**BIRLA PUBLIC SCHOOL (VIDYA NIKETAN)**



**Summer Vacation Assignment: 2018-19**

**Chemistry**

**CLASS- XI**

1. Define the terms:- (i) Precision (ii) Accuracy (iii) Significant figures (iii) unit conversion factors.
2. State the following :- (i) Law of conservation of mass (ii) Law of constant composition (iii) Law of multiple proportions (iv) Gay Lussac’s law (v) Avogadro’s law.
3. Give main points of Dalton’s atomic theory.
4. Give limitations of Dalton’s atomic theory.
5. Give relationship between molecular mass and vapour density.
6. Give relationship between molar mass and volume of a gas at S.T.P.
7. What is atomic mass unit or unified mass?
8. Which law explains the formation of five oxides of nitrogen?
9. Why are most of atomic masses fractional?
10. Write short notes on: - (i) Mass percent (ii) Mole fraction (iii) Molarity (iv) Molality.
11. What do you mean by limiting reagent and excess reagent? Calculate the maximum amount of water formed when 3.0 g of hydrogen react with 29.0 g of oxygen.
12. Calculate mass percentage composition of copper pyrites (CuFeS2). [ RAM:- Cu = 63.5, Fe = 56 & S = 32]
13. How are 0.50 mol Na2CO3 and 0.50 M Na2CO3 different? [ RAM;- Na = 23, C = 12 & O = 16]
14. Calculate the amount of lime stone needed to obtain 88 g of CO2, by heating the sample of lime stone.
15. How much copper metal can be obtained from 100 g of copper sulphate, CuSO4? (Atomic weights- Cu=63.5 u, S=32 u, O=16 u)
16. Calculate the molecular formula of an organic compound having the percentage of carbon, Hydrogen is 57.8, 3.6 and rest is oxygen. If its vapour density is 83 u. (Atomic mass of, C=12 u, H=1 u, O=16 u)
17. An organic compound contains C, H and rest is Oxygen, If they are present in the 26.67%, 2.22% and 71.11% calculate the empirical formula.(C=12u, H=1u,O=16u)
18. Calculate (a) molality (b) Molarity and (c) mole fraction of KI if the density of 20% (mass/mass) aqueous KI solution is 1.202 g mL-1. (molar mass of KI = 166 g mol-1)
19. Calculate the molarity of water if its density is 1000 kg m3.
20. A solution has been prepared by dissolving 5 g of urea in 95 g of water. What is the mass precent of urea in the solution?
21. Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc. Following reaction takes place:- Zn + 2 HCl --🡪 ZnCl2 + H2; Calculate the volume of hydrogen gas liberated at STP when 32.65 of Zn react with HCl. Given that the one mole of a gas occupies 22.7 L volume at STP; atomic mass of Zn = 65.3 u
22. How many oxygen atoms are present in 96 g of ozone (O3)?
23. Why is it necessary to balance a chemical equation?
24. Calculate mass of one atom of C-12 in grams.
25. Calculate molecular mass of H2C2O4.2H2O.

**Class XII Chemistry Summer Assignment (Solid State)**

1. How do metallic and ionic substances differ in conducting electricity? **[2009(set 1)]** 1
2. Silver crystallizes with face-centred cubic unit cells. Each side of the unit cell has a length of 409 pm. What is the radius of an atom of silver? (Assume that each face atom is touching the four corner atoms.) **[2009(set 1, 3)]** 3
3. Which point defect of its crystals decreases the density of a solid? **[2009(set 2)]** 1
4. Iron has a body-centred cubic unit cell with a cell edge of 286.65 pm. The density of iron is 7.87 g cm-3. Use this information to calculate Avogadro’s number. (Atomic mass of iron = 56 g mol-1) **[2009(set 2)]** 3
5. What is the number of atoms in a unit cell of a face-centred cubic crystal?**[2009(set 3)]** 1
6. What type of interactions hold the molecules together in a polar molecular solid? **[2010(set 1)]** 1
7. The density of copper metal is 8.95 g cm-3. If the radius of copper atom be 127.8 pm, is the copper unit cell simple cubic, body-centred cubic or face-centred cubic? (given : atomic mass of Cu = 63.54 g mol-1 and NA = 6.02 x 1023 mol-1) **[2010(set 1)]** 3
8. Write a distinguish feature of metallic solids. **[2010(set 3)]** 1
9. Silver crystallizes in fcc lattice. If the edge length of unit cell is 4.07 x 10-8 cm and the density of the crystal is 10.5 g cm-3, calculate the atomic mass of silver. (NA = 6.02 x 1023 atoms mol-1) **[2010(set 3)]** 3
10. Calculate the packing efficiency of a metal crystal for a simple cubic lattice. **[2011(set 1,2,3)]** 2
11. Explain how you can determine the atomic mass of an unknown metal if you know its mass, density and the dimensions of unit cell of its crystal. **[2011(set 1, 3)]** 2
12. Define the following terms in relation to crystalline solids: - (i) Unit cell (ii) Coordination number. Give one example in each case. **[2011(set 1)]** 2
13. How may the conductivity of an intrinsic semiconductor be increased? **[2012(set 1)]** 1
14. Copper crystallizes with face centred cubic unit cell. If the radius of copper atom is 127.8 pm, calculate the density of copper metal.

(Atomic mass of Cu = 63.55 u and Avogadro’s number, NA = 6.02 x 1023 mol-1)

**OR**

 Iron has a body-centred cubic unit cell with a cell edge of 286.65 pm. The density of iron is 7.87 g cm-3. Use this information to calculate Avogadro’s number. (Atomic mass of iron = 56 g mol-1) **[2012(set 1, 2, 3)]** 3

1. Which stoichiometric defect increases the density of a solid? **[2012(set 2)] 1**
2. What are n-type semiconductors? **[2012(set 3)] 1**
3. Account for the following:- (i) Schottky defects lower the density of related solids. (ii) Conductivity of silicon increases on doping it with phosphorous. **[2013(set 1)] 2**
4. Aluminium crystallizes in an fcc structure. Atomic radius of the metal is 125 pm. What is the length of the side of the unit cell of the metal? **[2013(set 1,2,3 )] 2**
5. (a) Why does presence of excess of lithium makes LiCl crystals pink? (b) A solid with cubic crystal is made of two elements P and Q. Atoms of Q are at the corners of the cube and P at the body-centre. What is the formula of the compound? **[2013(set 2 )] 2**
6. (a) What change occurs when AgCl is doped with CdCl2? (b) What type of semiconductor is produced when silicon is doped boron? **[2013(set 3)] 2**
7. An element with density 2.8 g cm-3 forms a f.c.c. unit cell with edge length 4 x 10-8 cm. Calculate the molar mass of the element. (Given: NA = 6.022 x 1023 mol-1) **[2014(set 1,2,3 )] 2**
8. (i) What type of non-stoichiometric point defect is responsible for the pink colour of LiCl? (ii) What type of defect is shown by NaCl?

**OR**

How will you distinguish between the following pairs of terms:- (i) Tetrahedral and octahedral voids (ii) Crystal lattice and unit cell. **[2014(set 1 )] 2**

1. (i) Write the type of magnetism observed when the magnetic moments are oppositely aligned and cancel out each other. (ii) Which stoichiometric defect does not change the density of the crystal? **[2014(set 2)] 2**
2. (i) Write the type of magnetism observed when the magnetic moments are aligned in parallel and anti-parallel directions in unequal numbers. (ii) Which stoichiometric defect decreases the density of the crystal? **[2014(set 3)] 2**
3. Write the formula of a compound in which the element Y forms ccp lattice and atoms of X occupy 1/3rd of tetrahedral voids. **[2015(set 1,2,3)] 1**
4. Examine the given defective crystal:-

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X+ | Y- | X+  | Y- | X+ |
| Y- | X+ | Y- | X+ | Y- |
| X+ | Y- | X+ | e- | X+ |
| Y- | X+ | Y- | X+ | Y- |

Answer the following questions:-

1. Is the above defect stoichiometric or non-stoichiometric?
2. Write the term used for the electron occupied site.
3. Give an example of the compound which shows this type of defect. **[2015(set 1,2,3)] 3**
4. ZnO turns yellow on heating. Why? **[2016(set 1,2,3)] 1**
5. An element crystallizes in an f.c.c. lattice with cell edge of 4000 pm. The density of the element is 7 g cm-3. How many atoms are present in 280 g of the element? **[2016(set 1,2,3)] 3**
6. Calculate the number of unit cells in 8.1 g of aluminium if it crystallizes in a face-centre cubic (f.c.c.) structure. (Atomic mass of Al = 27 g mol-1) **[2017(set 1,2,3)] 2**
7. (a) Based on the nature of intermolecular forces, classify the following solids:- Silicon carbide, Argon.

(b) ZnO turns yellow on heating. Why?

(c) What is meant by groups 12-16 compounds? Give an example. **[2017(set 1)] 3**

 31. (a) Based on the nature of intermolecular forces, classify the following solids:-

 Benzene, Silver.

 (b) AgCl shows Frenkel defect while NaCl does not. Give reason.

 (c) What type of semiconductor is formed when Ge is doped with Al? **[2017(set 2)] 3**

 32. a) Based on the nature of intermolecular forces, classify the following solids:-

 Sodium sulphate, Hydrogen.

 (b) What happens when CdCl2 is doped with AgCl?

 (c) Why do ferromagnetic substances show better magnetism than antiferromagnetic

 substances? **[2017(set 3)] 3**

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