

India's Number 1 Education App

## **CHEMISTRY**

# **BOOKS - CHETANA PUBLICATION**

# SOLID STATE



1. What are the three most common states of

matter?







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

two states?

4. Is solids, the constitutent particles may be



7. Name the two types of solids.



9. Define Crystalline solid.

10. Explain crystalline solids.



**11.** Define Amorphous solid.

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12. Write a note on Amorphous solids.

**13.** Distingusih between crystalline and amorphous solids.



#### **14.** What are Isomophouxs substances?



**15.** What is a polymorphous substance?



**18.** Define Anisotrophy.



**21.** Name the following: Polymorphs of  $CaCO_3$ 

and Silica.

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22. Name the following: Polymorphic forms of

Carbon.



23. True or False: Silica shows allotropy.



25. Distinguish between the characteristic of

ionic, covalent network, molecular and metallic

solid.



26. Distinguish between ionic solids and

moecular solids.



27. Write the types of the particles in each of

the four main classes of crystalline solids.

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

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29. What is the hybridization of carbon atom

in graphite and diamond?

**30.** Write a note on ionic solids.



**33.** What is a hydrogen bond?



**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?

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**37.** Are all the valence electrons of cabon atoms in graphite localized to specific covalent bonds?

**38.** What are molecular crystals?

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39. Write note on the various intermolecular

forces of attraction in molecular solids.



**42.** What are metallic crystals? Explain.

**43.** Give reason:  $H_2O$  is a liquid while  $H_2S$  is a

gas at room temperature.



44. Classify the following crystalline solids into

different types: Ammonium phosphate, Brass,

 $S_8$  molecule, Diamond.

45. Classify the following molecular solids into

different types.HCI,  $CO_2$ , Solid ice,  $SO_2$ .



**47.** Define the following terms: Basis.

**48.** Define the following terms: Crystal.



**49.** Diagammatically represent formation of crystal.



50. Draw the unit cell parameters and explain

the symbols involved in it.



**52.** Give the parameters of a unit cell.

53. Write is a unit cell and give its parameters?



#### 54. What is a unit cell and give its parameters?

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**55.** Write a note on types of unit cell.

56. By mathematical anylsis, how many space

latties/Bravis Lattices are possible?



#### **57.** Distinguish between crystal lattice unit call.





cells.



63. Calculate number of atoms in : FCC



#### 65. Calculate the number of atoms in FCC



66. Dervie a relationship between molar, mass,

density of subtances and unit cell edge length

for any substance.



#### 67. Obtain a relationship between density of a

subtances and edge length of unit cell.



**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 p kg m-3.

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**69.** State the meaning of each of the parameters in the equation  $p = \frac{nM}{a^3 N_A}$ ,

70. Define co-ordination number.



73. Explain linear packing in one direction.



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



**76.** Explain packing in simple cubic unit cell crystal.

77. Expalin square does packing in three dimension.
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**78.** Expalin ABAB type arrangement in three dimensions.



79. Explain hexagonal close packing in three

dimensions.

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80. Explain ABCABC type of three dimensional

arrangement.



83. Explain tetrahedral void.

**84.** Sketch a tetrahedral void.

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### 85. Distiguish between hexagonal close

packing and cubic pakcing.

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86. Write note on Octahedral void.


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



## 90. How are tetrahedral and octahedral voids

formed?

 91. Distinuish between Tetrahedral and

 Octahedral void.

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

93. Mention two properties that are common

both hcp and ccp lattices.



94. What is the numbe rof octachedral vocids

per sphere for an fcc/ccp arrangement?

95. What is the number of octahedral voids

per sphere in hcp arrangement?

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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?

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98. Mention the co-ordination number of sc,fcc

and hcp structures.



**99.** In a crystla of zinc sulphid, zinc occupies tetrahedral voids. What is the co-ordination number of zinc?



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.



**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.



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?



**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?

particles.



108. Derive a relation to find: Number of unit

cells in x g metal.

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



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

113. At what temperature ideal crystals with no

imperfection are possible?



**114.** Write a note on defects in crystal lattice.



117. Distingusih between stoichiometric

defects and non stoichiometic defects.



**118.** Write a note on vacany defect with diagram.



119. Write a note on the two types of self

interstitial defect in an element solid.



121. Describe Schottky defects in crystals.

**122.** What are the conditions required of Schottky defect?



## 123. What are the consequences of schottky

defect?

**124.** Mention examples of Schottky defect.



**125.** How would you account for the effect of Schottky defect on the density of the ionic solid?



**126.** Write a note on Frenkel Defect.



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128. Write examples of ionic solids with frenkel

Defect.

129. Name the type of point defect that occurs

in a crystal of zinc sulphide?





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?



133. Distinguish between Schottky defect and

Frankel defect.



**134.** When do impurity defects airse.

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<b>135.</b> Write a note on substituational impurity defect.
<b>Watch Video Solution</b>

**136.** Write a note on "Vacancy through aliovalent impurity" type of substitutional

impurity defect using example of NaCI and

 $SrCI_2$ .



137. Write a note on interstitial impurity defect

with example.

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**138.** Explain impurity defect in stainless steel with diagram.



defects.

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140. Write a note on metal deficieny defect

with an example and its diagram.

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



F= center prossesses\_\_\_\_colour.

144. Complete the following and rewrite: F

centers are caused by \_\_\_\_\_

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## 145. Complete the following and rewrite: Metal

deficiency defect is a \_\_\_\_\_type of defect.

**146.** Complete the following and rewrite: The present of paried cation-anion vacancy leads to \_\_\_\_\_type of defect.



# 147. Complete the following and rewrite:

Stainless steal shows \_\_\_\_\_type of defect.

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



149. Complete the following and rewrite:

\_ defect occurs with very samll

difference in sizes of cation and anion.

#### 150. What is F-centre?



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

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



## **153.** What is electical conductivity?



154. What is meant by the elctrical Insulators

and Semi conductors?

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155. Distinuish between conductors, Insulators

and Semi conductors.



156. Difference between 1. Conductors and

Insulators 2. Conductors and Semiconductors.



**158.** Write a note on band theory.



161. What are the valece band and conduction

band?



**162.** Explain electrical property of: metallic conductors.

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**163.** Explain electrical property of: Insulators.



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

Metals are good conductors of electricity.



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

Insulators have extremely low conductivity.

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#### **167.** On the basis of Band theory, give reasons:

Semi conductors show some conductivity.

**168.** The picture represents bands of MO s for Si. Label Valence band, Conduction band and Band gap.



## 169. How does electical conductivity of a metal

chandge with temperature?
170. Explain variation of conductivity of a semiconductor with temperature. Watch Video Solution 171. How does the conductivity of a semiconductor change with temperature?

Why?

172. Define: Intrinsic semiconductors.





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?

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179. What is metallic bond?

**180.** What are n-type semiconductors?

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**182.** Explain doping of Silicon with Phosphorus.





183. Expalin n-type semiconductor with an

example.



**184.** Write examples of n-type semiconductor.



187. Classify the following semiconductors into

n-type of p-typ: B doped with Si

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188. Classify the following semiconductors into

n-type or p-type: As doped with Si

189. Classify the following semiconductors into

n-type of p-typ: P doped with Si

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190. Classify the following semiconductors into

n-type of p-typ: Ge doped with In

**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?

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192. Explain the origin of magnetic properties

in solids.



193. What are diamagnetic substances? Give

examples.



**194.** What are paramegnetic substances? Give

examples.

**195.** What are ferromagnetic substances? Give examples. Watch Video Solution **196.** What are ferromagnetic substances? Watch Video Solution

197. Define ferromagnetism materials. Explain

why iron is a strong ferromagnet.



**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?

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**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?

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

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

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



**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 CI are 133 and 35.5 respectively.

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**204.** Unit call of iron crystal has edge length of 288 pm and density of 7.86 g  $cm_3$ , Determine

the type of crystla lattice.



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 10g  $cm_3$ 



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

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**207.** Niobium is found to crystalline with bcc structure and found to have denstiy of  $8.55gcm^{-3}$ . 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.

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



# **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?

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**211.** Face centred cubic crystal lattice of copper has density of 8.966 g  $cm^{-3}$ . Calculate the

volume of the unit cell.

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



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

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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 g/mol.

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**216.** Calculate the number of unit cells in 1.00  $cm^3$  of Al given edge length of 353.6 pm and

fcc structure.

**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?



**218.** An element with molar mass 27/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.





**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  $200cm^3$  of element?



**220.** A metal crystallizes in two forms FCC and BCC each with edge lengths 3.5A and 3.0 A respectively. Find ration of their densities. Nite

in both cases the molar of the element does

not change.



in each unit cell.

**222.** CsCI crystallizes in cubic unit with  $CI^-$  at corners and  $Cs^+$  at the centre of the cube. How many CsCI molecules are these in each unit cell?

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**223.** The unit cell of metallic Silver is FCC. If radius of Ag atom is 144.4pm, 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.



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.



**225.** The density of iron is  $8.54(g(cm^{-3}))$ . Edge length is 2.8 no and atomic mass  $56(g(mol))^{-1}$ . Find on of atoms in unit cell.





**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.

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



**3.** X-ray diffraction studies show that copper crystallizes in an fcc unit cell edge of  $3.608 \times 10^{-8}$  cm. In a separate experiment,

copper is determined to have a density  $8.92gcm^{-3}$ . Calculate the atomic mass of copper.

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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?

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

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**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?

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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.



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

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10. Molecular solids are

A. crystalline solids

B. amorphous solids

C. ionic solids

D. metallic solids

#### Answer:



#### 11. Which of the following is not correct?

A. Four spheres are involved in the

formation of tetrahedral void

B. The centres of spheres 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 2N 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:

**13.** A single substance that exists in two or more forms is called.

A. polymorphous

B. amorphous

C. isomorphous

D. monomorphous

# Answer:

# 14. Graphite is a

A. metallic crystal

B. covalent crystal

C. ionic crystal

D. molecular srystal

## Answer:



# 15. Diamond is a

A. metallic crystal

B. convalent crystal

C. ionic crystal

D. molecular crystal

#### **Answer:**

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**16.** The ratio of close packed atoms to tetrahedral holes in cubic pakcing is

# A. 0.04236111111111

# B. 0.04305555555556

C. 0.08402777777778

D. 0.04375

#### **Answer:**

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

# A. 0.04236111111111

# B. 0.04305555555556

C. 0.08402777777778

D. 0.04375

#### **Answer:**

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18. The number of tetrahedral sites per sphere

in cpp structure is

A. 1

B. 2

C. 3

D. 4

#### Answer:



19. The number of tetrahedral sites per sphere

in cpp structure is

A. 1

B. 2

C. 3

D. 4

### Answer:



20. The packing efficiency for a body centred

cubic Structure is

A. 0.42

B. 0.53

C. 0.68

D. 0.82

Answer:

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21. Due to Frenkel defect the density of ionic

solid

# A. increases

- B. decreases
- C. remains same
- D. fluctuates

### **Answer:**

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**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.  $AB_3$ 

B.  $AB_4$ 

 $\mathsf{C.}\,A_3B$ 

D.  $A_4B$ 

### Answer:



 ${\bf 23.}\,\%$  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:

25. Semicoductors are manufactured by

addition of impurities of

A. p-block elements

B. actinoids

C. lanthanoids

D. s-block elements

## Answer:

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:



**27.** n-type semiconductor is formed when trace amount of impurity is added to silicon. The number of electrons in the impurity atom must be

- A. 3
- B. 5
- C. 1

D. 2

#### Answer:



# **28.** Which is covalent network solid?

- A.  $Fe_2O_3$
- $\mathsf{B.}\,NF_3$
- 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:

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:

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

B. 7

C. 30

D. 14

# Answer:

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:

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



# **35.** Calculate number of atoms in : SSC

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





# 37. Calculate number of atoms in : BCC

A. 1

**B.** 2

C. 3

D. 4

**Answer:** 

38. Sodium chlorid crystal consists of:

A. NaCI molecules

B. Na and CI atoms

C.  $Na^+$  and  $CI^-$  molecules

D.  $Na^+$  and  $CI^-$  ions

**Answer:** 

**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:**

40. The co-ordination number of hexagonal

closest packed structure is

A. 6

B. 8

C. 10

D. 12

#### Answer:



**41.** The atomic radius for a face-centred cubic cell of lattice parameter 'a'.radius is

A. 
$$\frac{\sqrt{2}}{4}$$
a  
B.  $\frac{\sqrt{3}}{4}$ a  
C.  $\frac{a}{2}$   
D.  $\frac{\sqrt{8}}{4}$ 

 $\boldsymbol{a}$ 

### **Answer:**

42. The number of atoms per unit cell is 2, the

arrangement is

A. octahedral

B. fcc

C. bcc

D. none

### Answer:

**43.** The name given to the ABABABAB... type of arrangement is

A. cubic close-packed arrangement

B. hexagonal close-pecked arrangement

C. tetrahedral arrangement

D. octahedral arrangment

# Answer:

44. The atomic radius for a face-centred cubic

cell of lattice parameter 'a'.radius is

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A.  $\sqrt{8}r$ B.  $\frac{\sqrt{3}}{4}r$  $\mathsf{C}.\,\frac{1}{2\sqrt{2}r}$ D.  $\frac{4r}{\sqrt{3}}$ 

#### Answer:

**45.** Explain packing in simple cubic unit cell crystal.

A. 0.6

B. 0.52

C. 0.74

D. 0.92

## **Answer:**

46. Density of a crystal is given by

A. 
$$rac{a^3 imes M}{z imes N_A}$$
  
B.  $rac{N_A imes M}{z imes a^3}$   
C.  $rac{z imes M}{a^3 imes N_A}$   
D.  $rac{a^3 imes N_A}{z imes M}$ 

#### Answer:



**47.** The crystals exhibit following number of

arrangements for their atoms.

A. 4 arrangments

B. 7 arrangements

C. 10 arrangements

D. 14 arrangements

# Answer:
48. The total number of Bravias lattice for a

cubic system is

A. 4

B. 3

C. 2

D. 1



**49.** The correct relation between angles of the edge of a crystal belonging to a cubic system is

A. a=b=c

B. 
$$a 
eq b = c$$

C. 
$$a=b
eq c$$

D. a 
eq b 
eq c

### Answer:

50. The packing fraction in a face-centred cubic

cell of crystals is



## Answer:

**51.** The correct relation between angles of the edge of a crystal belonging to a cubic system is

A. 
$$a=eta=\gamma=90^\circ$$
  
B.  $a=eta=\gamma
eq 90^\circ$   
C.  $a=eta=90^\circ, \gamma
eq 90^\circ$   
D.  $a
eq eta
eq \gamma
eq 90^\circ$ 



**52.** The number of atoms per unit cell in a simple cubic, face-centred cubic and body-centred cubic are, respectively.

A. 1,4,2

B. 1,2,4,

C. 8,14,9

D. 8,4,2



**53.** The name given to the ABABABAB... type of arrangement is

A. cubic close-packed arrangement

B. hexagonal close-packed arrangement

C. tetrahedral arrangement

D. octahedral arrangment

# Answer:

**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:

**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 imes , 2 imes



**56.** Which is used as dopant for p-type semiconductros?

A. Si

B. P

С. В

D. As

## **Answer:**

# 57. We can study crystals by

A. X-ray diffraction

**B.** Optical activity

C. Both

D. None

**Answer:** 



58. Diamond is a

A. metallic crystal

B. covalent crystal

C. ionic crystal

D. molecular crystal

#### **Answer:**

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**59.** The number of atoms in a face centred cubic unit cell is

A. 4

B. 16

C. 8

D. 12

### Answer:

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60. Explain the term Schottky defect.

61. Attempt the following: Give characterstics

of solid state.

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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  $10g \ cm_3$ 

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**64.** X-ray diffraction studies show that copper crystallizes in an fcc unit cell edge of  $3.608 \times 10^{-8}$  cm. In a separate experiment, copper is determined to have a density

 $8.92gcm^{-3}$ . Calculate the atomic mass of

copper.



65. Gold occurs as face centred cube and has a

density of 19.30 kg dm. Calculate atomic redius of gold.

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**67.** Niobium is found to crystalline with bcc structure and found to have denstiy of  $8.55gcm^{-3}$ . 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 g/mol.



**69.** Calculate the number of unit cells in 1.00  $cm^3$  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.



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