CHEMISTRY

BOOKS - R SHARMA CHEMISTRY (HINGLISH)

SOLID STATE

Follow Test 1

1. Constituent particles of a solid have

A. vibrational motion only

B. rotational motion only

C. translational motion only

D. all the three types of motion

Answer: 1

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2. At room temperature a substance exists in the solid state only when

A. thermal motion dominates over intermolecular force

B. thermal motion is balanced by the intermoleuclar forces

C. thermal motion is susperseded by the intermolecular forces

D. constituent particles are ions

Answer: 3

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3. Crystalline solids have

A. short range order only

B. long range order only

C. neither short range nor long range order

D. both short range and nor long range order

Answer: 4

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4. Which of the following is not a cystalline solids?

A. Polyurethane

B. Copper

C. Potassium nitrate

D. Benzoic acid

Answer: 1

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5. Which of the following is an amorphous solid?

A. Teflon

B. Cellophane

C. Polyvinyl chloride

D. All of these

Answer: 4

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6. Which of the following is used to convert sunlight into electricity?

A. Amorphous sulphur

B. Amorphous phosphorus

C. Amorphous silicon

D. Both (1) and (2)

Answer: 3

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7. Amorphorous solids such as glass may be classified as

A. supercooled liquids

B. supercooled solids

C. superheated liquid

D. superheated solids

Answer: 1

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8. Because of antisotropy

A. mica cleaves into long rod like piece and asbestos cleaves into thin sheets

B. mica cleaves into thin sheets and asbestos cleaves into long rod like pieces.

C. both mica and asbestos cleave into thin sheets

D. both mica and asbestos cleaves into long rod like pieces

Answer: 2

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Follow Test 2

1. Which of the following is not a molecular crystal?

A. Iodine

B. Silicon

C. Phosphorus

D. Sulphur

Answer: 2

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2. Which of the following is a covalent crystal?

A. Benzene

B. Urea

C. Zinc sulphide

D. Silicon carbide

Answer: 4

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3. Which of the following is a molecular crystalline solids?

A. Graphite

B. Diamond

C. Fullerene

D. None of these

Answer: 3

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4. Carbon is _____ in graphite

A. divalent

B. trivalent

C. tetravalent

D. pentavalent

Answer: 3

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5. Which of the following covelent network solids is referred to as pencil lead?

A. Corundum

B. Carborundum

C. Quartz

D. Graphite

Answer: 4

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6. Which of the following crystalline solids conduct electricity in molten state but not in solid state?

A. Ionic crystals

B. Molecular crystals

C. Covalent crystals

D. Metallic crystals

Answer: 1

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Follow Test 3

1. A set of identical point within a crystal is called

A. crystal system

B. crystal habit

C. crystal lattice

D. both (1) and (2)

Answer: 3

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2. If lattice points are connected by straight lines, the space within the crystal is divided into parallelepipeds. Each of these parallelepipeds is called

A. a motif

B. a unit cell

C. a crystal lattice

D. a crystal habit

Answer: 2

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3. How many crystal systems occur in crystalline solids?

A. 5

B. 10

C. 14

D. 7

Answer: 4

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4. How many types of Bravais lattices can occur in crystalline solids?

A. 14

B. 7

C. 10

D. 11

Answer: 1

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5. Which of the crystal systems matches with the geometry of a match box?

A. Triclinic

B. Monoclinic

C. Orthorhombic

D. Rhombohedral

Answer: 3

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6. Which of the crystal systems has all the axial angles equal but not equal to 90°?

A. Cubic

B. Tetragonal

C. Orthorhombic

D. Rhombohedral

Answer: 4

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7. Which of the crystal systems have all the axial distances (or edge lengths)equal?

A. Cube and rhombohedral

B. Cubic and hexagonal

C. Cubic and tetragonal

D. Only cubic

Answer: 1

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8. Which of the crystal system is different from other?

A. Triclinic

B. Cubic

C. Monoclinic

D. Triclinic

Answer: 2

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9. Which of the crystal systems has more than one type of bravais lattices?

A. Hexagonal

B. Rhombohedral

C. Monoclinic

D. Triclinic

Answer: 3

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10. How many types of body centred unit cells are possible?

A. Three

B. Two

C. Four

D. Seven

Answer: 1

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11. On the basis of its unit cell structure, Glauber's salt (crystal-line solution sulphate, $NaSO_4.10H_2O$) belongs to the

A. tetragonal system

B. monoclinic system

C. triclinic system

D. cubic system

Answer: 2

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12. Potassium dichromatic, blue vitriol, and boric acid all crystal-lize in the

A. cubic (or regular) system

B. orthorhomic (or rhombic) system

C. rhombohedral (or trigonal) system

D. triclinic (or anorthitic) system

Answer: 4

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Follow Test 4

1. How many time atoms are in one unit cell of polonium ?

A. 4

B. 1

C. 2

D. 5

Answer: 2

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2. How many atoms are in one unit cell of vanadium?

A. 2

B. 3

C. 4

D. 1

Answer: 1

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3. How many atoms ar in one unit cell of calcium ?

A. 4

B. 3

C. 2

D. 1

Answer: 3

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4. An ionic compound is made up of cations A and anions B. if cations A are at the alternate corners and anions are at the alternate faces

of the cubic unit cell then empirical formula of the compound will be

A. AB_2

B. A_2B_3

C. AB_3

D. AB

Answer: 1

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5. The number of atoms in a cubic based unit cell having one atom on each corner and two atoms on each body diagonal is

A. 6

B. 7

C. 8

D. 9

Answer: 4

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Follow Test 5

1. The stacking pattern of a simple cubic structure is

A. $ABCABC$

B. $ABABAB\ldots\ldots$

C. AAAAAA....

D. AABBAA....

Answer: 3

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2. The coordination number of each atom in simple cubic structure is

A. 6

B. 4

C. 8

D. 9

Answer: 1

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3. Which of the following metals has the simple cubic lattice?

A. Ra

B. Po

C. Fe

D. Cu

Answer: 2

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4. The stacking pattern of body contered cubic structure is

A. $\mathrm{AAAAAA}\ldots\ldots$

B. $ABCABCABC\ldots$

C. $\mathrm{ABBAEE}\ldots$

D. $ABABAB\ldots\ldots$

Answer: 4

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5. The coordination number of each atom in body centered cubic unit cell is

A. 12

B. 6

C. 8

D. 5

Answer: 3

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6. Potassium crystallizes with a

A. face centered cubic lattic structure

B. hexagonal closest packed structure

C. primitive cubic lattice structure

D. body centered cubic lattice structure

Answer: 4

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7. In a two -dimensional hexagonal close-packed layer.

(i) each sphere is surrounded by six sphere

(ii) each sphere is surrounded by six voids

(iii)each void is surrounded by three spheres

(iv) there are on an average two voids belonging to each sphere

A. (i),(ii),(iii),(iv)

B. (i),(ii),(iii)

C. (i),(iii),(iv)

D. (ii),(iii),(iv)

Answer: 1

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8. Hexagonal closet packed arrangement of equal -sized spheres is described by

A. $ABCACB\ldots\ldots$

B. $\mathrm{ABBAAB}\ldots\ldots$

C. $ABABAB\ldots\ldots$

D. $ABCABABC\ldots$

Answer: 3

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9. In hexagonal closest-packed arrangement each spher has a coordinationnumber of

A. 12

B. 8

C. 4

D. 6

Answer: 1

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10. Which of the following noble gases crystallizes in hcp structure?

A. He

B. Ne

C. Ar

D. All of these

Answer: 1

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11. The staking pattern of cubic closet packed arrangement is

A. $A - A - A - A -$

B. $A - B - A - B -$

C. $A - B - C - A - B - C$

D. $A-B-B-A-B-B-$

Answer: 3

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12. The coordination number of the fcc structure for metals is

A. 9

B. 8

C. 6

D. 12

Answer: 4

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13. Which of the following metals does not have and fcc structure?

A. Ca

B. Sr

C. Ba

D. Both (1) and (2)

Answer: 3

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14. Which of the following statement is correct for a closet packed structure? (i) Each tetrahedral void is surrounded by 4 spheres and each sphere is surrounded by 8 tetrahedral voids.

(ii) Each octahedral voids is surrounded by 6

spherus and each sphere is surrounded by 6 octahedral voids.

(iii) The number of tetrahedral voids in a closest-packed arrangement is twice the number of spheres.

(iv) The number of octahedral voids in a closest-packed arrangement is equal to the number of spheres.

A. (i), (ii)

B. (iii), (iv)

C. (i), (iii)

D. (i), (ii), (iii), (iv)

Answer: 4

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15. The ratio of the size of the central atom to the size of the coordanating atom which in turn is expressed by the ration of their respective radii of called

A. radius ratio

B. coordinating number

C. rank

D. effective ratio

Answer: 1

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16. If in a closest packed arrangement r is the radius of the sphere respresenting the tetrahedral void and R is the radius of the spheres in closest packed arrangement then

A. $r/R = 0.732$

B. $r/R = 0.155$

C. $r/R = 0.225$

D. $r/R = 0.414$

Answer: 3

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17. In a crystalline solid, anions B are arranged in a ccp. Cations A are equally distributed between octahedral and tetrahedral voids. If

all the octahedral voids are occupied, the formula of the compound is A_2B / A_3B.

A. A_2B

B. AB_2

C. AB_3

D. A_3B

Answer: 1

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18. Barium titanate crystallizes in perovskite structure (ABO_3) which is a cubic lattice with barium ions occupying the corners of the unit cell ,oxide ions occupying the face centres and titanium ion occupying centes of unit cell.if Ti^{4+} ions are described as occupying the holes in $Ba-O$ lattice. then type of hole and fraction of these holes occupied by these ions are

A. $100\ \%$ of tetrahedral holes

B. $25\ \%$ of octahedral holes

C. $100\ \%$ of octahedral holes

D. $25\ \%$ of tetrahedral holes

Answer: 2

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19. In an ionic compound, oxide ions have ccp arrangement Cations A are present in one eighth of the tetrahedral voids whilst cations B occupy half of the octahedral voids.the empirical formula of the compound is

A. ABO_4

B. ABO_2

C. AB_2O_4

D. A_2BO_4

Answer: 3

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20. which of the following statement is correct for the $NaCl$ lattice?

A. An Na^+ ion is placed at a distance of $\frac{1}{\sqrt{2}}a$ directly above each Cl^- (where a is the cube unit cell edge length).

B. An Na^+ ion is placed at a distance of $\frac{1}{2\sqrt{2}}$ a directly above each Cl^- ion.

C. An Na^+ ions is placed at a distance of $\frac{1}{6}a$ directly above each Cl^- ion

D. An Na^+ ion is placed at a distance of $\frac{1}{2}a$ directly above each Cl^-.

Answer: 4

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21. In $CsCl$ the number of formula units per unit cell is

A. 2

B. 4

C. 6

D. 12

Answer: 1

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22. Which of the following is polymorphic?

A. Caesium chloride

B. Sodium chloride

C. Zinc sulphide

D. Both (1) and (2)

Answer: 3

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23. The ZnS structure can be obtained from the

A. rock salt structure by replacing the Na^+ and Cl^- ions of each basis with one Zn atoms and one S atom respectively

B. fullferene structure by replacing the two C atoms of each basis with one Zn atoms and one S atom.

C. graphite structure by replacing two C atoms of each basis with one Zn atom

and one S atom respectively.

D. diamond structure by replacing the two C atoms of each basis with one Zn atom and one S atom respectively.

Answer: 4

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24. In calcium fluoride (CaF_2), the coordinate number of each Ca^{2+} ion is _____ and that of each F^- ion is _____.

A. $8, 4$

B. $4, 8$

C. $4, 4$

D. $8, 8$

Answer: 2

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Follow Test 6

1. The fcc structure is often called

A. hexagonal closest packed structure

B. tetragonal closest packed structure

C. cubic closest packed structure

D. triclinic closest packed structure

Answer: 3

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2. In fcc unit cell the radius of each atom (sphere) is releated to the edge length (or side) of the cube as

A. $r = \frac{\sqrt{3}}{2}a$

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

C. $r = \sqrt{3}a$

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

Answer: 2

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3. The packing effciency ofa simple cubic crystal is given by

A. $\sqrt{2}\pi/6$

B. $\sqrt{3}\pi/8$

C. $\pi/6$

D. $\pi/8$

Answer: 3

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4. A metallic element crystallizes into a lattice contained sequence of layers $ABABAB\ldots$. Any packing of sphere leaves out voilds in the lattice.The percentage by volume of this lattice as empty space is

A. $74\ \%$

B. $68\ \%$

C. $52.4\ \%$

D. $26\ \%$

Answer: 4

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Follow Test 7

1. Sliver metal crystallizes in a cubic closet packed arrangement with the edge of the unit cell having a length $a = 407\text{pm}$. The distance between centers of two closet Ag atoms is

A. 288 pm

B. 144 pm

C. 407 pm

D. 432 pm

Answer: 1

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2. Which of the following relationship helps to calcuate the denstity of the crystal?

A. $d = \frac{a^3 N_A}{ZM}$

B. $d = \frac{ZM}{a^3 N_A}$

C. $d = \frac{Za^3}{MN_A}$

D. $d = \frac{a^3 M}{Z N_A}$

Answer: 2

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Follow Test 8

1. A perfect crystal is one in which

A. the free energy is minimum

B. entropy is zero at room temperature

C. each atom is vibrating on its correct lattice position in the crystal structure

D. each atom is in rest at its correct lattice position in the crystal structure

Answer: 4

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2. Crystals are imperfect because the presence of defects upto a certain concentration

A. increases G and decreases S

B. decreases G and increase S

C. increases both G and S

D. decreases both $G$and S

Answer: 2

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3. which of the following decribes atomic imperfections?

A. Lattice imperfections extended along surfaces

B. Lattice imperfections extended along lines

C. Departures from the ordered and periodic arrangement in the vicnity of a particle or a group of particles.

D. Deviation from periodicity extended over microscope regions of the crystals.

Answer: 3

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4. Which of the following crystal defects are generally shown by nonionic solids?

A. Vacancy defects

B. interstitial defects

C. Stoichiometric defects

D. Both (1) and (2)

Answer: 4

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5. Which of the following crystals exhibits Schottky defect?

A. $NaCl$

B. $CsCl$

C. $AgBr$

D. All of these

Answer: 4

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6. Frenkel defects involving anions is found in

A. CaF_2

B. $NaCl$

C. $AgBr$

D. Both (2) and (3)

Answer: 1

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7. Which of the folloiwng can't exhibits Frenkel defect?

A. ZnS

B. $NaCl$

C. $AgBr$

D. $AgCl$

Answer: 2

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8. Which of the following stoichiometic defect results in the increase in the density of the crystalline substance.

A. Frenkel defect

B. Schottky defect

C. Interstitial defect

D. Vacancy defect

Answer: 4

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9. The excess of potassium in KCl makes the crystal appear

A. yellow

B. pink

C. violet

D. green

Answer: 3

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10. Zinc oxide is white in colour at room temperature but turns yellow when heated on account of

A. metal excess defect due to anionic vacancies

B. metal excess defect due to the presence of extra cations at interstitial sites.

C. metal deficiency defect due to absence of positive ions

D. metal deficiency defect due to extra interstitial negative ions

Answer: 2

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11. Which of the following compounds is nonstoichiometric ?

A. FeO

B. Cu_2O

C. Cu_2S

D. All of these

Answer: 4

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12. Anaysis shows that nickel oxide has the formula $NI_{0.90}O_{1.00}$. Fractional of nickel existing as Ni^2 and Ni^{3+} ions respectively. Are

A. 4% and 96%

B. 96% and 4%

C. 6% and 94%

D. 94% and 6%

Answer: 2

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13. If Al^{3+} replaces Na^{+} at the edge centre of $NaCl$ lattice ,then the cation vacancies in 1 mole of $NaCl$ will be

A. 6.022×10^{23}

B. 6.775×10^{23}

C. 4.517×10^{23}

D. 3.01×10^{23}

Answer: 4

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Follow Test 9

1. A metal 's ability to conduct electricity

A. increases with increase of temperature

B. decreases with increase of temperature

C. decreases with increase of temperature

D. does not charge with temperature

Answer: 2

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2. Which of the following is an insulator?

A. White tin

B. Gray tin

C. Diamond

D. Germanium

Answer: 3

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3. Conductivity of a _____ increase with increase of temperature

A. conductor

B. super conductor

C. insulator

D. semiconductor

Answer: 4

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4. The ability of a semiconductor to conduct electricity can be enhanced by adding small amount of certain impurities to the semiconducting element .The process of adding small quantities of these other elements to a semiconducting element to increase it conductivity is called

A. doping

B. tapping

C. hiding

D. tampering

Answer: 1

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5. A diode is _____ and is used as a rectifier

A. an n type semiconductor

B. an p type semiconductor

C. an combination of n-type and p-type semiconductor

D. either (1) and (2)

Answer: 3

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6. Which of the following types of semiconductor are used in transistors?

A. npn type

B. pnp type

C. pn type

D. Both (1) and (2)

Answer: 4

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7. Which of the following transition metal oxides is like matallic copper in its conducitvity and appearance?

A. ReO_3

B. CrO_3

C. TiO

D. VO_3

Answer: 1

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Follow Test 10

1. Diamagnetic solids are _____ By an external magnetic field.

A. weakly repelled

B. strongly repelled

C. weakly attracted

D. strongly attracted

Answer: 1

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2. Paramagnetic solids are _____ by an external magnetic field

A. strongly repelled

B. weakly attracted

C. weakly repelled

D. strongly attracted

Answer: 2

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3. Ferromagnetic solids are..... By an external magnetic field

A. weakly attracted

B. strongly repelled

C. weakly repelled

D. strongly attrated

Answer: 4

4. Ferrimagnetic substances have

A. large magnetic moment

B. zero magnetic moment

C. small magnetic moment

D. any value of magnetic moment

Answer: 3

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5. Electricity produced on applying stress on the crystals of dielectrics is

A. piezoelectrocity

B. pyroelectricity

C. ferroelectricity

D. antiferroelectricity

Answer: 1

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Question Bank Level 1

1. A solid with high electrical and thermal conductivity from the following is

A. Si

B. Li

C. $NaCl$

D. ICl

Answer: 2

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2. The number of atoms contained in a fcc units cell of a monatomic substance is

A. 1

B. 2

C. 4

D. 6

Answer: 3

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3. Diamond is hard because

A. all the four valence electrons are bounded to carbon atoms by covalent bonds

B. it is a giant molecule

C. it is made up of C atoms

D. it can not be burned

Answer: 1

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4. A particular solid is very hard and has a very high melting point.In solid state it is nonconductor and its melt is a conductor of electricity. Classify the solid.

A. Metallic

B. Molecular

C. Network

D. Ionic

Answer: 4

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Question Bank Level 2

1. Coordinating number of Na^+ in $NaCl$ is

A. 4

B. 3

C. 6

D. 5

Answer: 3

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2. Which of the following is correct for closest packed structure?

A. There are six types of interstices

B. There are four types of interstices

C. There are two types of interstices

D. There are three types of interstices

Answer: 3

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3. If the radius of the octahedral void is r and radius of the atom in closet packed structure is R then

A. $r/R = 0.414$

B. $r/R = 0.225$

C. $r/R = 0.155$

D. $r/R = 0.732$

Answer: 1

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4. Which of the following elements exhibits ferromagetism?

A. Fe

B. Co

C. Ni

D. All of these

Answer: 4

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5. The edge length of face centred cubic unit cell is 5.8 pm. if the radius of the caiton is 110 pm. The radius of the anion is

A. 288 pm

B. 398 pm

C. 144 pm

D. 618 pm

Answer: 3

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6. Schottky defect in a crystal is observed when

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

B. unequal number of cations and anions are missing form the lattices

C. density of the crystal is increased

D. equal number of cations and anions are missing from the lattice

Answer: 4

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7. The intermetallic compounds $LiAg$ crystallises in cubic lattice in which both lithium and silver have coordination number of eight ,the crystal class is

A. simple cubic

B. body centered cubic

C. face centred cubic

D. none of these cubic

Answer: 2

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8. When electrons are trapped into the crystalline anion vacancy the defect is known as

A. schottky defect

B. Stoichiometric defect

C. Frenkel defect

D. F-centres

Answer: 4

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9. In the fluorite structure the coordination number of Ca^{2+} ion is

A. 4

B. 6

C. 8

D. 3

Answer: 3

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10. For orthorhombic system axial ratios are $a \neq b \neq c$ and the axial angle are

A. $\alpha = \beta = \gamma \neq 90^\circ$

B. $\alpha = \beta = \gamma = 90^\circ$

C. $\alpha = \gamma = 90^\circ, \beta \neq 90^\circ$

D. $\alpha \neq \beta \neq \gamma \neq 90^\circ$

Answer: 2

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11. Most crystals show good cleavage because their atoms ions or molecules are

A. weakly bonded together

B. strongly bonded together

C. spherically symmetrical

D. arranged in planes

Answer: 4

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12. Three element A, B, C crystallize into a cubic solid lattice.Atoms A occupy the corners B atoms the cube centres and atom C the edge .The formula of the compound is

A. ABC

B. ABC_2

C. ABC_3

D. ABC_4

Answer: 3

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13. Schottky defect occurs mainly in electrovalent compounds where

A. positive and negative ions are of different size

B. positive and negative ions are of same size

C. positive ions are small and negative ions are big.

D. positive ions are big and negative ions are small.

Answer: 2

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14. Which of the following shows ferrimagnetism?

A. TiO_2

B. CrO_2

C. MnO

D. Fe_3O_4

Answer: 4

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15. If Z is the number of atoms in the unit cell that represent the closed packing sequence $---ABCAB---$ the number of terrahedral in the unit cell is equal to

A. Z

B. $2Z$

C. $Z/2$

D. $Z/4$

Answer: 2

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16. A metal crystallises in a bcc lattice ,its unit cell edge length in about 300 pm and its molar mass is about $50gmol^{-1}$ what would be the density of the metal (in g cm^{-3})?

A. 3.1

B. 6.2

C. 9.3

D. 12.4

Answer: 2

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17. In face -centered cubic unit cell, edge length is

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

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

C. $2r$

D. $\frac{\sqrt{3}}{2}$

Answer: 2

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18. On doping Ge with a little of In or Ga one gets

A. p-type semiconductor

B. n-type semiconductor

C. insulator

D. rectifier

Answer: 1

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19. A compound is formed by elements A and B. This crystallises in the cubic structure when atoms A are at the corners of the cube and atoms B are at the centre of the body.The simplest formula of the compound is

A. AB

B. AB_2

C. A_2B

D. AB_4

Answer: 1

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20. A semiconductor of Ge can be made p-type by adding

A. trivalent impurity

B. tetravalent impurity

C. pentavalent impurity

D. divalent impurity

Answer: 1

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21. Which of the crystal systems has maximum number of Bravais lacttices?

A. Cubic

B. Monoclinie

C. Tetragonal

D. Orthorhombic

Answer: 4

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22. Ruby is an example of crystal with aa chemical impurity .The crystal is mainly colorless aluminium oxide, Al_2O_3, but occasional aluminium ions .Al^{3+}, are replaced by ..... .

A. Cr^{3+} ions

B. Co^{3+} ions

C. Fe^{3+} ions

D. Os^{3+} ions

Answer: 1

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

A. $4.08\ \%$

B. $6.05\ \%$

C. $5.08\ \%$

D. $7.01\ \%$

Answer: 1

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24. The second order Bragg diffraction of X rays with $\lambda = \text{Å}$ form a set of parallel planes

in a metal occurs at an angle 60°. the distance between the scattering planes in the crystal is

A. 0.575Å

B. 1.00Å

C. 2.00Å

D. 1.15Å

Answer: 4

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25. A pure crystallic substance , on being heated gradually first a hurbit looking liquid and then the furbidly completely disppears .This behaviour is the characteristic of substances forming

A. allotropic crystals

B. liquid crystals

C. isomeric crystals

D. isomorphous crystals

Answer: 2

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26. $AgBr$ can exhibit

A. only Schottky defect

B. only Frenkel defect

C. both (1) and (2)

D. none of these

Answer: 3

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27. The Ca^{2+} and F^{-} ions arc located in CaF_2 crystal respectively at face centred cubic lattice points and in

A. tetrahedral voids

B. half of tetrahedral voids

C. octahedral voids

D. half of octahedral voids

Answer: 1

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28. if $a = b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$, the crystal system is

A. cubic

B. rhombic

C. tetragonal

D. monoclinic

Answer: 3

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

A. cubic

B. hexagonal

C. Orthorhombic

D. rhombohedral

Answer: 2

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30. In a compound XY_2O_4 , oxide ions are arranged in CCP and cations X are present in octahedral voids. Cations Y are equally distributed between octahedral and tetrahedral voids. The fraction of the octahedral voids occupied is :-

A. $1/2$

B. $1/4$

C. $1/8$

D. $1/6$

Answer: 1

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31. Which of the following is used ot make magnetic tapes for use in audio recording?

A. CuO_2

B. CoO_2

C. CmO_2

D. CrO_2

Answer: 4

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32. $CsCl$ crystallizes in body centred cubic lattice .If $'a'$ is its edge length then which of the following expression is correct?

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

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

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

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

Answer: 1

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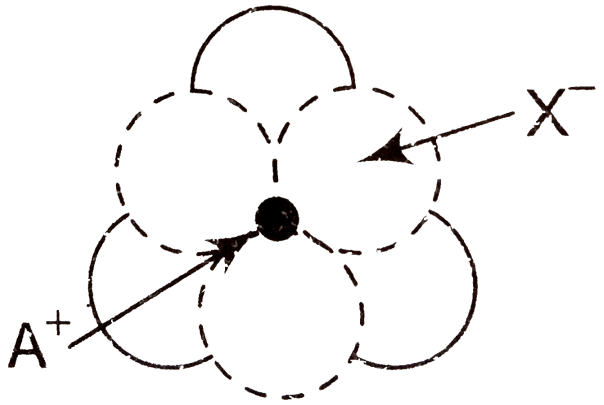
33. The arrangement of X^- ions around A^+ in solids AX is given in the figure (not drawn to scale). if the radius of X^- is 250 pm, the

radius of A^+ is



A. $104pm$

B. $125pm$

C. $183pm$

D. $57pm$

Answer: 1

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34. The liquefied metal expanding on soildification is

A. Ga

B. Al

C. Zn

D. Cu

Answer: 1

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Archives

1. In calcium, fluoride having the florite structures. The coordination number for calcium ion $\left(Ca^{2+}\right)$ and fluoride ion $\left(F^{-}\right)$ are

A. 4 and 2

B. 6 and 6

C. 8 and 4

D. 4 and 8

Answer: 3

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2. Lithium has a bcc structure .Its density is $530 kgm^{-3}$ and its atomic mass is $6.94 gmol^{-1}$ .Calculate the edge length of a unit cell of lithium metal $\left(N_A = 6.02 \times 10^{23} mol^{-1}\right)$

A. $264 pm$

B. $154pm$

C. $352pm$

D. $527pm$

Answer: 3

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

A. 2

B. 6

C. 4

D. 8

Answer: 2

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4. The vacant space in bcc lattice unit cell is :

A. $23\ \%$

B. $32\ \%$

C. $26\ \%$

D. $48\ \%$

Answer: 2

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5. The correct statement regarding defects in crystalling solids.

A. Frenkel defect is a dislocation defect

B. Frenkel defect is found in halides of alkaline metals

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

D. Frenkel defects decrease the density of crystalline solids.

Answer: 1

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6. A given metal crystalline out with a cubic structure having edge length of 361 pm .if there are four metal atoms in one unit cell, what is the radius of metal atom?

A. $108pm$

B. $40pm$

C. $127pm$

D. $80pm$

Answer: 3

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

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

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

C. $\frac{\sqrt{3}}{4}a$

D. $\frac{\sqrt{3}}{2}a$

Answer: 4

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8. A metal has a fcc lattice.The edge length of the unit cell is 404 pm ,the density of the metal is $2.72gcm^{-3}$. The molar mass of the metal is $(N_A,$ Avorgadro's constant $= 6.02 \times 10^{23}mol^{-1})$

A. $30gmol^{-1}$

B. $27gmol^{-1}$

C. $20gmol^{-1}$

D. $40gmol^{-1}$

Answer: 2

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

A. 8

B. 6

C. 1

D. 4

Answer: 1

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10. a metal crystallizes with a face-centered cubic lattice.The edge of the unit cell is 408 pm. The diameter of the metal atom is :

A. $288pm$

B. $408pm$

C. $144pm$

D. $204pm$

Answer: 1

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11. The number of octabedral voids (s) per atoms present in a cubic packed structure is

A. 1

B. 3

C. 2

D. 4

Answer: 1

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12. Structure of a mixed oxide is cubic close packed the cubic unit cell of mixed oxide is composed of oxide ions. One fourth of the tetrahedral voids are occupied by divalent metal.A and the octahedral voids are occupied by a monvalent metal B. The formula of the oxide is :

A. AB_2O_2

B. ABO_2

C. A_2BO_2

D. $A_2B_3O_4$

Answer: 1

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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 $\left(Y^-\right)$ will be

A. $165.7pm$

B. $275.1pm$

C. $322.5pm$

D. $241.5pm$

Answer: 4

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14. AB crystallizes in a body centred cubic lattice with edge length a equal to $387pm$ .The

distance between two oppositely charged ions in the lattice is :

A. $300pm$

B. $335pm$

C. $250pm$

D. $200pm$

Answer: 2

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15. Lithium metal crystallizes in a body centred cubic crystals. If the length of the side of the unit cell of lithium is $351pm$ the atomic radius of the lithium will be

A. $151.8pm$

B. $75.5pm$

C. $300.5pm$

D. $240.8pm$

Answer: 1

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16. Copper crystalline in a face centred cubic lattice with a unit cell length of $361pm$ .What is the radius of copper atom in p m?

A. 157

B. 181

C. 108

D. 128

Answer: 4

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17. With Which one of the following elements silicon should be doped so as to give p-type of semiconductor?

A. Germanium

B. Arsenic

C. Selenium

D. Boron

Answer: 4

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18. If $'a'$ stands for the edge length of the cubic systems: simple cubic,body centred cubic and face centred cubic then the ratio of radii of the spheres inthese systems will be respectively,

A. $1a : \sqrt{3}a : \sqrt{2}a$

B. $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$

C. $\frac{1}{2}a : \sqrt{3}a : \frac{1}{2\sqrt{2}}a$

D. $\frac{1}{2}a : \frac{\sqrt{3}}{2}a : \frac{\sqrt{2}}{2}a$

Answer: 2

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19. Which of the following statements is not correct?

A. the number of Bravais lattices in which a crystal can ebh categorized in 44.

B. The fraction of the total volume occupaied by the atoms in a primitive cell is 0.48.

C. Molecular solids are generally volatile.

D. The number of C atoms in an unit cell of diamond is 4.

Answer: 2,4

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20. The fraction of total volume occupied by the atom present in a simple cubic is

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

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

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

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

Answer: 3

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21. If $NaCl$ is doped with $10^{-4} mol\,\%$ of $SrCl_2$ the concentration of cation vacancies will be $\left(N_A = 6.02 \times 10^{23} mol^{-1}\right)$

A. $6.02 \times 10^{17} mol^{-1}$

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

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

D. $6.02 \times 10^{16} mol^{-1}$

Answer: 1

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22. The appearance of colour in solid alkali metal halides is generally due to

A. Interstital positions

B. F- centres

C. Schottky defect

D. Frenkel defect

Answer: 2

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23. CsBr crystallises in a body centred cubic lattice. The unit cell length is 436 pm. Given that the atomic mass of Cs = 133 and that of Br = 80 amu and Avagadro number being $6.02 \times 10^{23} mol^{-1}$ the density of CsBr is

A. $4.25 gcm^{-3}$

B. $42.5 gcm^{-3}$

C. $0.425 gcm^{-3}$

D. $8.31 gcm^{-3}$

Answer: 1

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24. In a face centred cubic lattice unit cell is shared equally by how many unit cells?

A. 4

B. 2

C. 6

D. 8

Answer: 3

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25. A compound formed by elements X and Y crystallises in a cubic structure in which the X atoms are at the corners of a cube and the Y atoms are at the face centres.The formula of the compound is

A. XY_3

B. X_3Y

C. XY

D. XY_2

Answer: 1

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26. The pyknometric density of sodium chloride crystal is $2.165 \times 10^3 kgm^{-3}$ while its X ray density is $2.178 \times 10^3 kgm^{-3}$ the fraction of unoccupied sites in $NaCl$ crystal is

A. 5.96×10^{-1}

B. 5.96×10^{-3}

C. 5.96

D. 5.96×10^{-2}

Answer: 2

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27. Zn converts from its melted state to its soilds state, it has hcp structure ,thenfind out the number of nearest atoms.

A. 6

B. 8

C. 12

D. 4

Answer: 3

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28. A compound formed by elements A and B crystallises in a cubic structure where A atoms are present at the corners of a cube and the B atoms are present at the face centres.The formula of the compound is

A. A_2B

B. AB_3

C. AB

D. A_3B

Answer: 2

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