1 5.2 g of chromium (Cr) reacts with 4.8 g of oxygen (O_2) to form chromium oxide. Find the molar reacting ratio between chromium and oxygen.

moles Cr $= \frac{mass}{M_r} = \frac{5.2}{52} = 0.1$ mol

moles O_2 $= \frac{mass}{M_r} = \frac{4.8}{32} = 0.15$ mol

reacting ratio Cr : O_2 = 0.10 : 0.15 $= \frac{0.10}{0.10} : \frac{0.15}{0.10}$ = 1 : 1.5 = 2 : 3

$\therefore$ $2Cr + 3O_2 \rightarrow$

2 0.48 g of hydrazine (N_2H_4) decomposes to form 0.14 g of nitrogen (N_2) and 0.34 g of ammonia (NH_3). Find the molar ratios and use this to give the equation for the reaction.

moles N_2H_4 $= \frac{mass}{M_r} = \frac{0.48}{32} = 0.015$ mol

moles N_2 $= \frac{mass}{M_r} = \frac{0.14}{28} = 0.005$ mol

moles NH_3 $= \frac{mass}{M_r} = \frac{0.34}{17} = 0.020$ mol

reacting ratio N_2H_4 : N_2 : NH_3 = 0.015 : 0.005 : 0.020 $= \frac{0.015}{0.005} : \frac{0.005}{0.005} : \frac{0.020}{0.005}$ = 3 : 1 : 4

$\therefore$ $3N_2H_4 \rightarrow N_2 + 4NH_3$