

Gas laws - 2 Avogadro's law & STP

1) What is the new volume of a gas when 2.4 mol of a gas are added to 3.6 mol of gas which occupy 2.50 L.

initial mol $n_1 = 3.6 \text{ mol}$

$V_1 = 2.50 \text{ L}$

$n_2 = 3.6 \text{ mol} + 2.4 \text{ mol} = 6.0 \text{ mol}$

$V_2 = ?$

$$\frac{V_1}{n_1} = \frac{V_2}{n_2}, \quad V_2 = \frac{V_1 n_2}{n_1} = \frac{2.50 \text{ L} \times 6.0 \text{ mol}}{3.6 \text{ mol}} = 4.17 \text{ L} \approx \boxed{4.2 \text{ L}}$$

STP - standard temp pressure of 1 mol of gas

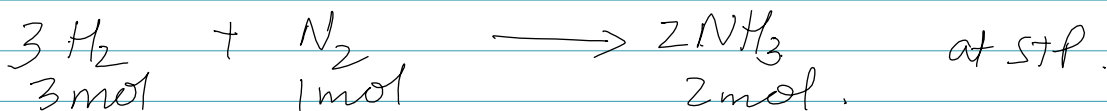
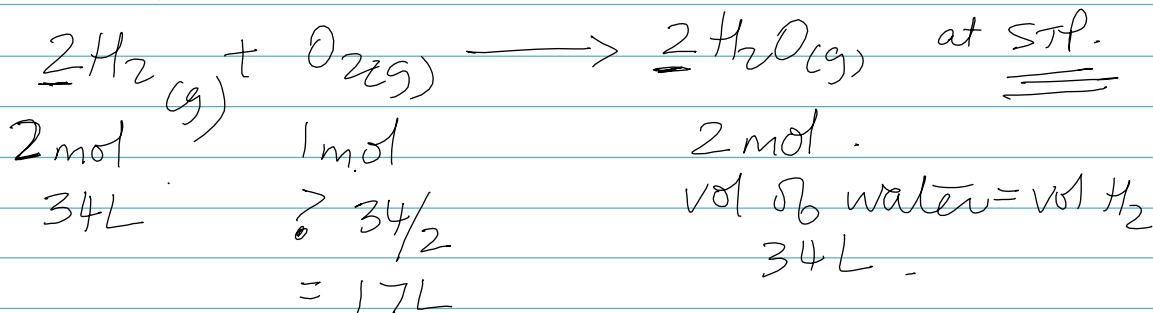
$p = 1 \text{ atm}$

$V = 22.4 \text{ L}$

$n = 1 \text{ mol}$

$T = 273 \text{ K}$

$0^\circ \text{C} = 273 \text{ K}$, 1 atm



if vol of H_2 is 9.0 L $\geq 3 \text{ L}$
 $3:1$ $\cdot 3 \text{ L}$

vol of NH_3 $\text{N}_2 : 2 \text{ NH}_3$
 3 L \downarrow
 $\boxed{6 \text{ L}}$