

$$1. P_1 V_1 = P_2 V_2 \quad P_1 = 300 \text{ mm Hg}, V_1 = 300 \text{ mL}, P_2 = 500 \text{ mm Hg}$$

$$V_2 = \frac{P_1 V_1}{P_2} = \frac{300 \text{ mm Hg}}{500 \text{ mm Hg}} \times 300 \text{ mL} = 180 \text{ mL}$$

$$2. P_1 V_1 = P_2 V_2 \quad P_1 = 500 \text{ mm Hg}, V_1 = 460 \text{ mL}, P_2 = 1.2 \text{ atm}$$

$$P_1 = 500 \text{ mm Hg} \times \frac{1 \text{ atm}}{760 \text{ mm Hg}} = 0.658 \text{ atm}$$

$$V_2 = \frac{P_1 V_1}{P_2} = \frac{0.658}{1.2 \text{ atm}} \times 460 \text{ mL} = 250 \text{ mL}$$

$$3. P_1 V_1 = P_2 V_2 \quad P_1 = 3 \text{ atm}, V_1 = 5 \text{ L}, P_2 = ?, V_2 = 7500 \text{ mL} = 7.500 \text{ L}$$

$$P_2 = \frac{V_1}{V_2} P_1 = \frac{5 \text{ L}}{7.5 \text{ L}} \times 3 \text{ atm} = 2 \text{ atm}$$

$$4. P_1 V_1 = P_2 V_2 \quad P_1 = 1.5 \text{ atm}, V_1 = 5.6 \text{ L}, P_2 = 2, V_2 = 4.8 \text{ L}$$

$$P_2 = \frac{V_1}{V_2} P_1 = \frac{5.6 \text{ L}}{4.8 \text{ L}} \times 1.5 \text{ atm} = 1.75 \text{ atm} \rightarrow \text{s.f. } 1.8 \text{ atm}$$

$$6. P_1 V_1 = P_2 V_2 \quad P_1 = 1.0 \text{ atm}, V_1 = 12000 \text{ L}, P_2 = 1.4 \text{ atm}, V_2 = ?$$

$$V_2 = \frac{P_1 V_1}{P_2} = \frac{1.0 \text{ atm}}{1.4 \text{ atm}} \times 12000 = 8571 \text{ L} = \begin{matrix} 9600 \text{ L} \\ 8600 \text{ L} \end{matrix}$$

$$5. P_1 V_1 = P_2 V_2 \quad P_1 = 1.0 \text{ atm}, V_1 = 15 \text{ L}, P_2 = 0.85 \text{ atm}, V_2 = ?$$

$$V_2 = \frac{P_1 V_1}{P_2} = \frac{1.0 \text{ atm}}{0.85 \text{ atm}} \times 15 \text{ L} = 17.6 \text{ L}$$

$$7. \frac{V_1}{T_1} = \frac{V_2}{T_2} \quad V_2 = V_1 \left(\frac{T_2}{T_1} \right) = 4.0 \text{ L} \left(\frac{100 + 273}{50 + 273} \right) = 4.6 \text{ L}$$

$$90.4^\circ \text{C}$$

$$8. \frac{V_1}{T_1} = \frac{V_2}{T_2} \quad T_2 = \left(\frac{V_2}{V_1} \right) T_1 = \left(\frac{400 \text{ mL}}{350 \text{ mL}} \right) (45 + 273) = 363 \text{ K} - 273 = 84^\circ \text{C}$$

$$9. \frac{V_1}{T_1} = \frac{V_2}{T_2} \quad V_2 = V_1 \left(\frac{T_2}{T_1} \right) = 45 \text{ L} \left(\frac{55 + 273}{25^\circ \text{C} + 273} \right) = 49.5 \text{ L}$$

$$10. \frac{V_1}{T_1} = \frac{V_2}{T_2} \quad V_2 = V_1 \left(\frac{T_2}{T_1} \right) = 25 \text{ L} \left(\frac{25^\circ \text{C} + 273}{1200^\circ \text{C} + 273} \right) = 5.06 \text{ L}$$

$$11. \frac{V_1}{T_1} = \frac{V_2}{T_2} \quad T_2 = \left(\frac{V_2}{V_1} \right) T_1 = \frac{85 \text{ L}}{130 \text{ L}} (250^\circ \text{C} + 273) = 342 \text{ K} - 273 = 69^\circ \text{C}$$