CHEMISTRY

BOOKS - FULL MARKS CHEMISTRY (TAMIL ENGLISH)

SOLID STATE

Evaluate Yourself I

1. An element has a face centered cubic unit cell with a length of 352.4 pm along an edge. The density of the element is $8.9\ \mathrm{gcm\text{-}3}$. How many atoms are present in 100 g of an element ?

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2. Determine the density of $CsCI$ which crystallizes in a bcc type structure with an edge length 412.1 pm.

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3. A face centered cubic solid of an element (atomic mass 60) has a cube edge of 4Å. Calculate its density.

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Textbook Evaluation I Choose The Best Answer

1. Graphite and diamond are .....

A. Covalent and molecular crystals

B. ionic and covalent crystals

C. both covalent crystals

D. both molecular crystals

Answer: C

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2. An ionic compound A_xB_y crystallizes in fcc type crystal structure with B ions at the centre of each face and A ion occupying centre of the cubic, the correct formula A_xB_y is .....

A. AB

B. AB_3

C. A_3B

D. A_8B_6

Answer: B

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3. The ratio of close packed atoms to tetahedral hole in cubic packing is .....

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:4$

Answer: B

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4. Solid CO_2 is an example of .....

A. Covalent solid

B. metallic solid

C. molecular solid

D. ionic solid

Answer: C

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5. Assertion : monoclinic sulphur is an example of monoclinic crystal system

Reason : for a monoclinic system, $a \neq b \neq c$ and $a = \gamma = 90^\circ, \beta \neq 90^\circ$

A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false

Answer: A

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6. In calcium fluoride, having the flurite structure the coordination number of Ca^{2+} ion and F^{-} Ion are ..... .

A. 4 and 2

B. 6 and 6

C. 8 and 4

D. 4 and 9

Answer: C

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7. The number of unit cells in 8 gm of an element X (atomic mass 40) which crystallizes in bcc pattern is $(N_A$ is the Avogadro number) ..... .

A. 6.023×10^{23}

B. 6.023×10^{22}

C. 60.23×10^{23}

D. $\left(\frac{6.023 \times 10^{23}}{8 \times 40}\right)$

Answer: B

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8. The number of carbon atoms per unit cell of diamond is ..... .

A. 8

B. 6

C. 1

D. 4

Answer: A

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9. In a solid atom M occupies ccp lattice and $\left(\frac{1}{3}\right)$ of tetrahedral voids = 2n

Given that $\left(\frac{1}{3}\right)$rd of tetrahedral voids are occupied i.e., $\left(\frac{1}{3}\right) \times 2n$ are occupied by6 N atoms $\therefore M : N \Rightarrow n : \left(\frac{2}{3}\right)$ $1 : \left(\frac{2}{3}\right) 3 : 2 \Rightarrow M_3N_2$

A. MN

B. M_3N

C. MN_3

D. M_3N_2

Answer: D

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10. The composition of a sample of wurtzite is $Fe_{0.93}O_{1.00}$ what $\%$ of Iron present in the form of Fe^{3+}?

A. $16.05\ \%$

B. $15.05\ \%$

C. $18.05\ \%$

D. $17.05\ \%$

Answer: B

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11. The ionic radii of A^+ and B^- are $0.98 \times 10^{-10} m$ and $1.81 \times 10^{-10} m$, the coordination number of each ion in AB is ..... .

A. 8

B. 2

C. 6

D. 4

Answer: C

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12. $CsCl$ has bcc arrangement, its unit cell edge length is 400 pm, its inter atomic distance is ..... .

A. 400 pm

B. 800 pm

C. $\sqrt{3} \times 100 \text{ pm}$

D. $\left(\frac{\sqrt{3}}{2}\right) \times 400 \text{ pm}$

Answer: D

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13. A solid compound XY has $NaCl$ structure. If the radius of the cation is 100 pm, the radius of the anion will be.....

A. $\left(\frac{100}{0.414}\right)$

B. $\left(\frac{0.732}{100}\right)$

C. 100×0.414

D. $\left(\frac{0.414}{100}\right)$

Answer: A

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14. The vacant space in bcc lattice unit cell is ..... .

A. $48\ \%$

B. $23\ \%$

C. $32\ \%$

D. $26\ \%$

Answer: C

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15. The radius of an atom is 300pm, if it crystallizes in a face centered cubic lattice, the length of the edge of the unit cell is ..... .

A. 488,5 on

B. 848,5 on

C. 884,5 on

D. 484.5 on

Answer: B

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16. The fraction of total volume occupied by the atoms in a simple cubic is ..... .

A. $\left(\frac{\pi}{4\sqrt{2}}\right)$

B. $\left(\frac{\pi}{6}\right)$

C. $\left(\frac{\pi}{6}\right)$

D. $\left(\frac{\pi}{3\sqrt{2}}\right)$

Answer: B

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17. The yellow colour in $NaCl$ crystal is due to ..... .

A. excitation of electrons in F centers

B. reflectionof light from Cl^- ion on the surface

C. refraction of light from Na^+ ion

D. all of the above

Answer: A

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18. If 'a' stands for the edge length of the cubic system , sc, bcc, and fcc. Then the ratio of radii of spheres in these systems will be respectively.

A. $\left(\frac{1}{2}a : \frac{\sqrt{3}}{2}a : \frac{\sqrt{2}}{2}a\right)$

B. $\left(\sqrt{1}a : \sqrt{3}a : \sqrt{2}a\right)$

C. $\left(\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a\right)$

D. $\left(\frac{1}{2}a : \sqrt{3}a : \frac{1}{\sqrt{2}}a\right)$

Answer: C

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

A. $\left(\frac{2}{\sqrt{3}}\right)a$

B. $\left(\frac{4}{\sqrt{3}}\right)a$

C. $\left(\frac{\sqrt{3}}{4}\right)a$

D. $\left(\frac{\sqrt{3}}{2}\right)a$

Answer: D

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20. Potassium has a bcc structure with nearest neighbor distance 4.52Å. Its atomic weight is 39. its density will be ..... .

A. $915\ \text{kg m}^{-3}$

B. $2142\ \text{kg m}^{-3}$

C. $452\ \text{kg m}^{-3}$

D. $390\ \text{kg m}^{-3}$

Answer: A

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21. Schottky defect in a crystal is observed when.....

A. unequal number of anions and anions are missing from the lattice

B. equal number of anions and anions are missing from the lattice

C. an ion leaves its normal site and occupies an interstitial site

D. no ion is missing from its lattice.

Answer: B

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22. The cation leaves its normal position in the crystal and moves to some interstitial position, the defect in the crystal is known as .....

A. Schottky defect

B. F center

C. Frenkel defect

D. non-stoichiometric defect

Answer: C

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23. Assertion : due to Frenkel defect, density of the crystalline solid decreases.

Reason : in Frenkel defect cation and anion leaves the crystal.

A. Both assertion and reason are true and reason is the correct explanation of assertion.

B. Both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false

Answer: D

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24. The crystal with a metal deficiency defect is.....

A. $NaCl$

B. FeO

C. ZnO

D. KCI

Answer: B

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Textbook Evaluation Ii Answer The Following Questions

1. Define unit cell.

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2. Give any three characteristics of ionic crystals.

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3. Differentiate crystalline solids and amorphous solids.

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4. Classify the following solids (a) P_4, (b) Brass (c) Diamond (d) NaCI (e) lodine

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5. Explain briefly seven types of unit cell.

Seven types of unit cell,

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6. Distinguish between hexagonal close packing and cubic close packing.

View Text Solution

7. Distinguish tetrahedral and octahedral voids.

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8. What are point defects ?

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9. Explain Schottky defect.

View Text Solution

10. Write short note on metal excess and metal deficiency defect with an example.

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11. Calculate the number of atoms in a fee unit cell.

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12. Explain AAAA and ABABA and ABCABC type of three dimensional packing with the help of neat diagram. Voids :

The empty spaces between the three dimensional layers are known as voids. There are two types of common voids

possible. They are tetrahedral and octahedral voids.

Tetrahedral void:

A void formed by three spheres of a layer in contact with each other and also with a sphere on the top or bottom layer is a hole between four spheres. The spheres are arranged at the vertices of a regular tetrahedron such a hole or void is called tetrahedral void.

Octahedral void:

A hole or void formed by three spheres of a hexagonal layer and another three spheres of the adjacent layer is a hole between six spheres. The spheres are arranged at the vertices of a regular octahedron. Such a hole or void is called octahedral void.

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13. Why ionic crystals are hard and brittle ?

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14. Calculate the percentage efficiency of packing in case of body centered cubic crystal.

View Text Solution

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

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16. Experiment shows that Nickel oxide has the formula $Ni_{0.96}O_{1.00}$. What friction of Nickel exists as of Ni^{2+} and Ni^{3+} ions ?

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17. What is meant by the term "coordination number" ? What is the coordination number of atoms in a bcc structure ?

View Text Solution

18. An element has bcc structure with a cell edge of 208 pm. the density of the element is $7.2gcm^{-3}$. How many atoms are present in 208g of the element.

View Text Solution

View Text Solution

19. Aluminium crystallizes in a cubic close packed structure. Its metallic radius is 125pm. Calculate the edge length of unit cell.

View Text Solution

20. If NaCl is doped with 10^{-2} mol percentage of strontium chloride, what is the concentration of cation vacancy ?

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21. KF crystallizes in fce structure like sodium chloride. calculate the distance between K^+ and F^- in KF.

$\left(\text{given : density of KF is } 2.48 \text{ g cm}^{-3}\right)$

View Text Solution

22. An atom crystallizes in fee erystal lattice and has a density of 10 gcm^{-3} with unit cell edge length of 100pm. calcutate the number of atoms present in 1 g of crystal.

View Text Solution

23. Atoms X and Y form bee erystalline structure. Atom X is present at the corners of the cube and Y is at the centre of the cube. What is the formula of the compound ?

View Text Solution

24. Sodium metal crystallizes in bee structure with the edge length of the unit cell $4.3 \times 10^{-}$ cm. Caleulate the radius of sodium atom.

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25. Write a note on Frenkel defect.

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Additional Questions I Choose The Best Answer

1. Consider the following statements .....

Solids have definite volume and shape

(ii) Solids are rigid and compressible

(iii) Solids have weak cohesive forces

Which of the above statemetns is/are not correct ?

A. (i) only

B. (ii) & (iii) only

C. (iii) only

D. (i) & (ii) only

Answer: B

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2. Which one of the following is an ionic crystal ?

A. Glass

B. Rubber

C. $NaCl$

D. SiO_2

Answer: C

View Text Solution

3. Which one of the following is an amor- phous solid ?

A. Glass

B. SiO_2

C. NaCl

D. Na

Answer: A

View Text Solution

4. Which one of the following is an example for molecular crystals ?

A. Diamond

B. Silica

C. Glass

D. Naphthalene

Answer: D

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5. Which one of the following is an example for atomic solids ?

A. Frozen elements of group 18

B. Group 17 elements

C. Inner - transition elements

D. chalcogens

Answer: A

View Text Solution

6. Which one of the following is a covalent crystal ?

A. Glass

B. Diamond

C. Anthracene

D. Glucose

Answer: B

View Text Solution

7. Consider the following statements.

(i) Crystalline solids have irregular shape

(ii) Generally crystalline solids are anisotropic in nature

(iii) Heat of fusion of crystalline solids are not definite at

Which of the above statements is /are correct ?

A. (i) & (iii)

B. (i) only

C. (iii) only

D. (ii) only

Answer: D

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8. Consider the following statements.

(i) Amorphous solids are isotropic like liquids

(ii) Amorphous solids are considered as pseudo solids

(iii) Amorphous solids have sharp melting points

Which of the above statemetns is/are correct ?

A. (i) only

B. (ii) only

C. (i) & (ii)

D. (i) & (iii)

Answer: C

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9. In an ionic crystal, both cations and an- ions are bound together by.....

A. Strong electrostatic attractive forces

B. Weak electrostatic attractive forces

C. Vanderwaals forces of attraction

D. Weak cohesive forces

Answer: A

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10. Molecular solids contains neutral molecules held together by .....

A. strong cohesive forces

B. weak vanderwaals forces

C. weak ionic forces

D. strong electrostatic forces

Answer: B

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11. Which is used inside pencils and in many lubricants ?

A. Lead nitrate

B. charcoal

C. graphite

D. coke

Answer: C

View Text Solution

12. In non polar molecular solids, molecules are held together by .....

A. London forces

B. weak vanderwaals forces

C. Strong electrostatic forces

D. strong cohesive forces

Answer: A

View Text Solution

13. Which one of the following is non-polar molecular solids ?

A. Diamond

B. SiC

C. Anthracene

D. Glass

Answer: C

View Text Solution

14. Silicon carbide is an example of

A. Ionic solid

B. Covalent solid

C. Polar molecular solid

D. Non - polar molecular solid

Answer: B

View Text Solution

15. Naphthalene is an example of.....

A. ionic solid

B. covalent solid

C. non polar molecular solid

D. polar molecular solid

Answer: C

View Text Solution

16. Solid NH_3 solid CO_2 are examples of

A. Covalent solids

B. polar molecular solids

C. molecular solids

D. ionic solids

Answer: B

View Text Solution

17. Solids ice, glucose are examples of .....

A. metallic solids

B. ionic solids

C. hydrogen bonded molecular solids

D. non polar molecular solids

Answer: C

View Text Solution

18. Consider the following statements.

metallic solids possess high electrical and thermal

conductivity

(ii) solid ice are soft solids under room temperature

(iii) In non polar molecular solids constituent molecules are held together by strong electrostatic forces of attraction

Which of the above statenments is/are not correct ?

A. (i) & (ii) only

B. (iii) only

C. (ii) only

D. (i) onlu

Answer: B

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19. Each atom in the corner of the cubic unit cell is shared by how many unit cells ?

A. 8

B. 6

C. 1

D. 12

Answer: A

View Text Solution

20. Which is the coordination number of each atom in a simple cubic unit cell ?

A. 8

B. 6

C. 12

D. 4

Answer: B

View Text Solution

21. The number of atoms belongs to bcc unit cell is .....

A. 2

B. 4

C. 6

D. 12

Answer: A

View Text Solution

22. The number of atoms in fcc unit cell is .....

A. 2

B. 4

C. 6

D. 8

Answer: B

View Text Solution

23. The atoms the face centre is being shared by ..... unit cells.

A. 4

B. 8

C. 2

D. 6

Answer: C

View Text Solution

24. An atom present at the body centre belongs to only ..... unit cell.

A. 1

B. 2

C. 4

D. 8

Answer: A

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25. Which one of the following is known as Bragg's equation ?

A. $d = \frac{2\sin\theta}{n\lambda}$

B. $d = \frac{n\lambda}{2\sin\theta}$

C. $n\lambda = \frac{d}{\sin\theta}$

D. $d = \frac{2\sin\theta}{n\lambda}$

Answer: D

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26. Which one the following formula is used to calculate the density of the unit cell ?

A. $\rho = \frac{nM}{a^3 N_A}$

B. $\rho = \frac{a^3 N_A}{nM}$

C. $\rho = \frac{N_A}{a^3 NM}$

D. $\rho = \frac{a^3 NM}{n}$

Answer: A

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27. Which is the packing fraction in simple cubic unit cell ?

A. $52.31\ \%$

B. $100\ \%$

C. $68\ \%$

D. $75\ \%$

Answer: A

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28. The packing fraction in bcc arrangement is .....

A. $52.31\ \%$

B. 68 %

C. 100 %

D. 80 %

Answer: B

View Text Solution

29. Which is the coordination number in both hcp and ccp arrangements ?

A. 12

B. 6

C. 4

D. 8

Answer: A

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30. What is the coordination number of B_20_3 ?

A. 4

B. 6

C. 8

D. 3

Answer: D

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31. Which one of the following is the structure of $B_2 0_3$?

A. Tetra hedral

B. Octahedral

C. Trigonal planar

D. Cubic

Answer: C

View Text Solution

32. The coordination number of zinc sulphide is .....

.....

A. 3

B. 4

C. 6

D. 8

Answer: B

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33. The coordination number of CsCl is .....

A. 3

B. 4

C. 6

D. 8

Answer: D

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34. Which one of the following is the coordination number of NaCl ?

A. 3

B. 4

C. 6

D. 8

Answer: C

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35. Which one of the following is the packing efficiency in fcc unit cell ?

A. $74\ \%$

B. $52.61\ \%$

C. $100\ \%$

D. $68\ \%$

Answer: A

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36. Which one of the following is an example for schottky defect ?

A. $NaCl$

B. $AgBr$

C. KCI

D. FeS

Answer: A

View Text Solution

37. Which one of the following is an example for Frenkel defect ?

A. $NaCl$

B. $AgCl$

C. $AgBr$

D. $AgNO_3$

Answer: C

View Text Solution

38. Metal excess defect is possible in .....

A. $AgCl$

B. $AgBr$

C. KCI

D. FeS

Answer: C

View Text Solution

39. Which one of the following is the metal deficiency defect ?

A. FeO

B. ZnO

C. KCI

D. $NaCI$

Answer: A

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40. Which one of the following shows non- stoichiometric defect ?

A. FeO

B. $AgBr$

C. ZnO

D. Both a and c

Answer: A::B::C::D

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Additional Questions Ii Fill In The Blanks

1. Naphthalene,Anthracene and glucose are examples of .....

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2. The best examples of covalent crystals are ..... and .....

View Text Solution

3. Frozen elements of group 18 are called .....

View Text Solution

4. Glass, Rubber, plastics are the examples of ..... solids.

View Text Solution

5. ..... means uniformity in all directions.

View Text Solution

6. Crystalline solids are ..... and they show different values of physical properties when measured along different directions.

View Text Solution

7. Diamond and silicon carbide are the examples of..... solids.

View Text Solution

8. In molecular solids, the neutral molecules are held together by weak .....

View Text Solution

9. ..... is a component of many lubricants for example cycle chain oil.

View Text Solution

10. In non polar molecular solids constituent molecules held together are by .....

View Text Solution

11. In solids CO_2 solid NH_3 the molecules are held together by strong .....

View Text Solution

12. Glucose and urea are generally ..... under room temperature.

View Text Solution

13. ..... solids possess excellent electrical and thermal conductivity.

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14. The regular arrangement of the ions throughout the crystal is called a.....

View Text Solution

15. The basic repeating structural unit of a crystalline solid is called a.....

View Text Solution

16. The number of the nearest neighbours that surrounding a particle in a crystal is called the .....

View Text Solution

17. A unit cell that contains only one lattice point is called a .....

View Text Solution

18. ..... is the most powerful tool for the determinaiton of crystal structure.

View Text Solution

19. Only..... of the available volume is occupied by the spheres in simple cubic packing.

View Text Solution

20. Of all the metals in the periodic table, only..... crystallizes in simple cubic pattern.

View Text Solution

21. If the third layer arrangement is aba arrangement, it is called ..... arrangement.

View Text Solution

22. If third layer arrangement is abc arrangment, it is known as ..... arrangement.

View Text Solution

23. In both ..... and ..... arrangements, the coordination number of each sphere is 12.

View Text Solution

24. ..... defect arises due to the missing of equal number of cations and anions from the crystal lattice.

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25. Vanadium monoxide shows ..... defect.

View Text Solution

26. ..... arises due to the dislocation of ions from its crystal lattice.

View Text Solution

27. ..... arises due to the presence of more number of metalions as compared to anions.

View Text Solution

28. Zno is ..... at room temperature but when it is heated it become ..... In colour

View Text Solution

29. ..... arises due to the presence of less number of cations than the anions.

View Text Solution

30. ..... is the appearance of an electrical potential across the sides of the crystal, when it is subjected to mechanical stress.

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31. Stoichiometric defects in an ionic solid is also called ..... or ..... defect.

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Additional Questions Iii Match The Following

1. Match the list I and II using the code given below the list

List - I	List - II
A. $NaCl$	1. Molecular crystal
B. SiO_2	2. Metallic crystal
C. $C_6H_{12}O_6$	3. Ionic crystal
D. Copper	4. Covalent crystal

A.

A	B	C	D
3	4	1	2

B.

A	B	C	D
2	3	4	1

C.

A	B	C	D
4	1	2	3

D.

A	B	C	D
1	2	3	4

Answer: (a) 3, 4, 1, 2

View Text Solution

	List - I	List - II
	A. Atomic solid	1. Naphthalene
2.	B. Molecular crystal	2. KCl
	C. Covalent crystal	3. Frozen elements of group 18
	D. Ionic crystal	4. Diamond

A.
A	B	C	D
1	2	3	4

B.
A	B	C	D
3	1	4	2

C.
A	B	C	D
4	3	2	1

D.
A	B	C	D
2	4	1	3

Answer: (b) 3, 1, 4, 2

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	List - I	List - II
	A. Covalent solid	1. Solid CO_2
3.	B. Non polar molecular solid	2. SiC
	C. Polar molecular solid	3. Solid ice
	D. Hydrogen bonded molecular solids	4. Anthracene

A.
A	B	C	D
2	4	1	3

B.
A	B	C	D
4	3	2	1

C.
A	B	C	D
3	1	4	2

D.
A	B	C	D
1	2	3	4

Answer: (a) 2, 4, 1, 3

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	List - I	List - II
	A. Schottky defect	A. AgBr
4.	B. Frenkel defect	2. FeO
	C. Metal excess defect	3. NaCl
	D. Metal deficiency defect	4. ZnO

A.
A	B	C	D
2	4	3	1

B.
A	B	C	D
3	1	4	2

C.
A	B	C	D
4	2	1	3

D.
A	B	C	D
1	3	2	4

Answer: (b) 3, 1, 4, 2

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5.

List - I	List - II
A. Bragg's equation	1. $\frac{nM}{a^3 N_A}$
B. Density of unit cell	2. $\frac{\text{Total volume of all spheres in unit cell}}{\text{Volume of unit cell}} \times 100$
C. Packing efficiency	3. $\frac{r_{c+}}{r_{A-}}$
D. Radius ratio	4. $n\lambda = 2d \sin\theta$

A.
A	B	C	D
3	4	1	2

B.
A	B	C	D
1	2	3	4

C.
A	B	C	D
4	1	2	3

D.
A	B	C	D
2	3	4	1

Answer: (c)4, 1, 2, 3

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Additional Questions Iv Assertion And Reason

1. Assertion (A) : Amorphous solids are isotropic in nature.

Reason (R) : In amorphous solids, they have identical values of physical properties such as

refractive index, electrical conductance in all directions which is called isotropy.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: a

View Text Solution

2. Assertion (A) : Crystalline solids are anisotropic in nature.

Reason (R) : Anisotropy is the property which depends on the direction of measurement. Crystalline solids are anisotropic and they show different values of physical properties when measured along different directions. Both A and R are correct and R is the correct explanation of A.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: a

View Text Solution

3. Assertion (A) : Ionic solids do not conduct electricity in solid state but in molten state they conduct electricity.

Reason (R) : In solid state, the ions are fixed in their lattice positions but in molten state, the ions are free to move and conduct electricity

A. Both A and R are correct but R is not the correct explanation of A

B. Both A and R are correct and R is the correct explanation of A.

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: b

View Text Solution

4. Assertion (A) : Diamond and Silicon carbide are very hard and have high melting point.

Reason (R) : In covalent solids, the atoms are bound together in a three dimensional network entirely by covalent bonds.

A. Both A and R are correct but R is not the correct explanation of A

B. Both A and R are correct and R is the correct explanation of A.

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: a

View Text Solution

5. Assertion (A) : Solid CO_2 Solid NH_3 have higher melting points

Reason (R): The constituents are molecules formed by polar covalent bonds. They are held together by relatively strong dipole- dipole interactions.

A. A is correct but R is wrong

B. A is wrong but R is correct

C. A and R are correct and R is the correct explanation of A.

D. A and R are correct but R is not the correct explanation of A

Answer: c

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6. Assertion (A) : Solid ice, Glucose are generally soft solids under room temperature

Reason (R): The constituents are held together by strong electrostatic forces of attraction

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: c

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7. Assertion (A) : In bcc, the available volume is more efficiently used than in simple cubic packing.

Reason (R) : In simple cubic arrangement, the number of

spheres belongs to a unit cell is equal to one whereas in bcc, it is equal to 2.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: a

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8. Assertion (A) : B_2O_3 has trigonal planar structure.

Reason (R) : The ratio of radius of cation and anion $\frac{r_{C^+}}{r_{A^-}} = 0.155 - 0.225$ plays an important role in determining the structure and B_2O_3 has coordination number as 3 and has trigonal planar structure.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: a

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9. Assertion (A) : Schottky defect does not change the stoichiometry of the crystal.

Reason (R) : This defect arises due to the missing of equal number of cations and anions from the crystal lattice.

A. Both A and R are correct but R is not the correct explanation of A

B. Both A and R are correct and R is the correct explanation of A

C. A is correct but R is wrong.

D. A is wrong but R is correct

Answer: b

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10. Assertion (A) : Zinc oxide is colourless at room temperature but on heating it becomes yellow in colour.

Reason (R) : On heating Zinc loses oxygen and thereby forming free Zn^{2+} ions. The excess Zn^{2+} ions move to interstitial sites and the electrons also occupy interstitial positions.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A

C. A is correct but R is wrong

D. A is wrong but R is correct

Answer: a

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Additional Questions V Find The Odd One Out

1. Find the odd one out

A. Plastic

B. Rubber

C. Glucose

D. Glass

Answer: c

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2. Find the odd one out

A. Anthracene

B. Naphthalene

C. Glucose

D. Sodium chloride

Answer: d

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3. Find the odd one out

A. Sodium

B. Pottasium

C. Frozen elements of group 18

D. Gold

Answer: c

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4. Find the odd one out

A. Solid Co_2

B. Solid ice

C. Glucose

D. Urea

Answer: a

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5. Find the odd one out

A. Cubic

B. Rhombohedral

C. Hexagonal

D. Cyclic

Answer: d

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Additional Questions Vi Find Out The Correct Pair

1. Find out the correct pair

A. Glass, plastic

B. Rubber, ice

C. Nacl, Glucose

D. Urea, solid NH_3

Answer: a

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2. Find out the correct pair

A. $NaCl, KCI$

B. FeO, ZnO

C. $AgBr$, $AgNO_3$

D. VO, ZnO

Answer: a

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3. Find out the correct pair

A. Solid CO_2, Solid ice

B. Solid CO_2 Solid NH_3

C. Graphite, Silicon carbide

D. Naphthalene, Phenol

Answer: b

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4. Find out the correct pair

A. $NaCI$, SiC

B. Naphthalene, anthracene

C. Solid ice, graphite

D. Copper, KCI

Answer: b

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Additional Questions Vii Find Out The Incorrect Pair

1. Find out the incorrect pair

A. $NaCI, KCI$

B. Naphthalene, anthracene

C. Solid CO_2 Solid NH_3

D. Diamond, solid ice

Answer: d

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2. Find out the incorrect pair

A. Cu, Fe

B. Glucose, Urea

C. Diamond, SiC

D. Benzene, glucose

Answer: d

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Additional Questions 2 Mark Questions

1. What are crystalline solid ? Give example.

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2. What are amorphous solid ? Give example.

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3. What are covalent solids ? Give example.

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4. Silicon carbide is very hard. Justify this statement.

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5. Write a note about molecular solids.

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6. What are non-polar molecular solids ? Give example.

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7. What are hydrogen bonded molecular solids ? Give example.

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8. Define crystal lattice.

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9. Define coordination number.

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10. Draw the tetragonal crystal systems

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11. Draw the hexagonal primitive erystal structure.

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12. Draw the types of monoclinic primitive cubic crystals.

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13. Draw the primitive cubes (i) trigonal (i) triclinic

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14. What is Bragg's equation ?

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15. What is meant by linear arrangement of spheres in one direction ?

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16. What is meant by Piezo electricity ?

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17. Why are solids rigid ?

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18. Why do solids have a definite volume ?

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19. Classify the following as amorphous or crystalline solids : Polyurethane, naphthalene, benzoic acid, teflon, potassium nitrate, cellophane, polyvinyl chloride, fibre glass, copper.

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20. Why is glass considered as super cooled liquid ?

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21. 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?

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22. 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.

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

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24. Ionic solids conduct electricity in molten state but not in solid state, Explain.

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25. An element with molar mass $2.7 \times 10^{-2}\ \mathrm{kg\ mol^{-1}}$ forms a cubic unit cell with edge length 405 pm. If the density is

$2.7 \times 10^3 \ \ \mathrm{kg\,m^{-3}}$, what is the nature of the cubice unit cell?

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

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27. Classify each of the following solids as ionic, metallic, molecular, network (covalent) or amorphous. (i) Tetra phosphorous decoxide (P_4O_{10}) (ii) Ammonium Phosphate $(NH_4)_3, PO_4)$ (iii) Sic (iv) I_2 (v) P4 (vi) Plastic (vii) Graphite (viii) Brass (ix) Rb (x) LiBr (xi) Si

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28. What is the formula of a compound in which the element Y forms cep Lattice and atoms of X occupy $2/3$rd of tetrahedral voids ?

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29. The energy required to vapourise one mole of copper is smaller than that of energy required to vapourise 1 mol of diamond. Why ?

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30. Assign reason for the following :

(i) phosphorous doped silicon is a semiconductor.

(ii) Schottky defect lowers the density of a solid.

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Additional Questions 3 Mark Questions

1. Distinguish between isotropy and anisotropy ?

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2. What are polar molecular solids ? Give example.

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3. Write a note about metallie solids.

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4. What are characteristic parameters of a unit cell ?

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5. What are type of unit cells ? Give their names.

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6. Draw the seven types of primitive erystal systems.

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7. Draw the types of cubic crystal systems.

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8. Draw the types of orthorhombic cubic crystal systems.

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9. Calculate the number of atoms belong to one unit cell of simple cubic unit cell(sc)

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10. Calculate the number of atoms per unit cell of bee type.

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11. How will derive the formula of density of a unit cell ?

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12. Calculate the packing fraction of simple cubic arrangement.

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13. What is meant by packing efficiency ? How is it measured ?

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14. Calculate the packing efficiency in fcc unit cell ?

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15. How is radius ratio is useful in determination of structure of an Ionic compound ?

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16. What is meant by impurity defect ? Explain with example ?

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17. A compound is formed by two elements M and N. The element N forms ccp and atoms of M occupy $1/3$ rd of the tetrahedral voids. What is the formula of the compound ?

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

(i)Face-centred cubic (ii) Face-centred tetragonal (iii) Body-centered

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19. Explain:

(i) The basis of similarities and differences between metallic

and ionic crystals.

(ii) Ionic solids are hard and brittle.

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20. ZnO is colourless at room temperature, while yellow when hot. Why ?

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Additional Questions 5 Mark Questions

1. What are general characteristics of solids ?

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2. Write a note about classification of solids with suitable examples.

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3. What are ionic solids ? Give their charaeteristics.

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4. What are molecular solids ? Explain their classification with suitable examples.

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5. An element crystallizes in a fee lattice with cell edge of 400 pm. The density of the element is $7g/cm3$. How many atoms one present in 280 g of the element ?

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