

$$1 \text{ atm} = 14.7 \text{ psi}$$

Solve the following problems.

1. A tank contains 115 moles of neon gas. It has a pressure of 57 atm at a temperature of 45°C. Calculate the volume of the tank.
2. A scuba tank has a pressure of 195 atm at a temperature of 10°C. The volume of the tank is 350 L. How many moles of air are in the tank?
3. A helium-filled balloon has a volume of 208 L and it contains 9.95 moles of gas. If the pressure of the balloon is 1.26 atm, determine the temperature in Celsius degrees.
4. A tank of oxygen has a volume of 1650 L. The temperature of the gas inside is 35°C. If there are 9750 moles of oxygen in the tank what is the pressure in PSI?
5. A canister of acetylene has a volume of 42 L. The temperature of the acetylene is 305 K and the pressure is 780 torr. Determine the amount (moles) of gas in the canister.
6. Calculate the volume of a CO₂ cartridge that has a pressure of 850 PSI at a temperature of 21°C. The cartridge contains 0.273 mol of CO₂.
7. A tank contains 2500 L of argon gas. The pressure is 13790 kPa and the temperature is 25°C. How many moles of argon are in the tank?

$$1) PV = nRT \quad (57 \text{ atm})V = (115 \text{ mol}) \left(0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \right) (318 \text{ K})$$

$$V = 53 \text{ L}$$

$$2) PV = nRT \quad (195 \text{ atm})(350 \text{ L}) = n \left(0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \right) (283 \text{ K})$$

$$2980 \text{ mol} \leftarrow 2977 \text{ mol} = n$$

$$3) PV = nRT \quad (1.26 \text{ atm})(208 \text{ L}) = (9.95 \text{ mol}) \left(0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \right) T$$

$$321 \text{ K} = T$$

$$T = 321 - 273 = 48^\circ \text{C} = T$$

$$4) PV = nRT \quad P(1650 \text{ L}) = (9750 \text{ mol}) \left(0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \right) (308 \text{ K})$$

$$P = 149 \text{ atm}$$

$$\frac{149 \text{ atm}}{1 \text{ atm}} \left| \frac{14.7 \text{ psi}}{1 \text{ atm}} \right| = 2190 \text{ psi}$$

$$5) PV = nRT \quad (780 \text{ torr} / 760 \text{ torr})(42 \text{ L}) = n(0.0821)(305 \text{ K})$$

$$1.7 \text{ mol} = n$$

$$6) PV = nRT \quad (850 \text{ psi} / 14.7 \text{ psi}) V = (273 \text{ mol}) \left(0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \right) (294 \text{ K})$$

$$V = 114 \text{ L}$$

$$7) PV = nRT \quad (13790 \text{ kPa})(2500 \text{ L}) = n \left(8.314 \frac{\text{L} \cdot \text{kPa}}{\text{mol} \cdot \text{K}} \right) (298 \text{ K})$$

$$13900 \text{ mol} = n$$