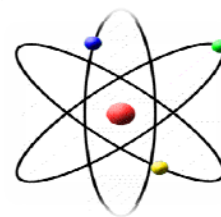**National Institute of Open Schooling**
Senior Secondary Course: Chemistry
Chapter- 1 (Atoms, Molecules and Chemical arithmetic)
Worksheet-1

1. The mass of a piece of phosphorus is 99.3 g. How many moles of phosphorus are present in it? (The atomic mass of phosphorus is 31 amu).

2. Calculate the molar mass of each of the following in $gmol^{-1}$.
    (i)   Sodium Hydroxide, (NaOH)
    (ii)   Copper Sulphate, ($CuSO_4$. $5H_2O$)
    (iii)   Sodium Carbonate, (Na_2CO_3. $10H_2O$)
    (iv)   Aluminium Sulphate, $Al_2(SO_4)_3$

3.   How many moles of $CaCO_3$ will weigh 5 grams.

4. If you need 1.0×10^{23} molecules of nitrogen for the reaction $N_2 + 3H_2 \rightarrow 2NH_3$ then:
    (a)   How many mass (in grm) of nitrogen is required?
    (b)   How many quantities of NH_3 will be formed from 1.0×10^{23} molecules in the above mentioned process?
    (c)   What is the volume of NH_3 gas at STP in (b)?

5. Write down the empirical formula for the following:
    C_2H_6, C_6H_6, C_4H_{10}, H_2O_2, KCl

6. The empirical formula of glucose is CH_2O. Whose Formula mass is 30 amu. If the molecular mass of glucose is 150 amu then, what is the molecular formula of glucose?

7. Write down the percentage of Fe and O for F_3O_4 compounds**.**

8. A 2.4 gram compound of carbon, hydrogen and oxygen yields 3.52 grams of carbon dioxide (CO_2) and 1.44 grams of water (H_2O). If the molecular mass of the compound is found to be 60 amu then:
    (a) What is the mass of carbon, hydrogen and oxygen in 2.4 g of the compound.
    (b) What is the empirical and molecular formula of the compound?

9. In the following reaction:
    $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$
    (a) How much mass of oxygen will be required for the complete reaction of 24g CH_4?
    (b) How much mass of CH_4 will be required to react 96 g of oxygen?

10. Industrially caustic soda (NaOH) can be prepared by reacting sodium carbonate (Na_2CO_3) with slaked lime. How many grams of sodium hydroxide (NaOH) will be obtained when 2.0 kg of sodium carbonate (Na_2CO_3)is reacted with calcium hydroxide ($Ca(OH)_2$).