Holidays' Homework 2024

XI - Chemistry

1. (a) What is the mass of (i) 1 mole of water (ii) 0.5 mole of CO_2(iii) 2.5 moles of Cl_2?
   (b) How many moles of atoms are contained in: (1) 9.0 g of Aluminium (ii) 0.8 g of Iron?
2. Calculate the number of moles in each of the following amounts of materials:
   (1) 10.0 g of $CaCO_3$ (ii) 1 x 10^{23} molecules of CO_2
3. What is the mass in grams of:
   (i) 6.022 x 10^{23} atoms of oxygen.
   (ii) 1 x 10^{23} molecules of H_2S.
   (iii) 6.022 x 10^{23} molecules of oxygen.
   (iv) 1.5 moles of H_2SO_4
4. Which of the following weighs the most?
   (1) 50 g of iron (ii) 5 g atoms of nitrogen
   (iii) 0.1 g atom of silver (iv) 1 x 10^{23} atoms of carbon
5. Calculate the number of molecules present in 22 g of CO_2.
6. Calculate the mass of CO_2 which contains the same number of molecules as are contained in 40 g of oxygen.
7. A crystalline salt when heated becomes anhydrous and loses 51.2% of its weight. The anhydrous salt on analysis gave the percentage composition as:
   Mg =20.0% ;S=26.66% andO =53.33%
   Calculate the molecular formula of the anhydrous salt and the crystalline salt. Molecular mass of the anhydrous salt is 120.
8. A compound containing carbon, hydrogen and oxygen gave the following analytical data:
   C = 40.0 % and H = 6.67%
   Calculate the molecular formula of the compound if its molecular mass is 180.
9. On analysis, a substance was found to have the following composition:
   K = 31.84, Cl = 28.98 and O = 39.18 %
   Calculate its molecular formula if its molecular mass is 122.5.
10. An organic liquid having carbon, hydrogen, nitrogen and oxygen was found to contain C=41.37% ; H= 5.75% ; N=16.09% and the rest oxygen. Calculate the molecular formula of the liquid if its V.D. is 43.3. [Hint : molecular mass = 2 x V.D.]
11. A chemical compound is found to have the following composition:
    C = 19.57% ; Fe =15.2% ; N=22.83% ; K = 42.39%
    Calculate the empirical formula of the compound. What will be its molecular formula if the molecular mass of the compound is 368? Name the compound.
12. Balance the following equations by Hit and Trial Method:
    (i) $SO_2 + H_2S$ -------> $S + H_2O$
    (ii) $Al_4C_3 + H_2O$ --------> $Al(OH)_3 + CH_4$
    (iii) $KMnO_4 + HCl$ ----→ $KCl + MnCl_2 + H_2O + Cl_2$
    (iv) $KMnO_4 + KOH$ ------→ $K_2MnO_4 + MnO_2 + O_2$
    (v) $FeS_2 + O_2$ ------→ $Fe_2O_3 + SO_2$
    (vi) $Zn + NaOH$→ $Na_2ZnO_2 + H_2$
13. What information is conveyed by each of the four quantum numbers?

14. An atomic orbital has n = 3 What are the possible values of I and m_l ?
    (ii) List the quantum numbers (m_l and I) of electrons for 3d-orbital.
    (iii) Which of the following orbitals are possible ?
    1 p, 2 s, 2 p and 3 f.
15. Write down the electronic configuration of (i) Cr^{+3} (ii) Cu^{+2} (iii) S^{-2}
16. Explain: (i) Why is the energy of electron negative?
    (ii) How did Bohr explain the stability of atom?

Note: Also Solve the following NCERT Questions:
Chapter 1: Q1.7, Q1.8, Q1.28, Q1.30, Q1.33, Q1.36
Chapter 2 : Q2.20, Q2.21, Q2.22, Q2.23, Q2.24, Q2.29, Q2.66, Q2.67

Also learn Chapter No. 1 and Chapter No.2

Practical Work

1. To analyse the given salt (Ammonium Sulphate) for cation and anion.
2. To analyse the given salt (Lead Nitrate) for cation and anion.
3. To analyse the given salt (Ammonium Chloride) for cation and anion.
4. To analyse the given salt (Aluminium Sulphate) for cation and anion.
5. To analyse the given salt (Ferric Chloride) for cation and anion.

Project

Prepare a Project on any of the following:

- Checking the bacterial contamination in drinking water by testing sulphide ion
- Study of the methods of purification of water
- Testing the hardness, presence of Iron, Fluoride, Chloride, etc., depending upon the regional variation in drinking water and study of causes of presence of these ions above permissible limit (if any).
- Investigation of the foaming capacity of different washing soaps and the effect of addition of Sodium carbonate on it
- Study the acidity of different samples of tea leaves.
- Determination of the rate of evaporation of different liquids Study the effect of acids and bases on the tensile strength of fibers.
- Study of acidity of fruit and vegetable juices.