RAVI MATHS TUITION CENTER, NEAR VILLIVAKKAM RLY STATION, CHENNAI – 82.
WHATSAPP - 8056206308

Solid State

12th Standard

Chemistry

Exam Time : 02:30:00 Hrs | Total Marks : 100

25 x 1 = 25

1) Graphite and diamond are
(a) Covalent and molecular crystals (b) ionic and covalent crystals (c) both covalent crystals (d) both molecular crystals

2) An ionic compound AxBy crystallizes in fcc type crystal structure with B ions at the centre of each face and A ion occupying entre of the cube. the correct formula of AxBy is
(a) AB (b) AB_3 (c) A_3B (d) A_8B_6

3) The ratio of close packed atoms to tetrahedral hole in cubic packing is
(a) 1:1 (b) 1:2 (c) 2:1 (d) 1:4

4) Solid CO_2 is an example of
(a) Covalent solid (b) metallic solid (c) molecular solid (d) ionic solid

5) Assertion : monoclinic sulphur is an example of monoclinic crystal system
Reason: for a monoclinic system, $a \neq b \neq c$ and $\alpha = \gamma = 90^0, \beta \neq 90^0$
(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.

6) In calcium fluoride, having the flurite structure the coordination number of Ca^{2+} ion and F- Ion are (NEET)
(a) 4 and 2 (b) 6 and 6 (c) 8 and 4 (d) 4 and 8

7) The number of unit cells in 8 gm of an element X (atomic mass 40) which crystallizes in bcc pattern is (NA is the Avogadro number)
(a) 6.023 X 10^{23} (b) 6.023 X 10^{22} (c) 60.23 X 10^{23} (d) $\left(\frac{6.023 \times 10^{23}}{8 \times 40}\right)$

8) The number of carbon atoms per unit cell of diamond is
(a) 8 (b) 6 (c) 1 (d) 4

9) In a solid atom M occupies ccp lattice and $\left(\frac{1}{3}\right)$ of tetrahedral voids are occupied by atom N. find the formula of solid formed by M and N.
(a) MN (b) M_3N (c) MN_3 (d) M_3N_2

10) The composition of a sample of wurtzite is $Fe_{O0.931}.00$ what % of Iron present in the form of Fe^{3+}?
(a) 16.05% (b) 15.05% (c) 18.05% (d) 17.05%

11) The ionic radii of A^+ and B^- are 098X10^{-10} mand 1.81X10^{-10}. m. the coordination number of each ion in AB is
(a) 8 (b) 2 (c) 6 (d) 4

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

(a) 400pm (b) 800pm (c) $\sqrt{3} \times 100pm$ (d) $\left(\frac{\sqrt{3}}{2}\right) \times 400pm$

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

(a) $\left(\frac{100}{0.414}\right)$ (b) $\left(\frac{0.732}{100}\right)$ (c) 100X0.414 (d) $\left(\frac{0.414}{100}\right)$

14) The vacant space in bcc lattice unit cell is

(a) 48% (b) 23% (c) 32% (d) 26%

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

(a) 488.5pm (b) 848.5pm (c) 884.5pm (d) 484.5pm

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) $\left(\frac{\pi}{4}\right)$ (d) $\left(\frac{\pi}{3\sqrt{2}}\right)$

17) The yellow colour in NaCl crystal is due to

(a) excitation of electrons in F centers (b) reflection of light from Cl- ion on the surface (c) refraction of light from Na^+ ion (d) all of the above

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

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

20) Potassium has a bcc structure with nearest neighbor distance 4.52 A0 . its atomic weight is 39. its density will be

(a) 915 kg m^{-3} (b) 2142 kg m^{-3} (c) 452 kg m^{-3} (d) 390 kg m^{-3}

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

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

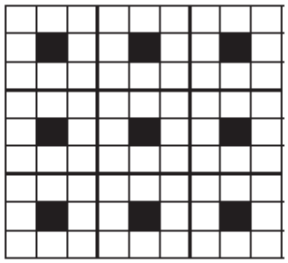
23) **Assertion:** due to Frenkel defect, density of the crystalline solid decreases.
Reason: in Frenkel defect cation and anion leaves the crystal

(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 (d) Both assertion and reason are false

reason is false

24) The crystal with a metal deficiency defect is
(a) NaCl (b) FeO (c) ZnO (d) KCl

25) A two dimensional solid pattern formed by two different atoms X and Y is shown below. The black and white squares represent atoms X and Y respectively. the simplest formula for the compound based on the unit cell from the pattern is



(a) XY_8 (b) X_4Y_9 (c) XY_2 (d) XY_4

8 x 2 = 16

26) Define unit cell
27) Give any three characteristics of ionic crystals.
28) Differentiate crystalline solids and amorphous solids.
29) classify the following solids
a. P4
b. Brass
c. diamond
d. NaCl
e. Iodine
30) Explain briefly seven types of unit cell
31) Distinguish between hexagonal close packing and cubic close packing.
32) Distinguish tetrahedral and octahedral voids.
33) What are point defects?

8 x 3 = 24

34) Explain Schottky defect.
35) Write short note on metal excess and metal deficiency defect with an example
36) Calculate the number of atoms in a fcc unit cell
37) Explain AAAA and ABABA and ABCABC type of three dimensional packing with the help of neat diagram.
38) Why ionic crystals are hard and brittle?
39) Calculate the percentage efficiency of packing in case of body centered cubic crystal.
40) What is the two dimensional coordination number of a molecule in square close packed layer?
41) Experiment shows that Nickel oxide has the formula $Ni_{0.96}.O_{1.00}$ What fraction of Nickel exists as of Ni^{2+} and Ni^{3}+ ions?

7 x 5 = 35

42) What is meant by the term “coordination number”? What is the coordination number of atoms in a bcc structure?
43) An element has bcc structure with a cell edge of 288 pm. the density of the element is 7.2 gcm^{-3}. how many atoms are present in 208g of the element.
44) Aluminium crystallizes in a cubic close packed structure. Its metallic radius is 125pm. calculate the edge length of unit cell.

45) if NaCl is doped with 10^{-2} mol percentage of strontium chloride, what is the concentration of cation vacancy

46) Atoms X and Y form bcc crystalline 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?

47) Sodium metal crystallizes in bcc structure with the edge length of the unit cell $4.3X10^{8}$.cm. calculate the radius of sodium atom.

48) Write a note on Frenkel defect.

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