

STOICHIOMETRIC CALCULATIONS

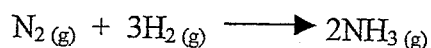
1. How many particles in each of the following?
 - a) 3 moles of Sn.
 - b) 0.5 moles of NH₃.
 - c) 11g of CO₂.
 - d) 96g of oxygen gas.
 - e) 11.2 L of neon gas at STP.
 - f) 44.8 L of hydrogen gas at STP.

2. How many moles in each of the following?
 - a) 6.02×10^{22} molecules of Br₂.
 - b) 4.81×10^{24} molecules of Li.
 - c) 15.5g of SiO₂.
 - d) 5.96g of KOH.
 - e) 11.2 L of Cl₂ at STP.
 - f) 67.2 L of O₂ at STP.

3. What is the mass of each of the following?
 - a) 1.5 moles of C₅H₁₂.
 - b) 33.6 L of NH₃ gas at STP.
 - c) 18.06×10^{23} molecules of CH₄.

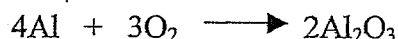
4. Calculate the volume of each of these gases at STP.
 - a) 7.6 moles of Ar.
 - b) 0.44 moles of C₂H₆.
 - c) 3.01×10^{23} molecules of CO₂.

5. Calculate the number of moles of nitrogen and hydrogen that are required to make 7.24 moles of ammonia.



(Ans 3.62 mol N₂ and 10.9 mol of H₂)

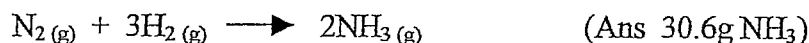
6. The formation of aluminium oxide is represented by the following equation.



- i) How many moles of aluminium are needed to form 3.7 moles of Al_2O_3 ?
- ii) Calculate the number of moles of Al_2O_3 formed when 0.78 moles of O_2 reacts with aluminium.

(Ans i) 7.4 mol ii) 0.52 mol)

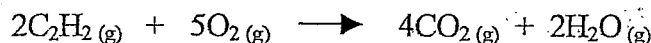
7. Calculate the number of grams of NH_3 produced by the reaction of 5.4g of hydrogen with an excess of nitrogen.



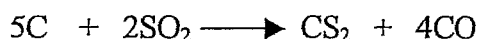
8. How many grams of nitrogen are needed to produce the 30.6g of NH_3 in the previous question?

(Ans 25.2g N_2)

9. The combustion of acetylene gas is represented by this equation.



- i) How many grams of CO_2 and grams of H_2O are produced when 52g of C_2H_2 burns? (Ans 176g CO_2 and 36g of H_2O)
 - ii) How many grams of oxygen is required to burn 52g of C_2H_2 ? (Ans 160g).
 - iii) Use the answers from i) and ii) to show this equation obeys the law of conservation of mass.
10. Carbon disulfide is an important industrial solvent. It is prepared by the reaction of coke with sulfur dioxide.



- i) How many moles of CS_2 form when 2.7 moles of C reacts?
- ii) How many moles of C are needed to react with 5.44 mol of SO_2 ?
- iii) How many grams of CS_2 and H_2O will be produced if 18g of C reacts with an unlimited amount of SO_2 ?