ANSWERS TO "TRY YOURSELF" PROBLEMS FROM STUDY SECTION 3.1

Try Yourself 3.1

$$2Al(s) + 3Br_2(\ell) \rightarrow Al_2Br_6(s)$$

- a. Name the reactants and products and give their physical states.
- b. What are the stoichiometric coefficients in this equation?
- c. If you were to use 8000 atoms of Al, how many molecules of Br₂ are required to consume the Al completely?

Answer:

- a. Reagents: Aluminium (Aluminum, Al) and Bromine (Br)
 - Product: Aluminium bromide (Aluminum bromide, Al₂Br₆)
- b. Stoichiometric coefficients: 2 for Al; 3 for Br₂ and 1 for Al₂Br₆
- c. Ratio between Al and $Br_2 = 2 : 3 = 3(8000)/2 = 12000 Br_2$ molecules.

Try Yourself 3.2

Balance the following reaction equations.

$$Cr(s) + O_2(g) \rightarrow Cr_2O_3(s)$$

$$AlCl_3(s) + NaOH(aq) \rightarrow Al(OH)_3(s) + NaCl(aq)$$

Answers:

$$4Cr(s) + 3O_2(g) \rightarrow 2Cr_2O_3(s)$$

$$AlCl_3(s) + 3NaOH(aq) \rightarrow Al(OH)_3(s) + 3NaCl(aq)$$

Try Yourself 3.3

Write a balanced chemical equation for the combustion of butane, C_4H_{10} .

Answer:

Unbalanced

 $C_4H_{10}\left(g\right) + O_2\left(g\right) \rightarrow CO_2\left(g\right) + H_2O\left(g\right)$ H_2O is a gas here because of the combustion process.

Balanced

$$2 C_4 H_{10} \left(g\right) \; + \; 13 O_2 \left(g\right) \; \rightarrow \; 8 C O_2 \left(g\right) \; + \; 10 H_2 O \left(g\right)$$