

Ch.3- ATOMS AND MOLECULES

1. Calculate the molar mass of : sugar  $[C_{12}H_{22}O_{11}]$ , glucose  $[C_6H_{12}O_6]$ ,  $H_2SO_4$ ,  $N_2$  gas,  $Al_2O_3$
2. Write the chemical formulae of: copper nitrate, ammonium carbonate, aluminium phosphate, sodium nitrate, calcium oxide, sodium nitride, potassium chloride.
3. Calculate the number of moles in: a) 12g of oxygen gas. b) 22 g of  $CO_2$   
c)  $3.011 \times 10^{23}$  number of carbon atoms.
4. Calculate the number of particles in : a) 8g of oxygen molecules, b) 2moles of hydrogen gas.
5. (a) Name the chemical compounds represented by the following formulae:  
 $Al_2(SO_4)_3$ ,  $CaCO_3$ ,  $NaHCO_3$ ,  $CaS$ ,  $(NH_4)_2CO_3$   
(b) Write the symbol of the following ions: phosphate, carbonate, nitride, silver, calcium, ammonium
6. State the laws of chemical combination.
7. Define: one mole, one atomic mass unit, valency, cation, anion, polyatomic ion, Avogadro constant.
8. Magnesium and Sulphur combine in the ratio of 3:4 by mass to form magnesium sulphide. What mass of magnesium would be required to react completely with 9 g of sulphur.
9. A 0.24 g sample of compound of oxygen and boron was found by analysis to contain 0.096 g of boron and 0.144 g of oxygen. Calculate the percentage composition of the compound by weight.
10. How many atoms are present in  $CaCO_3$ ,  $SO_4^{2-}$ ,  $AlCl_3$ ,  $KMnO_4$ ,  $NaHCO_3$ ,  $PO_4^{3-}$