

391

#20

$$V_1 = 140.0 \text{ mL}$$

$$T_1 = 67^\circ\text{C} + 273 = 340 \text{ K}$$

$T_2 =$

$$V_2 = 50.0 \text{ mL}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{140.0 \text{ mL}}{340 \text{ K}} = \frac{50.0 \text{ mL}}{T_2}$$

$$\frac{340 \text{ K} \times 50.0 \text{ mL}}{140.0 \text{ mL}} = 121.42 \text{ K}$$

$$\boxed{120 \text{ K}}$$

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#21

$$V_1 = 240.0 \text{ mL}$$

$$P_1 = 0.428 \text{ atm}$$

$$P_2 = 0.724 \text{ atm}$$

$$V_2 = ?$$

$$P_1 V_1 = P_2 V_2$$

$$\frac{P_1 V_1}{P_2} = V_2$$

$$\frac{0.428 \text{ atm} \cdot 240.0 \text{ mL}}{0.724 \text{ atm}}$$

$$141.87 = \boxed{142 \text{ mL}}$$

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#22

$$T_1 = 47^\circ\text{C} + 273 = 320\text{K}$$

$$P_1 = 0.329\text{atm}$$

$$T_2 = 77^\circ\text{C} + 273 = 350\text{K}$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$P_1 \frac{T_2}{T_1} = P_2$$

$$\frac{0.329\text{atm} \times 350\text{K}}{320\text{K}}$$

$$= \boxed{0.36\text{atm}}$$

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#23

$$T_1 = 47^\circ\text{C} + 273 = 320\text{K}$$

$$P_1 = 1.03\text{atm}$$

$$V_1 = 2.20\text{L}$$

$$V_2 = ?$$

$$T_2 = 107^\circ\text{C} + 273 = 380\text{K}$$

$$P_2 = 0.789\text{atm}$$

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$V_2 = \frac{P_1 V_1 T_2}{T_1 P_2}$$

$$\frac{1.03\text{atm} \cdot 2.20\text{L} \cdot 380\text{K}}{320\text{K} \cdot 0.789\text{atm}}$$

$$\boxed{3.4\text{L}}$$

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49a

$$V = 2.50L$$

$$n = 1.35 \text{ mole}$$

$$T = 320.0K$$

$$P = ? \text{ atm}$$

$$PV = nRT$$

$$P = \frac{nRT}{V}$$

1.35 mole	0.0821 L·atm	320.0K
mole·K		2.50L

$$14.2 \text{ atm}$$

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50c

$$n = \frac{4.00g O_2}{32.00g} \frac{1 \text{ mole}}{32.00g} = 0.125 \text{ mole}$$

$$T = 57^\circ C + 273 = 330K$$

$$P = 0.888 \text{ atm}$$

$$V = ?$$

$$PV = nRT$$

$$V = \frac{nRT}{P}$$

0.125 mole	0.0821 L·atm	330K
mole·K		0.888 atm

$$3.82L$$

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52b

$$V = 3.50 \text{ L}$$

$$P = 0.921 \text{ atm}$$

$$T = 27^\circ\text{C} + 273 = 300 \text{ K}$$

$$n = ? \text{ grams}$$

$$M_{\text{NH}_3} = \frac{17.04 \text{ g}}{\text{mole}}$$

$$PV = nRT$$

$$n = \frac{PV}{RT}$$

$$\frac{0.921 \text{ atm} \cdot 3.50 \text{ L}}{300 \text{ K}} \cdot \frac{\text{mole} \cdot \text{K}}{0.0821 \text{ L} \cdot \text{atm}}$$

$$0.1309 \text{ mole} = \frac{0.1309 \text{ mole} \cdot 17.04 \text{ g}}{1 \text{ mole}}$$

$$= \boxed{2.2 \text{ g}}$$