CHEMISTRY

BOOKS - SHARAM PUBLICATION

SOLID STATE

Exercise

1. The structure of $NaCl$ is

A. hexagonal

B. octahedral

C. Rhombohedral

D. Tetrahedral

Answer:

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2. The number of atoms in bcc arrangement is

A. 1

B. 4

C. 2

D. 6

Answer:

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3. If edge of a bcc crystal of an element is 'd' cm, M is the atomic mass and 'N' is the Avogadro number, then density of the crystal is

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

B. $2\frac{N}{M}a^3$

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

D. $M\frac{a^3}{2}N$

Answer:

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4. The arrangement of XYZ XYZ ..... Is referred to as -

A. octahedral close packing

B. hexagonal close packing

C. tetrahedral close packing

D. cubic close packing

Answer:

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5. Which among the following will show anisotropy?

A. Glass

B. $BaCl_2$

C. Wood

D. Paper

Answer:

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6. Which of the following is an exzmple of hexagonal Crystal System ?

A. Diamond

B. Graphite

C. Calcite

D. White tin

Answer:

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7. Which of the following shape has 6 coordination number ?

A. bcc

B. planar trigonal

C. octahedral

D. square planar

Answer:

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8. An atom inside a cube provides how many atoms to the unit cell ?

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

B. 1

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

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

Answer:

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9. In a face centred cubic lattice the number of nearest neighbours for a given lattice point are:

A. 6

B. 8

C. 12

D. 14

Answer:

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10. Number of particles per unit cell of BCC lattice is -

A. 1

B. 2

C. 3

D. 4

Answer:

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11. In NaCl, the Cl^- ions occupy the place in a fashion of:

A. corners of the cube

B. edge corners of the cube

C. corners as well as the centre of faces of the cube

D. only centres of the faces of the cube.

Answer:

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12. $NaCl$ is an example of

A. simple cubic lattice

B. bcc lattice

C. fcc lattice

D. hcp lattice

Answer:

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13. Number of particles per unit cell of BCC lattice is -

A. 9

B. 8

C. 6

D. 12

Answer:

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

A. $NaCl$

B. ZnS

C. CaF_2

D. Na_2O

Answer:

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15. Number of particles per unit cell of BCC lattice is -

A. 1

B. 2

C. 8

D. 4

Answer:

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16. What is the coordination number of each ion in NaCl ?

A. 6

B. 8

C. 4

D. 1

Answer:

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17. Which of the following is not correct for ionic crystals ?

A. High m.p and b.p

B. All are electrolytes

C. Exhibit prperties of the bond

D. Exhibit directional properties of the bond.

Answer:

18. The number of atoms in the unit cell of Na (bcc type crystal) and Mg (fcc type crystal) are respectively

A. $4, 4$

B. $4, 2$

C. $2, 4$

D. $1, 1$

Answer:

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19. In a crystal some of the ions are missing from their normal sites. This is an example of

A. F- Centres

B. Interstitial defect

C. Frenkel defect

D. Schottky defect

Answer:

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20. What is the number of atoms in a unit cell of

(a) a face-centred cubic structure?

(b) a body-centred cubic structure?

A. 4

B. 6

C. 8

D. 12

Answer:

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21. Among the following type of voids, which one is the largest void:

A. Triangular

B. Cubic

C. tetrahedral

D. Octahedral

Answer:

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22. Graphite is an example of:

A. Ionic crystal

B. Covalent crystal

C. Van der Waal's crystal

D. Metallic crystal

Answer:

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23. Quartz (SiO_2) is an example of

A. Metallic crystal

B. Ionic crystal

C. Covalent crystal

D. None

Answer:

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24. Ionic solids are characterised by:

A. Good conductivity in solid state

B. High vapour pressure

C. Low m.p

D. Solubility in polar solvents

Answer:

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25. Frenkel defect is noticed in:

A. $AgBr$

B. ZnS

C. AgI

D. All

Answer:

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26. In a body centred cubic cell, an atom at the body of centre is shared by:

A. One unit cell

B. 4 unit cell

C. 3 unit cell

D. 2 unit cell

Answer:

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27. In a solid lattice the cation has left a lattice site and is located at an interstitial position. The lattice defect is known as -

A. Crystal defect

B. Frenkel defect

C. Schottky defect

D. None of these

Answer:

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28. Which is not an amorphous solid ?

A. $NaCl$

B. Glass

C. Plastic

D. Rubber

Answer:

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29. The total number of atoms per unit cell of a face centred cubic crystal is

A. 01

B. 02

C. 03

D. 04

Answer:

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30. Give an example of super cooled liquid.

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31. How many atoms are present in the unit cell of fcc crystal ?

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32. What happens to imperfectness of the crystal with increase of temperature ?

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33. Which type of solids are anisotropic ?

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34. Define anisotropy.

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35. What are interstitials?

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36. Name the types of lattice in a cubic crystal.

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37. What is the basic difference between $NaCl$ and CsCl` crystal structure ?

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38. What is the contribution by a particle on the face of the unit cell ?

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39. How many particles are present in the unit cell of a body centred cubic cell ?

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40. Give two examples of molecular solid.

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41. How many atoms are present in the unit cell of fcc crystal ?

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42. How many atoms are present in body centred unit cubic cell ?

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43. What is called crystal lattice ?

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44. Which type of defect does not affect the density of the crystal ?

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45. Which point defect in crystals of a solid decreases the density of the solid ?

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46. Which stoichiometric defect in crystal increases the density of the solid ?

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47. What is F-centres ?

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48. Fill in the blanks : Glass is an example of ..... Solid .

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49. Fill in the blanks : The crystal structure of $CsCl$ is .....

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50. Fill in the blanks : The number of $Cl^{-}ions$ that surround each $Na^{+}ion$ in $NaCl$ crystal is .....

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51. Fill in the blanks : The existance of a substance in more than one crystalline form is known as .....

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52. Fill in the blanks : In covalent crystals, atoms are linked together by ..... Bonds.

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53. Fill in the blanks : The existence of different chemical compounds in same crystalline form is called .....

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54. Fill in the blanks : The smallest portion of the crystal which has the structural characterstics of the space lattice is called .....

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55. Fill in the blanks : In crystal lattice, the number of nearest neighbours of each atom is called .....

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56. Fill in the blanks : The conductance of semiconductors increase with ..... And .....

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57. Fill in the blanks : Ice is an example of ..... Crystal.

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58. Fill in the blanks : The bcc structure possesses ..... Corner atoms along with ..... At body centre.

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59. Fill in the blanks : The temperature at which a substance starts behaving as a super conductor is called ..... temperature.

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60. Fill in the blanks : Diamond and graphites are ..... Of carbon.

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61. Fill in the blanks : The number of octahedral voids in a unit cell of a simple cube is .....

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62. Fill in the blanks : The number of atoms per unit cell of a simple cube is .....

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63. Fill in the blanks : In an ionic crystal the anion B forms the close packed lattice and cations A occupy all the tetrahedral holes, the formula of the compound is .....

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64. Fill in the blanks : The number of Cs^+ and $Cl^- ions$ in the bcc lattice of $CsCl$ is ..... And ..... Respectively.

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65. Fill in the blanks : Metal deficiency defects are exhibited by ..... .

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66. Fill in the blanks : The ..... Centre is responsible for colour of the compound.

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67. Fill in the blanks : In a crystal of ZnS , Zn occupies tetrahedral void. The co- ordination number of zinc is .....

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68. What is difference between p-type and n-type semiconductor?

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69. What are covalent solids ? Give two charactersics.

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70. Give three differences between crystalline and Amorphous solids.

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71. Write four important characteristics of solids.

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72. Why is glass considered as a super cooled liquid ?

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73. In CaF_2, crystal, $Ca^{2+}ions$ are present in fcc arrangement. Calculate the number of Ca^{2+} ions in the unit cell.

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74. The electrical conductivity of metal decreases with rise in temperature while that of a semiconductor increase . Why ?

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75. Give significance of a 'lattice point'.

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

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77. How does Schottky defect arise ? In which type of ionic compounds does this defect arise ?

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78. Calculate the number of lattice points in one unit cell of face centred cubic and body centred cubic arrangement.

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79. Why are solids incompressible?

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

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81. What do you mean by space lattice and unit cell ?

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82. What do you mean by close packing in one dimension and in two dimensions ?

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83. What are different types of interstitial voids ? Explain.

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84. What is the contribution by a particle on the corner, on the face within the body and on the edge of the unit cell ?

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85. Calculate the number of particles (i.e. atoms or ions) per unit cell of a simple, cubic , fcc and bcc unit cell.

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86. A compound formed by elements A and B crystallizes in cubic structure where A atoms are at the corners of a cube and B atoms are at the face centre. The formula of the compound is :

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87. A cubic solid is made up of two element A and B. 'B' atoms are present at the corners of the cube and 'A' atoms are present at the body centre. What is the formula of the compound ?

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88. Calculate the approximate number of unit cells present in 1g. Of gold. Given that gold crystalizes in the face - centred cubic lattice. (Atomic mass of gold = 197)

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89. What do you understand by the term " Packing fraction" ?

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90. Calculate the packing efficiency of a metal crystal for a simple cubic lattice.

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91. Calculate the packing fraction in a face centred cubic structure (cubic close packing)

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92. What is the percentage efficiency of packing in case of simple cubic lattice and body centred cubic lattice ?

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93. Write the difference between Octahedral and Tetrahedral.

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94. How many octahedral and terahedral holes are present per unit cell in a face -centred cubic arrangement of atoms?

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95. Calculate the number of voids per unit cell of CCP structure.

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96. How many voids are present per unit cell of hcp structure ?

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97. Which ion of the following compounds forms fcc arrangement $NaCl$, ZnS, CaF_2 and which one occupies the void ?

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98. Derive the formula to calculate the density of a cubic crystal of elements.

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99. Derive the formula to calculate the density of a cubic crystals of ionic compounds.

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100. Sodium has bcc structure with nearest neighbour distance 367.9 pm. Calculate its density.

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101. Gold crystallizes in a face centred unit cell . Determine the density of gold (Given : Atomic mass of gold = 197, atomic radius = 0.144 nm)

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102. The density of KBr is $2.75 g cm^{-3}$. The length of edge of unit cell is 654pm. Predict the type of cubic lattice to which unit cell of kBr belongs.

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103. Write a note on Metal excess non-stoichiometric defects.

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104. How does metal deficiency defect arise ? Explain.

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105. How does impurity defect arise ? How is impurity defect introduced in ionic solids ?

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106. How is impurity defect introduced in case of covalent solids ?

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107. Write a note on classification of solids based on different binding forces.

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