# ©゙" doubtnut 

India's Number 1 Education App

## CHEMISTRY

## BOOKS - CHETANA PUBLICATION

## SOLID STATE

Example

1. What are the three most common states of matter?
2. What are the properties of solids? Or mention the caracterstics of solids

## - Watch Video Solution

## 3. How does solid state differe from the other

 two states?4. Is solids, the constitutent particles may be

## - Watch Video Solution

5. What are solids characterzed by?

- Watch Video Solution

6. Name the properties of crystalling solids
that you observed in this activiy.
7. Name the two types of solids.

- Watch Video Solution

8. Give exmples of crystalline Solid.

## D Watch Video Solution

9. Define Crystalline solid.
10. Explain crystalline solids.

D Watch Video Solution
11. Define Amorphous solid.

- Watch Video Solution

12. Write a note on Amorphous solids.
13. Distingusih between crystalline and amorphous solids.

## D Watch Video Solution

14. What are Isomophouxs substances?

## - Watch Video Solution

15. What is a polymorphous substance?

## - Watch Video Solution

16. Explain the term Isomorphism.

- Watch Video Solution

17. Write a note on Polymorphism.

- Watch Video Solution

18. Define Anisotrophy.

## - Watch Video Solution

19. Write a short note on Anisotropy.

- Watch Video Solution

20. Name the following: Two pairs of
isomorphous substances.

D Watch Video Solution
21. Name the following: Polymorphs of $\mathrm{CaCO}_{3}$ and Silica.

## D Watch Video Solution

22. Name the following: Polymorphic forms of

Carbon.
(D) Watch Video Solution
23. True or False: Silica shows allotropy.

## - Watch Video Solution

24. Define: Isotrophy.

- Watch Video Solution

25. Distinguish between the characteristic of
ionic, covalent network, molecular and metallic solid.
26. Distinguish between ionic solids and moecular solids.

## - Watch Video Solution

27. Write the types of the particles in each of
the four main classes of crystalline solids.

- Watch Video Solution

28. A crystalline solid is hard brittle and nonconducting in solid state. It conducts electricity when molten. What type of solid is it?

## - Watch Video Solution

29. What is the hybridization of carbon atom in graphite and diamond?
30. Write a note on ionic solids.

## D Watch Video Solution

31. Mention the characteristics of ionic solids.

D Watch Video Solution
32. Write note on covalent network crystals.

## 33. What is a hydrogen bond?

## D Watch Video Solution

34. Graphite is a covalent solid yet soft and good conductor of electricity. Explain.

## D Watch Video Solution

35. What are the structures of diamond and graphite?
36. What are the types of covalent bonds those link carbon atoms in Diamond and Graphite?

## D Watch Video Solution

37. Are all the valence electrons of cabon atoms in graphite localized to specific covalent bonds?
38. What are molecular crystals?

D Watch Video Solution
39. Write note on the various intermolecular forces of attraction in molecular solids.

- Watch Video Solution

40. Mention charactersitics of molecular solids.

D Watch Video Solution
41. Why are molecular crystals soft?

## - Watch Video Solution

42. What are metallic crystals? Explain.
43. Give reason: $\mathrm{H}_{2} \mathrm{O}$ is a liquid while $\mathrm{H}_{2} \mathrm{~S}$ is a gas at room temperature.

## D Watch Video Solution

44. Classify the following crystalline solids into
different types: Ammonium phosphate, Brass,
$S_{8}$ molecule, Diamond.

D Watch Video Solution
45. Classify the following molecular solids into different types. $\mathrm{HCI}, \mathrm{CO}_{2}$, Solid ice, $\mathrm{SO}_{2}$.

## - Watch Video Solution

46. Define the following terms: Littice.

- Watch Video Solution

47. Define the following terms: Basis.
48. Define the following terms: Crystal.

## ( Watch Video Solution

49. Diagammatically represent formation of crystal.
50. Draw the unit cell parameters and explain the symbols involved in it.

D Watch Video Solution
51. What is a unit cell?

## D Watch Video Solution

52. Give the parameters of a unit cell.
53. Write is a unit cell and give its parameters?

D Watch Video Solution
54. What is a unit cell and give its parameters?

## D Watch Video Solution

55. Write a note on types of unit cell.
56. By mathematical anylsis, how many space latties/Bravis Lattices are possible?

D Watch Video Solution
57. Distinguish between crystal lattice unit call.

## D Watch Video Solution

58. What are the different types of crystal
system.

- Watch Video Solution

59. What is a cubic system?

## - Watch Video Solution

60. Classifty and discribe types of cubic unit cells.

## - Watch Video Solution

61. Calculate number of atoms in : SSC

## - Watch Video Solution

62. Calculate number of atoms in : BCC

## - Watch Video Solution

63. Calculate number of atoms in : FCC

## - Watch Video Solution

64. A face centred cube consists of how many atoms? Explain.

## D Watch Video Solution

65. Calculate the number of atoms in FCC

- Watch Video Solution

66. Dervie a relationship between molar, mass,
density of subtances and unit cell edge length
for any substance.

## D Watch Video Solution

67. Obtain a relationship between density of a subtances and edge length of unit cell.

## D Watch Video Solution

68. Write the expression of Molar mass $M$ of a body centered cubic crystal of an ionic compound if it has edge length of 'a' meter and density $\mathrm{p} \mathrm{kg} \mathrm{m}-3$.

## D Watch Video Solution

69. State the meaning of each of the parameters in the equation $\mathrm{p}=\frac{n M}{a^{3} N_{A}}$,

## - Watch Video Solution

70. Define co-ordination number.
( Watch Video Solution
71. Write a note on co-ordination number.

## D Watch Video Solution

72. explain close packing in one dimension.

- Watch Video Solution


## 73. Explain linear packing in one direction.

## - Watch Video Solution

74. Explain the following types of 2
dimensional arrangements. AAAA/Square closed packing.

## - Watch Video Solution

75. Explain the following types of 2
dimensional arrangements. ABAB/Hexagonal closed packing.

## - Watch Video Solution

76. Explain packing in simple cubic unit cell crystal.

- Watch Video Solution

77. Expalin square does packing in three dimension.

D Watch Video Solution
78. Expalin $A B A B$ type arrangement in three dimensions.

D Watch Video Solution
79. Explain hexagonal close packing in three dimensions.

- Watch Video Solution

80. Explain $A B C A B C$ type of three dimensional arrangement.
81. Explain cubic close pakcing in three dimension.

D Watch Video Solution
82. Write a note on tetrahedral void.
(D) Watch Video Solution
83. Explain tetrahedral void.

## 84. Sketch a tetrahedral void.

D Watch Video Solution
85. Distiguish between hexagonal close packing and cubic pakcing.

## D Watch Video Solution

86. Write note on Octahedral void.

## - Watch Video Solution

87. Explain Octahedral void.

- Watch Video Solution

88. Draw a diagram of an octahedral void.

- Watch Video Solution

89. What is the ration octahedral voids to the number of atoms in hexagonal close packed structure?

## D Watch Video Solution

90. How are tetrahedral and octahedral voids
formed?

D Watch Video Solution

# 91. Distinuish between Tetrahedral and 

 Octahedral void.
## D Watch Video Solution

92. How are spheres arranged in first layer of
cubic close-packed structures? How are
successive layers of spheres placed above this
layers?

D Watch Video Solution

# 93. Mention two properties that are common 

 both hcp and ccp lattices.
## - Watch Video Solution

94. What is the numbe rof octachedral vocids per sphere for an fcc/ccp arrangement?

## D Watch Video Solution

95. What is the number of octahedral voids per sphere in hcp arrangement?

D Watch Video Solution
96. What is the number of terahedral voids per sphere in fcc/ccp arrangement?
97. What is the number of terahedral voids per sphere in hcp arrangement?

D Watch Video Solution
98. Mention the co-ordination number of $s c, f c c$ and hcp structures.
99. In a crystla of zinc sulphid,zinc occupies
tetrahedral voids. What is the co-ordination
number of zinc?

## D Watch Video Solution

100. How many octahedral voids are there in 1
mole of a compound having cubic closed packed structure?
101. Write the formulae of packing effeiciency and packing fraction.

## D Watch Video Solution

102. Write the steps involved to calculate the percentage of efficiency of packing of simple cubic crystal Or packing efficiency for simple cubic unit cell? Or Calculate the paking efficiency of metal crystal that has simple cubic structure?
103. Write the steps involved in the calculation of packing Efficiency for bcc unit call.

## D Watch Video Solution

104. Write the steps involved in the calculation
of packing Efficiency for face centered cubic lattice.

# 105. Which of the three lattices scc, bcc, fcc has 

most efficient and least efficent packing of particles?

## - Watch Video Solution

106. Which of the three types of packing used
by metals makes-the most efficient used of space and which makes the least efficient use?

## - Watch Video Solution

107. Derive a relation to find: number of particles.

## D Watch Video Solution

108. Derive a relation to find: Number of unit cells in x g metal.

## - Watch Video Solution

109. What are the number of unit cells in
volume $V$ of metal?

- Watch Video Solution

110. What are crystal defects?

## - Watch Video Solution

111. What are point defects?

- Watch Video Solution

112. What happens to the defects if the crystallization takes place at a slower rate?

D Watch Video Solution
113. At what temperature ideal crystals with no imperfection are possible?

## - Watch Video Solution

114. Write a note on defects in crystal lattice.

## - Watch Video Solution

115. Name the major classes of point defects?

- Watch Video Solution

116. What is a stoichiometric defect in crystals?

D Watch Video Solution
117. Distingusih between stoichiometric defects and non stoichiometic defects.

## D Watch Video Solution

118. Write a note on vacany defect with diagram.
(D) Watch Video Solution
119. Write a note on the two types of self interstitial defect in an element solid.

D Watch Video Solution
120. Explain the term Schottky defect.

## D Watch Video Solution

121. Describe Schottky defects in crystals.
122. What are the conditions required of Schottky defect?

## D Watch Video Solution

123. What are the consequences of schottky defect?

D Watch Video Solution
124. Mention examples of Schottky defect.

## - Watch Video Solution

125. How would you account for the effect of

Schottky defect on the density of the ionic solid?

D Watch Video Solution
126. Write a note on Frenkel Defect.

## - Watch Video Solution

127. What are the conditions and consequence of Frenkel Defect.

## - Watch Video Solution

128. Write examples of ionic solids with frenkel

Defect.
129. Name the type of point defect that occurs in a crystal of zinc sulphide?

## D Watch Video Solution

130. Why Frankel defect is found in AgCl ?

## D Watch Video Solution

131. Why is Frankel defect is not found in pure alkali metal halide?
132. Name the ionic compound which shows both Schottky and Frenkel defect?

## - Watch Video Solution

133. Distinguish between Schottky defect and

Frankel defect.
134. When do impurity defects airse.

## D Watch Video Solution

135. Write a note on substituational impurity defect.

- Watch Video Solution

136. Write a note on "Vacancy through aliovalent impurity" type of substitutional
impurity defect using example of NaCl and $\mathrm{SrCI} \mathrm{I}_{2}$.

D Watch Video Solution
137. Write a note on interstitial impurity defect with example.

## D Watch Video Solution

138. Explain impurity defect in stainless steel
with diagram.
139. Write a note on non-stoichiometric defects.

- Watch Video Solution

140. Write a note on metal deficieny defect with an example and its diagram.

D Watch Video Solution

## 141. Explain a note on metal excess defect?

## - Watch Video Solution

142. Explain F-centers with an example.

D Watch Video Solution
143. Complete the following and rewrite: NaCl

F= center prossesses___colour.

D Watch Video Solution
144. Complete the following and rewrite: $F$ centers are caused by

## D Watch Video Solution

145. Complete the following and rewrite: Metal deficiency defect is a type of defect.

## D Watch Video Solution

146. Complete the following and rewrite: The present of paried cation-anion vacancy leads to _________type of defect.

## - Watch Video Solution

147. Complete the following and rewrite: Stainless steal shows _______type of defect.

- Watch Video Solution

148. Complete the following and rewrite: defect occur with large difference in size of cation and anions.

## D Watch Video Solution

149. Complete the following and rewrite: defect occurs with very samll difference in sizes of cation and anion.
150. What is F-centre?

## - Watch Video Solution

151. Name the non-stoichiometric points defect resposible for colour in alkali metla halides.

D Watch Video Solution
152. When ZnO is heated it turns yellow and returns back to original white colour on cooling. What could be the reason?

## - Watch Video Solution

153. What is electical conductivity?

- Watch Video Solution

154. What is meant by the elctrical Insulators and Semi conductors?

## D Watch Video Solution

155. Distinuish between conductors, Insulators and Semi conductors.

## 156. Difference between 1. Conductors and

 Insulators 2. Conductors and Semiconductors.D Watch Video Solution
157. Explain band theory

D Watch Video Solution
158. Write a note on band theory.
159. What is a band gap?

- Watch Video Solution

160. What is a forbidden zone?

## D Watch Video Solution

161. What are the valece band and conduction
band?

## - Watch Video Solution

162. Explain electrical property of: metallic conductors.

## - Watch Video Solution

163. Explain electrical property of: Insulators.

- Watch Video Solution

164. Explain electrical property of:

Semiconductors, on the basis of band theory.

## D Watch Video Solution

165. On the basis of Band theory, give reasons:

Metals are good conductors of electricity.
( Watch Video Solution
166. On the basis of Band theory, give reasons:

Insulators have extremely low conductivity.

D Watch Video Solution
167. On the basis of Band theory, give reasons:

Semi conductors show some conductivity.

## D Watch Video Solution

168. The picture represents bands of $\mathrm{MO} s$ for

Si. Label Valence band, Conduction band and Band gap.

## - Watch Video Solution

169. How does electical conductivity of a metal chandge with temperature?

## D Watch Video Solution

170. Explain variation of conductivity of $a$ semiconductor with temperature.

## D Watch Video Solution

171. How does the conductivity of $a$ semiconductor change with temperature?

Why?

- Watch Video Solution

172. Define: Intrinsic semiconductors.

## D Watch Video Solution

173. Define: Extrinsic semiconductors.

D Watch Video Solution
174. Write a note on doping.

## 175. What is doping?

## D Watch Video Solution

176. What is a dopant?

## D Watch Video Solution

177. How many molecular orbitals are formed by interaction of two atomic orbitals?
178. Let a small quantity of phosphorus be doped into pure silicon. Will the resulting material contain same no. of total electrons as original pure silicon?

D Watch Video Solution
179. What is metallic bond?

## 180. What are n-type semiconductors?

## - Watch Video Solution

181. Why is the conductivity of doped n-type semicodnuctor highter than that of pure semicodnuctor? Explain with diagram.

## - Watch Video Solution

182. Explain doping of Silicon with Phosphorus.
183. Expalin n-type semiconductor with an example.

## D Watch Video Solution

184. Write examples of n-type semiconductor.
( Watch Video Solution
185. Write anote on p-type semiconductor usign an example.

- Watch Video Solution

186. Write an example of p-type semiconductor.
(D) Watch Video Solution

# 187. Classify the following semiconductors into 

 n-type of p-typ: B doped with Si
## D Watch Video Solution

188. Classify the following semiconductors into
n-type or p-type: As doped with Si

D Watch Video Solution
189. Classify the following semiconductors into n-type of p-typ: $P$ doped with Si

## D Watch Video Solution

190. Classify the following semiconductors into n-type of p-typ: Ge doped with In

## D Watch Video Solution

191. A group 14 elements is to be converted
into n-type semiconductor by doping it with a
suitable impurity. To which group should the impurity belong?

## - Watch Video Solution

192. Explain the origin of magnetic properties in solids.
193. What are diamagnetic substances? Give examples.

## - Watch Video Solution

194. What are paramegnetic substances? Give examples.

## - Watch Video Solution

# 195. What are ferromagnetic substances? Give 

 examples.D Watch Video Solution
196. What are ferromagnetic substances?

## D Watch Video Solution

197. Define ferromagnetism materials. Explain
why iron is a strong ferromagnet.

## - Watch Video Solution

198. Atoms $C$ and $D$ form fcc crystalline structure. Atom $C$ is present at the corners of the cube and $D$ is at faces of the cube. What is the formula of the compound?

## D Watch Video Solution

199. A element $A$ and $B$ constitue bcc type crystalline structure. Element A occupies body
centered position and $B$ is at the corners of
cube. What is the formula of the compound?

What are the co-ordination numbers of $A$ and B?

## - Watch Video Solution

200. In a crystalline compound atoms $A B, A$ occupies CCP latties while B occupies all of tetrahedral voids. What is the formula of the

## compound?

- Watch Video Solution

201. A compound is formed CCP and atoms of
$A$ and $B$. The elemetn B formed CCP and atoms of A occupy $1 / 3$ rd of octahedral voids. What is the formula of compound.

## D Watch Video Solution

202. Sikver crystallizes in fcc structure with edge length of unit cell, $4.07 \times 10^{-8} \mathrm{~cm}$ and if density of metallic silver is $10.5 \mathrm{gcm}^{-3}$.

Calculate the molecular mass of silver.

## - Watch Video Solution

203. Determine the density of cesium chloride which crystallizes in a bcc type structure with the edge length 412.1 pm . The atomic masses of Cs and Cl are 133 and 35.5 respectively.

## - Watch Video Solution

204. Unit call of iron crystal has edge length of

288 pm and density of $7.86 \mathrm{~g} \mathrm{~cm}_{3}$, Determine
the type of crystla lattice.

## - Watch Video Solution

205. Calculate the numbe rof atoms present in

2 grams of crystal which his face centred cubic
lattice having edge length of 100 pm and density 10 g cm 3

- Watch Video Solution

206. Copper crystallizes into a fcc structure and the unit cell has length of edge $3.16 \times 10^{-4} \mathrm{~cm}$. Calculate the dentsity of copper if the molar mass of Cu is $63.5 \mathrm{~g} \mathrm{~mol}^{-1}$

## D Watch Video Solution

207. Niobium is found to crystalline with bcc
structure and found to have denstiy of
$8.55 \mathrm{gcm}^{-3}$. Determine the atomic redius if niobium of its atmic mass is 93 u .
208. Gold occurs as face centred cube and has
a density of 19.30 kg dm . Calculate atomic redius of gold.

## - Watch Video Solution

209. In a crystalline compound, atoms C occupy CCP lattices while atoms D occupy 2/3rd tetrahedral voids, what is the formula of compound?

## - Watch Video Solution

210. A metallic element exists as a cubic lattice.

Each edge of the unit cell is 2.88 A . The density of the metal is $7.20 \frac{g}{c} m^{3}$. How many unit cells will be there in 100 g of the metal?

## - Watch Video Solution

211. Face centred cubic crystal lattice of copper has density of $8.966 \mathrm{~g} \mathrm{~cm}^{-3}$. Calculate the
volume of the unit cell.

## - Watch Video Solution

212. An atom crystallises in fcc crystal lattice and has a density of $10 \mathrm{~g} \mathrm{~cm}{ }^{-3}$ with unit cell edge length of 100 pm . Calculate number of atoms present in 1 g of crystal.

## - Watch Video Solution

213. Zinc sulphide crystallises with zinc ions occupying half of the tetarhedral holes in a Iclosest packed array of sulphide ions. What is the formula of zinc sulphide?

## - Watch Video Solution

214. Cu crystallizes in fac cell with edge lenght of 495 pm . Calculate its radius.
215. The density of iridium is $22.4 \frac{g}{c} m^{3}$. The unit cell of iridium is fcc. Calculate its radium given molar mass is $192.2 \mathrm{~g} / \mathrm{mol}$.

## - Watch Video Solution

216. Calculate the number of unit cells in 1.00
$\mathrm{cm}^{3}$ of Al given edge length of 353.6 pm and
fcc structure.

- Watch Video Solution

217. In an ionic crystalline solid atoms of element Y, form hcp lattice. The atoms of element $X$ occupy one third of tetrahedral voids. What is the formula of the compound?

## D Watch Video Solution

218. An element with molar mass $27 / \mathrm{mol}$ forms
cubic unit cell with edge length 405 pm. If density is given $2.7 \frac{g}{c} m^{3}$ find the type of cubic unit cell it forms. We try to find the no. of atoms in each unit cell.

## Watch Video Solution

219. An element has bcc studture with unit cell edge length of 288 pm. How many unit cells and no. of atoms are present in $200 \mathrm{~cm}^{3}$ of element?

## - Watch Video Solution

220. A metal crystallizes in two forms FCC and BCC each with edge lengths 3.5 A and 3.0 A respectively. Find ration of their densities. Nite
in both cases the molar of the element does not change.

## D Watch Video Solution

221. Density of silver is $10.8 \frac{g}{c} m^{3}$ with molar mass $107.8 \mathrm{~g} / \mathrm{mol}$ and edge length
$4.05 \times 10^{-8} \mathrm{~cm}$. Find the no of silver a toms in each unit cell.
222. CsCl crystallizes in cubic unit with $C I^{-}$ at corners and $C s^{+}$at the centre of the cube.

How many CsCl molecules are these in each unit cell?

## - Watch Video Solution

223. The unit cell of metallic Silver is FCC. If
radius of Ag atom is 144.4 pm , calculate (a) edge length of unit cell volume of Ag atom,
the percentage of the volume of a unit cell,
that is occupied by Ag atoms, the present of empty space.

## D Watch Video Solution

224. A compound forms hcp structure. What is
the number of octahedral voids, tetrahedral
voids and total voids formed in 0.4 mol of it.

D Watch Video Solution
225. The density of iron is $8.54\left(g\left(\mathrm{~cm}^{-3}\right)\right)$.

Edge length is 2.8 no and atomic mass
$56(g(\mathrm{~mol}))^{-1}$. Find on of atoms in unit cell.

## D Watch Video Solution

## Exercise

1. A compound having bcc geometry has
atomic mass 50. Calculate the density of the
unit cell, if its edge length is 290 p.m.

## Watch Video Solution

2. An element has a body centred cubic structure with a cell edge of 288 pm . The density of element is $7.2 \mathrm{~g} \mathrm{~cm}-3$. How many atoms are present in 208 g of this element?

## - Watch Video Solution

3. X-ray diffraction studies show that copper crystallizes in an fcc unit cell edge of $3.608 \times 10^{-8} \mathrm{~cm}$. In a separate experiment,
copper is determined to have a density $8.92 \mathrm{gcm}^{-3}$. Calculate the atomic mass of copper.

## D Watch Video Solution

4. 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

5. Atoms of element B form hcp lattice and
those of the element A occupy $\frac{2}{3^{r d}}$ of tetrahedral voids. What is the formula of the compoound formed by the elements A and B ?

## - Watch Video Solution

6. Gold occurs as face centred cube and has a density of 19.30 kg dm . Calculate atomic redius of gold.

## 7. What is the ration of packing effciency in fcc

 and bcc crystals of the metal?
## - Watch Video Solution

8. Sodium metal crystalizes in bcc structure with the edge length of unit cell $4.29 \times 10^{-8}$ cm . Calculate the radius of sodium atom.

## D Watch Video Solution

9. Niobium forms bcc structure. The density of niobium is $8.55 \mathrm{gcm}^{-3}$ and length of unit edge is 330.6 pm. How many atoms and unit cells are present in 0.5 g of niobium?

## D Watch Video Solution

10. Molecular solids are
A. crystalline solids
B. amorphous solids
C. ionic solids
D. metallic solids

## Answer:

## - Watch Video Solution

11. Which of the following is not correct?
A. Four spheres are involved in the
formation of tetrahedral void
B. The centres ofspheres in octahedral
voids are at the apices of a regular tetrahedron
C. If the number of atoms is N the number of octahedral voids is 2 N
D. If the number of atoms is $N / 2$, the number of tetrahedral voids is N .

## Answer:

# 12. Is solids, the constitutent particles may be 

A. atoms
B. ions
C. molecules
D. any one of the above three

Answer:
( Watch Video Solution
13. A single substance that exists in two or more forms is called.
A. polymorphous
B. amorphous
C. isomorphous

## D. monomorphous

## Answer:

D Watch Video Solution

## 14. Graphite is a

A. metallic crystal
B. covalent crystal
C. ionic crystal

D. molecular srystal

## Answer:

(D) Watch Video Solution
15. Diamond is a
A. metallic crystal
B. convalent crystal
C. ionic crystal
D. molecular crystal

## Answer:

D Watch Video Solution
16. The ratio of close packed atoms to tetrahedral holes in cubic pakcing is

## A. 0.042361111111111

B. 0.043055555555556
C. 0.084027777777778
D. 0.04375

## Answer:

## D Watch Video Solution

17. The ratio of closed packed atoms to octahedral holes in hexagonal close packign is

## A. 0.042361111111111

B. 0.043055555555556
C. 0.084027777777778
D. 0.04375

## Answer:

D Watch Video Solution
18. The number of tetrahedral sites per sphere in cpp structure is
A. 1
B. 2
C. 3
D. 4

Answer:

- Watch Video Solution

19. The number of tetrahedral sites per sphere in cpp structure is
A. 1
B. 2
C. 3
D. 4

Answer:

## D Watch Video Solution

20. The packing efficiency for a body centred
cubic Structure is
A. 0.42
B. 0.53
C. 0.68
D. 0.82

Answer:

- Watch Video Solution

21. Due to Frenkel defect the density of ionic solid
A. increases
B. decreases
C. remains same
D. fluctuates

Answer:

D Watch Video Solution
22. An ionic compound $A_{x} B_{y}$ occurs in fcc type crystal strucutre with $B$ ion at the cnetre
of each face and $A$ ion occupying conrners of
the cube. Give the formula $A_{x} B_{y}$.
A. $A B_{3}$
B. $A B_{4}$
C. $A_{3} B$
D. $A_{4} B$

Answer:
( Watch Video Solution

## 23. \% packing efficiency of FCC crystal is ?

A. 0.68
B. 0.52
C. 0.75
D. 0.81

Answer:
24. In crystalline solid few of the cations moved from their positions into the interstitial position. The defect is called as
A. interstitial defect
B. Frenkel defect
C. Schottky defect
D. line defect

## Answer:

D Watch Video Solution
25. Semicoductors are manufactured by addition of impurities of
A. p-block elements
B. actinoids
C. lanthanoids
D. s-block elements

Answer:

D Watch Video Solution
26. p-type semi conductor is formed when trace amount of impurity is added to silicon.

The number of valence electrons in the impurity atom must be
A. 3
B. 5
C. 1
D. 2

Answer:

- Watch Video Solution


# 27. n-type semiconductor is formed when trace 

 amount of impurity is added to silicon. The number of electrons in the impurity atom must beA. 3
B. 5
C. 1
D. 2

## 28. Which is covalent network solid?

A. $\mathrm{Fe}_{2} \mathrm{O}_{3}$
B. $N F_{3}$
C. Graphite

## D. All of the three

## Answer:

29. Which one of the following is a good conductor of electricity?
A. posphours
B. graphite
C. chlorine
D. silicon

Answer:

D Watch Video Solution
30. Which of the following defect, if presetn, lowers the density of the crystla?
A. Frenkel
B. Schottky
C. edge dislocation
D. constitution of centres

Answer:

- Watch Video Solution

31. How many kinds of space lattices are possible in a crystal?
A. 23
B. 7
C. 30
D. 14

Answer:

D Watch Video Solution
32. Which has minimum present volume occupied by the sphere?
A. Simple cubic
B. Body-centred cubic
C. Hexagonal closest packed
D. Cubic closest packed

## Answer:

D Watch Video Solution
33. In hcp structure, the packing fraction is
A. 0.74
B. 0.84
C. 0.94
D. 0.64

Answer:
34. Which of the followign best defines a crystal?
A. a coloured substance soluble in water
B. A clear substance which can transmit light
C. A simple lattice containing ions, atoms or molecules
D. A salt which has been grown from a
saturated solution

## Answer:

## - Watch Video Solution

## 35. Calculate number of atoms in : SSC

A. 1
B. 2
C. 3
D. 4

# 36. Calculate number of atoms in : FCC 

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

Answer:

## 37. Calculate number of atoms in : BCC

A. 1
B. 2
C. 3
D. 4

Answer:

## D Watch Video Solution

38. Sodium chlorid crystal consists of:
A. NaCl molecules
B. Na and Cl atoms
C. $\mathrm{Na}^{+}$and $C I^{-}$molecules
D. $N a^{+}$and $C I^{-}$ions

Answer:
(D) Watch Video Solution
39. In a face-centred cubic arrangement of metal, the co-ordination number of metal is
A. 12
B. 4
C. 6
D. 8

Answer:
(D) Watch Video Solution
40. The co-ordination number of hexagonal closest packed structure is
A. 6
B. 8
C. 10
D. 12

Answer:

D Watch Video Solution
41. The atomic radius for a face-centred cubic cell of lattice parameter 'a'.radius is
A. $\frac{\sqrt{2}}{4} a$
B. $\frac{\sqrt{3}}{4} \mathrm{a}$
C. $\frac{a}{2}$
D. $\frac{\sqrt{8}}{a}$

## Answer:

## - Watch Video Solution

42. The number of atoms per unit cell is 2 , the arrangement is
A. octahedral
B. fcc
C. bcc
D. none

## Answer:

D Watch Video Solution
43. The name given to the $A B A B A B A B$... type of arrangement is
A. cubic close-packed arrangement
B. hexagonal close-pecked arrangement
C. tetrahedral arrangement
D. octahedral arrangment

## Answer:

(D) Watch Video Solution
44. The atomic radius for a face-centred cubic cell of lattice parameter 'a'.radius is
A. $\sqrt{8} r$
B. $\frac{\sqrt{3}}{4} r$
C. $\frac{1}{2 \sqrt{2} r}$
D. $\frac{4 r}{\sqrt{3}}$

## Answer:

- Watch Video Solution

45. Explain packing in simple cubic unit cell crystal.
A. 0.6
B. 0.52
C. 0.74
D. 0.92

Answer:

D Watch Video Solution
46. Density of a crystal is given by
A. $\frac{a^{3} \times M}{z \times N_{A}}$
B. $\frac{N_{A} \times M}{z \times a^{3}}$
C. $\frac{z \times M}{a^{3} \times N_{A}}$
D. $\frac{a^{3} \times N_{A}}{z \times M}$

## Answer:

- Watch Video Solution

47. The crystals exhibit following number of arrangements for their atoms.
A. 4 arrangments
B. 7 arrangements
C. 10 arrangements
D. 14 arrangements

## Answer:

D Watch Video Solution
48. The total number of Bravias lattice for a cubic system is
A. 4
B. 3
C. 2
D. 1

Answer:

- Watch Video Solution

49. The correct relation between angles of the edge of a crystal belonging to a cubic system is
A. $a=b=c$
B. $a \neq b=c$
C. $a=b \neq c$
D. $a \neq b \neq c$

Answer:

D Watch Video Solution
50. The packing fraction in a face-centred cubic cell of crystals is
A. $\frac{\sqrt{3}}{8} \pi$
B. $\frac{\pi}{6} \pi$
C. $\frac{\sqrt{2}}{6} \pi$
D. $\frac{1}{2 \sqrt{2}} \pi$

Answer:
( Watch Video Solution
51. The correct relation between angles of the edge of a crystal belonging to a cubic system is
A. $a=\beta=\gamma=90^{\circ}$
B. $a=\beta=\gamma \neq 90^{\circ}$
C. $a=\beta=90^{\circ}, \gamma \neq 90^{\circ}$
D. $a \neq \beta \neq \gamma \neq 90^{\circ}$

## Answer:

52. The number of atoms per unit cell in a simple cubic, face-centred cubic and bodycentred cubic are, respectively.
A. 1,4,2
B. 1,2,4,
C. $8,14,9$
D. $8,4,2$

Answer:

D Watch Video Solution
53. The name given to the $A B A B A B A B$... type of arrangement is
A. cubic close-packed arrangement
B. hexagonal close-packed arrangement
C. tetrahedral arrangement
D. octahedral arrangment

## Answer:

(D) Watch Video Solution
54. Which one is not the property of crystalline solid?
A. isotropic
B. sharp melting point
C. high intermolecular force
D. a definite and regular geometry

## Answer:

D Watch Video Solution
55. The number of octahedral and tetrahedral
holes respectivley present in a hexagonal close packed crystal of ' $X$ ' atoms are
A. $\times, 2 \times$
B. $\times, \times$
C. $2 \times, \times$
D. $2 \times, 2 \times$

## Answer:

D Watch Video Solution
56. Which is used as dopant for p-type semiconductros?
A. Si
B. $P$
C. B
D. As

Answer:

D Watch Video Solution
57. We can study crystals by
A. X-ray diffraction
B. Optical activity
C. Both
D. None

Answer:

D Watch Video Solution
58. Diamond is a
A. metallic crystal
B. covalent crystal
C. ionic crystal
D. molecular crystal

## Answer:

D Watch Video Solution
59. The number of atoms in a face centred cubic unit cell is
A. 4
B. 16
C. 8
D. 12

Answer:

- Watch Video Solution

60. Explain the term Schottky defect.
61. Attempt the following: Give characterstics of solid state.

## D Watch Video Solution

62. Attempt the following: What is polymorphism?
63. Calculate the numbe rof atoms present in 2 grams of crystal which his face centred cubic lattice having edge length of 100 pm and density 10 gcm 3

## (D) Watch Video Solution

64. X-ray diffraction studies show that copper crystallizes in an fcc unit cell edge of $3.608 \times 10^{-8} \mathrm{~cm}$. In a separate experiment, copper is determined to have a density
$8.92 \mathrm{gcm}^{-3}$. Calculate the atomic mass of copper.

D Watch Video Solution
65. Gold occurs as face centred cube and has a density of 19.30 kg dm . Calculate atomic redius of gold.

- Watch Video Solution

66. Sodium metal crystalizes in bcc structure with the edge length of unit cell $4.29 \times 10^{-8}$ cm . Calculate the radius of sodium atom.

## D Watch Video Solution

67. Niobium is found to crystalline with bcc structure and found to have denstiy of $8.55 \mathrm{gcm}^{-3}$. Determine the atomic redius if niobium of its atmic mass is 93 u .
68. The density of iridium is $22.4 \frac{g}{c} m^{3}$. The unit cell of iridium is fcc. Calculate its radium given molar mass is $192.2 \mathrm{~g} / \mathrm{mol}$.

## D Watch Video Solution

69. Calculate the number of unit cells in 1.00
$\mathrm{cm}^{3}$ of Al given edge length of 353.6 pm and fcc structure.
70. A compound forms hcp structure. What is
the number of octahedral voids, tetrahedral voids and total voids formed in 0.4 mol of it.

## D Watch Video Solution

71. An atom crystallises in fcc crystal lattice and has a density of $10 \mathrm{~g} \mathrm{~cm}^{-3}$ with unit cell edge length of 100 pm . Calculate number of atoms present in 1 g of crystal.
72. An atom crystallises in fcc crystal lattice and has a density of $10 \mathrm{~g} \mathrm{~cm}{ }^{-3}$ with unit cell edge length of 100 pm . Calculate number of atoms present in 1 g of crystal.

- Watch Video Solution

