area $10^{-12} m^2$ can be expressed in scientific notation as $y \times 10^x$. The value of x is

A. 1) 3

B. 2) 5

C. 3) 7

D. 4) 9

Answer:

Watch Video Solution

442. In NaCl structure, Cl^{-} ions have ccp arrangement and Na^{+} ion occupy all the octahedral site. The total number of Na^{+} and Cl^{-} ions per unit cell is:

Watch Video Solution

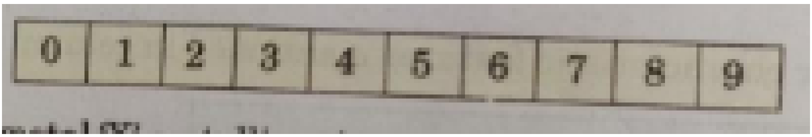
443. The radius ratio of an ionic solid $\frac{r_{+}}{r_{-}}$ ions is 0.524. The coordination number of this type of structure is

Watch Video Solution

444. Atoms of element B form hcp lattice and those of the element A occupy 2/3rd of tetrahedral voids. What is the formula of the compound formed by the elements A and B?

Watch Video Solution

445. A compound is formed by two elements X and Y. The element Y form ccp and atoms of X occupy 1/3 of tetrahedral voids. If the formula fo the compound is X_aY_b then value of a+b is



Watch Video Solution

446. 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

Answer:

Watch Video Solution

447. Which of the following is not a characterstics of a crystalline solid?

A. Definite and characterstics heat of fusion

B. Isotropic nature

C. A regular periodicaly repeated pattern of arrangement of consituent particles in the entire crystal.

D. a true solid.

Answer:

Watch Video Solution

448. Which of the following is an amorphous solid?

A. Graphite

B. Quartz glass

C. Chrome alum

D. Silicon carbide

Answer:

Watch Video Solution

449. Fill in the blanks- Paddy and maize crops are also known as_______.

Watch Video Solution

450. Which of the following is true about the value of refractive index of quartz glass?

A. Same in all direction

B. Different in different directions

C. Cannot be measured

D. Always zero

Answer:

Watch Video Solution

451. Define the term amorphous. Give a few examples of 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.

Answer:

Watch Video Solution

452. Why crystalline solids have a sharp melting point?

A. a regular arrangement of constituent particels is observed over a short distacne in the crystal lattice.

B. a regular arrangement of consituent particles observed over a long distacne in the crystal lattice.

C. same arrangement of consituent particles in different directions

D. different arrangement of consituent particles in different direction.

Answer:

Watch Video Solution

453. Iodine moelcules are held in the crystals lattice by

A. London forces

B. dipole dipole interactions

C. covalent bond

D. coulombic forces.

Answer:

Watch Video Solution

454. Which of the following is a network solid?

A. SO_2

B. I_2

C. Diamond

D. H_2O.

Answer:

Watch Video Solution

455. Which of the following solids is not an electrical conductor?

Mg(s)

TiO(s)

I_2(s)

$H_2O(s)$

A. A only

B. (B) only

C. (C) and (D)

D. (B),(C) and (D)

Answer:

Watch Video Solution

456. Which of the following is not the characterstics of ionic solids?

A. Very low value of electrical conductivity in he molten state

B. Brittle nature.

C. Very strong forces of interactions.

D. Anistropic nature.

Answer:

Watch Video Solution

457. Graphite is a good conductor of electricity because

A. lone pair of electrons

B. free valence electrons

C. cations

D. anions

Answer:

Watch Video Solution

458. Which of the following oxides behaves as conductor or insulator depending upon temperature?

A. TiO

B. SiO_2

C. TiO_3

D. MgO

Answer:

Watch Video Solution

459. Which of the following oxides shows electrical properties like metals?

A. SiO_2

B. MgO

C. SO_2

D. CrO_2

Answer:

Watch Video Solution

460. The lattice site in a pure crystal cannot be occupied by

A. molecule

B. ion

C. electron

D. atom

Answer:

Watch Video Solution

461. Graphite cannot be classified as

A. conducting solid

B. network solid

C. covalent bond

D. ionic solid

Answer:

Watch Video Solution

462. Cations are present in the interstitial sites in which defect?

Watch Video Solution

463. Schottky defect is observed in crystal when

Watch Video Solution

464. Which of the following is true about the charge acquired by p type semiconductors?

A. positive

B. negative

C. neutral

D. depends on concentration of p impurity.

Answer:

Watch Video Solution

465. To get a n-type semicondcutor from silicon, it should be doped with a substance with valence

A. 2

B. 5

C. 3

D. 4

Answer:

Watch Video Solution

466. The total number of tetrahedral voids in the face centred unit cell is

A. 6

B. 8

C. 10

D. 12

Answer:

Watch Video Solution

467. Which of the following is not correct for Frenkel defect in crystals?

A. (A) and (B)

B. (C) and (D)

C. (A) and (C)

D. (B) and (D)

Answer:

Watch Video Solution

468. The percentage of empty space in a body centre cubic arrangement is

A. 74

B. 68

C. 32

D. 26

Answer:

Watch Video Solution

469. In which part most efficiency packing is present?

A. hcp and bcc

B. hcp and ccp

C. bcc and ccp

D. bcc and simple cubic cell

Answer:

Watch Video Solution

470. Which of the following statement is not true

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 experiment spheres of the fourth layer are exactly aligned with those of the first layer.

Answer:

Watch Video Solution

471. In which of the following structureds coordination number for cations and anions are in the packed structure will be same?

A. Cl^{-} ions form fcc lattice and Na^{+} ions occupy all octahedral voids of the unit cell.

B. Ca^{2+} ions from fcc lattice and F^{-} ions occupy all the eight tetrahderal voids of the unit cell.

C. O^{2-} ions from fcc lattice and Na^{+} ions occupy all the eight tetrahedral voids of the unit cell

D. S^{2-} ions from fcc lattice and Zn^{2+} ions go to alternate tetrahedral voids of the unit cell.

Answer:

Watch Video Solution

Watch Video Solution

472. What is the coordination number in a square close packed structure in two dimensions?

A. 2

B. 3

C. 4

D. 6

Answer:

Watch Video Solution

473. Which kind of defects are introduced by doping?

A. Discolation defect

B. Schottky defect

C. Frenkel defects

D. Electronic defects

Answer:

Watch Video Solution

474. Silicon doped with electron rich impurity forms

A. p-type semiconductor

B. n-type semiconductor

C. intrinsic semiconductor

D. insulator

Answer:

Watch Video Solution

475. 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 domain in antiferromagnetic substance are oppositiely orriednted with respect to each other.

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

Answer:

Watch Video Solution

476. Which of the following is not true about the ionic solids?

A. Bigger ions from the close packed structure.

B. Smaller ions occupy either the tetrahedral or the octahedral voids depending opon their size.

C. Occupation of all the voids is not necessary

D. voids occupy depends upon the radii of the ions occupying the void.

Answer:

Watch Video Solution

477. 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 magnetice 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.

Answer:

Watch Video Solution

478. The correct order of the paking efficiency in different types of unit cell is

A. fcc< bcc< simple cubic

B. fcc < bcc > simple cubic

C. bcc < fcc > simple cubic

D. bcc < fcc > simple cubic

Answer:

Watch Video Solution

479. Which of the following defects is also known as dislocation defect?

A. Frenkel defect

B. Schottky defect

C. Non-stochiometric defect

D. Simple interstitial defect

Answer:

Watch Video Solution

480. 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 the width is shared by four adjacent unit cells

D. 8 tetrahedral voids within the unit cells.

Answer:

Watch Video Solution

481. The edge lengths of the unit cells in terms of the radius of spheres consituting fcc, bcc and cubic unit cell are respectively.

A. $2\sqrt{2}r, \frac{4r}{\sqrt{3}}, 2r$

B. $\frac{4r}{\sqrt{3}}, 2\sqrt{2}r, 2r$

C. $2r, 2\sqrt{2}r, \frac{4r}{\sqrt{3}}$

D. $2r, \frac{4r}{\sqrt{3}}, 2\sqrt{2}$

Answer:

Watch Video Solution

482. Name three common fruits that are known as Rabi harvests?

Watch Video Solution

483. Which of the following is not true about the voids formed in three dimensional hexagonal close packed structure?

A. A tetrahedral void is formed when a sphere of the second layer is present above triangular void in the first layer.

B. All the triangular voids are not covered by the spheres of the second layer.

C. tetrahedral voids are formed when the triangular voids in the second layer lie above the triangular voids in the first layer and the triangular shapes of thes voids do not overlap.

D. Octahedral voids are fomed when the triangular voids in the second layer exactly overlap with similar voids in the first layer.

Answer:

Watch Video Solution

484. The value of magnetic moment is zero in the case of antiferromagnetic substances because the domains.

A. get oriented int eh direction of the applied magnetic field.

B. get oriented opposite the direction of the apled magnetic field.

C. are oppositely oriented with respect to each other without the application of magnetic field

D. cancel out each other magnetic moment.

Answer:

Watch Video Solution

485. Which of the following statements are not true?

A. Vacancy defect resulsts in a decrease in the density of the substance

B. Interstitaial defects results in an increase in the density of the substance

C. Impurity defect has no effect on the density of the substance.

D. Frankel defect results in an incraase in the density of the substances.

Answer:

Watch Video Solution

486. Which of the following statements are true about metals?

A. Valanece bond overlaps with conduction band

B. The gap between valence band and conduction band is negligible

C. The gap between valence band and conduction band cannot be determined.

D. Valence band may remain partialy filled.

Answer:

Watch Video Solution

487. Under the influence of electric field, which of the following statements is true about the movement of electrons and holes in a p type semiconductor?

A. Electron will move towards the positively charged plate .

B. Holes will appear to be moving towards the negatively charged plate.

C. Both electrons and holes appear to move towards the positively charged plate

D. Movement of electrons is not related to the movement of holes.

Answer:

Watch Video Solution

488. Which of the following statements are true about semiconductors?

A. silicon doped with electron rich impurity is a p type semiconductor.

B. Silicon doped with an electron rich impurity is an n-type semiconductor

C. Delocalised electrons increase the ends the conductivity of doped silicon

D. an electron vacancy increases the conductivity of silicon n-type semiconductor.

Answer:

Watch Video Solution

489. An excess of potassium ions makes KCl crystals appear violet or lilac in colour since

A. some of the anionic sites are occupied by an unpaired electrons

B. some of the anionic sites are occupied by a pair of electrons

C. there are vacancies at some anionic sites.

D. F-centres are created which impart colour the crystals.

Answer:

Watch Video Solution

490. The total number of tetrahedral voids in the face centred unit cell is

A. 4

B. 8

C. twice the number of octahedral voids

D. four times the number of octahedral voids.

Answer:

Watch Video Solution

491. Amorphous solid can use also be called

A. pseudo solids

B. true solids

C. super cooled solids

D. super cooled liquids

Answer:

Watch Video Solution

492. Which of the following statements are correct?

A. Ferrimagnetic substance lose ferrimagnetims heating and become paramagnetics.

B. Ferrimagnetic substance do not lose ferrimagnetism on heating and remain ferrimagnetic.

C. Antiferromagnetic substances have domain structure similar to ferromagnetic substances and their magnetic moment are not cancelled by each other.

D. In ferromagnetism substances all the domin get orientd in the direction of magnetic field and remain as such even after removing magnetic field.

Answer:

Watch Video Solution

493. Which of the following features are not shown by quartz glass?

A. This is a crystalline solid.

B. Refractive index is same in all the directions

C. This is also called super cooled liquid.

D. None of these.

Answer:

Watch Video Solution

494. Which of the following cannot be regarded as molecular solid?

A. SiC

B. AIN

C. Diamond

D. I_2

Answer:

Watch Video Solution

495. Which of the following shall form an octahedral complex?

A. hcp

B. bcc

C. simple cube

D. fcc

Answer:

Watch Video Solution

496. Frenkel defect is also known as..........

A. stoichiometric defect

B. dislocation defet

C. impurity defect

D. non-stoichometric defect

Answer:

Watch Video Solution

497. Which of the following defects decrease the density?

A. Interstitial defect

B. Vacancy defect

C. Frenkel defect

D. Schottky defect

Answer:

Watch Video Solution

498. Match the type of packing given in column I with the items given in column II.

Column I	Column II
(a) Square close packing in two dimensions.	(i) Triangular voids.
(b) Hexagonalclose packing in two dimensions.	(ii) Pattern of spheres is repeated in every fourth layer.
(c) Hexagonal close packing in three dimensions.	(iii) Coordination number 4.
(d) Cubic close packing in three dimensions.	(iv) Pattern of sphere is repeated in alternate layers.

Watch Video Solution

499. Match the type of packing given in column I with the items given in column II.

Column I	Column II
(a) Square close packing in two dimensions.	(i) Triangular voids.
(b) Hexagonalclose packing in two dimensions.	(ii) Pattern of spheres is repeated in every fourth layer.
(c) Hexagonal close packing in three dimensions.	(iii) Coordination number 4.
(d) Cubic close packing in three dimensions.	(iv) Pattern of sphere is repeated in alternate layers.

Watch Video Solution

500. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. Assertion: The total number of atoms present in a simple cubic unit cell is one.

Reason: Simple cubic unit cell has atoms in its corners each of which is shared between eight adjacent unit cells.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion

B. Assertion and reason both are correct statements and reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer:

Watch Video Solution

501. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

Assertion and reason both are correct statements and reason is correct explanation for assertion

Assertion and reason both are correct statements but reason is not correct explanation for assertion.

Assertion is correct statement but reason is wrong statement.

Assertion is wrong statement but reason is correct statement.

Assertion: Graphite is a good conductor of electricity however diamond belongs to the category of insulators.

Reason: Graphite is soft in nature on the other hand diamond is very hard and brittle.

Watch Video Solution

502. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

Assertion and reason both are correct statements and reason is correct explanation for assertion

Assertion and reason both are correct statements but reason is not correct explanation for assertion.

Assertion is correct statement but reason is wrong statement.

Assertion is wrong statement but reason is correct statement.

Assertion:Total numbr of octahedral voids present in unit cell of cubic close packing including the one that of present at the body centre is four

Reason: Besides the body centre there is one octahedral void present a the centre of each of the six faces of the unit cell and each of the which is shared between two adjacent unit cells.

Watch Video Solution

503. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

Assertion and reason both are correct statements and reason is correct explanation for assertion

Assertion and reason both are correct statements but reason is not correct explanation for assertion.

Assertion is correct statement but reason is wrong statement.

Assertion is wrong statement but reason is correct statement.

Assertion: Graphite is a good conductor of electricity however diamond belongs to the category of insulators.

Reason: Graphite is soft in nature on the other hand diamond is very hard and brittle.

Watch Video Solution

504. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

Assertion and reason both are correct statements and reason is correct explanation for assertion

Assertion and reason both are correct statements but reason is not correct explanation for assertion.

Assertion is correct statement but reason is wrong statement.

Assertion is wrong statement but reason is correct statement.

Assertion: Semiconductors are solids with condcutivity in the intermediate range from $10^{-6} - 10^4 ohm^{-1} m^{-1}$.

Reason: Intermediate conductivity in semiconductors is due to partially filled valence bond.

Watch Video Solution

505. What is the maximum coordination number of an atom in a hcp crystal structure of an element?

Watch Video Solution

506. Both diamond and rhombic sulphur are covalent solids but the latter has very low melting point than the former. Explain why?

Watch Video Solution

507. Why is Frenkel defect not found in pure alkali metal halides ?

Watch Video Solution

508. A Group 14 element is to be converted into n-type semiconductor by doping it with a suitable impurity. To which group should this impurity belong ?

Watch Video Solution

509. How do the structures of quartz and qurtz glass differ from each other.

Watch Video Solution

510. Calculate the packing efficiency for body centred cubic arrangement.

Watch Video Solution

511. Analysis of a metal oxide shown shows its empirical formula $M_{0.96}O_{1.0}$. Calculate the percentage of M^{2+} and M^{3+} ions in the crsytal.)`

Watch Video Solution

512. What are Schottky and Frenkel defects? How does density of a solid get affected by these defects?

Watch Video Solution

513. What is the difference between anti-ferromagnetic and ferromagnetic substance? What is the cause of the difference?

Watch Video Solution

514. Ferric oxide crystallizes in a hexagonal close pakced array of oxide ions with two out of every three octahedral holes occupied by ferric ions. Derive the formula of the ferric oxide.

Watch Video Solution

515. An element has a body-centred cubic (bbc) structure with a cell edge of 288 pm. The density of the element is $7.2\frac{g}{c}m^3$. How many atoms are present in 208 g of the element?

Watch Video Solution

516. Some of the very old glass objects appear slightly milky instead of being transparent.

Watch Video Solution

517. Why does zinc oxide exhibit enhanced electrical conductivity on heating?

Watch Video Solution

518. $CaCl_2$ will introduce Schottky defect when added to AgCl crystal. Explain.

Watch Video Solution

519. Explain the following terms with suitable example:

Ferrimagnetism.

Watch Video Solution

520. Explain the following terms with suitable example:

Intrinsic conducton of solids.

Watch Video Solution

521. Explain the following with suitable examples: Ferromagnetism

Watch Video Solution

522. Niobium crystallizes in a body centred cubic structure. If density is 8.55 gcm^{-3}, calculate atomic radius of niobium, given that its atomic mass is 92.9μ.

Watch Video Solution

523. Chromium metal crystallises in body centred cubic lattice. The length of the unit cell edge is found to be 287 pm. Calculate the atomic radius. What would be the density of chromium in gcm^{-3}.

Watch Video Solution

524. If the radius of octahedral void is r and the radius of the atoms in the close packing is R, derive relatioship between r and R.

Watch Video Solution

525. What is a semiconductor? Describe the two main types of semiconductors and contrast conductions mechanism in them.

Watch Video Solution