

Intro to Chemistry II

1. Calculate the number of moles present in each of the following cases:	2. Calculate the mass of substance present in the following cases:	3. Calculate the relative molecular mass of the following substances and suggest a possible identity of each substance:
a) 2.3 g of Na	a) 0.05 moles of Cl ₂	a) 0.015 moles, 0.42 g
b) 2.5 g of O ₂	b) 0.125 moles of KBr	b) 0.0125 moles, 0.50 g
c) 240 kg of CO ₂	c) 0.075 moles of Ca(OH) ₂	c) 0.55 moles, 88 g
d) 12.5 g of Al(OH) ₃	d) 250 moles of Fe ₂ O ₃	d) 2.25 moles, 63 g
e) 5.2 g of PbO ₂	e) 0.02 moles of Al ₂ (SO ₄) ₃	e) 0.00125 moles, 0.312 g

4. Calculate the number of particles in the following substances:

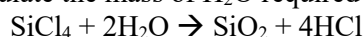
- a) 0.025 moles b) 2.5 g of CO₂ c) 5.0 g of Pb d) 100 g of N₂

5. Calculate the mass of the following substances:

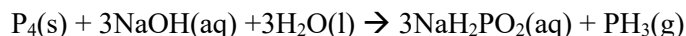
- a) 2.5×10^{23} molecules of N₂
b) 1.5×10^{24} molecules of CO₂
c) 2×10^{20} atoms of Mg

Reacting Masses

6. Calculate the mass of H₂O required to react completely with 5.0 g of SiCl₄:



7. Calculate the mass of phosphorus required to make 200 g of phosphine, PH₃, by the reaction:

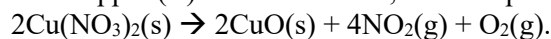


8. Lead (IV) oxide reacts with concentrated hydrochloric acid as follows:



What mass of lead chloride would be obtained from 37.2g of PbO₂, and what mass of chlorine gas would be produced?

9. When copper (II) nitrate is heated, it decomposes according to the following equation:



When 20.0g of copper (II) nitrate is heated, what mass of copper (II) oxide would be produced?

What mass of NO₂ would be produced?

Using molarities and concentrations

1. Calculate the number of moles of H₂SO₄ in 50 cm³ of a 0.50 moldm⁻³ solution.
2. Calculate the number of moles of FeSO₄ in 25 cm³ of a 0.2 moldm⁻³ solution.
3. Calculate the mass of KMnO₄ in 25 cm³ of a 0.02 moldm⁻³ solution.
4. Calculate the mass of Pb(NO₃)₂ in 30 cm³ of a 0.1 moldm⁻³ solution.

5. What is the molarity of 1.06g of H_2SO_4 in 250 cm^3 of solution?
6. What is the molarity of 15.0 g of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ in 250 cm^3 of solution?
7. What volume of a $0.833 \text{ mol dm}^{-3}$ solution of H_2O_2 will be required to make 250 cm^3 of a $0.100 \text{ mol dm}^{-3}$ solution?
8. What volume of a 0.50 mol dm^{-3} solution of HCl will be required to make 100 cm^3 of a 0.050M solution?
9. How many moles of NaCl are there in 25 cm^3 of a 50 g dm^{-3} solution?

1. A compound contains C 62.08%, H 10.34% and O 27.58% by mass. Find its empirical formula and its molecular formula given that its relative molecular mass is 58.
2. Find the empirical formula of the compound containing C 22.02%, H 4.59% and Br 73.39% by mass.
3. A compound containing 85.71% C and 14.29% H has a relative molecular mass of 56. Find its molecular formula.
4. A compound containing 84.21% carbon and 15.79% hydrogen by mass has a relative molecular mass of 114. Find its molecular formula.
5. Analysis of a hydrocarbon showed that 7.8 g of the hydrocarbon contained 0.6 g of hydrogen and that the relative molecular mass was 78. Find the molecular formula of the hydrocarbon.
6. 3.36 g of iron join with 1.44 g of oxygen in an oxide of iron. What is the empirical formula of the oxide?
7. What is the percentage composition of SiCl_4 ?
8. What is the mass of sulphur in 1 tonne of H_2SO_4 ?