

A 270 mL flask contains He at a pressure of 760 torr and a temperature of 27°C.
What mass of He is present?

$$V = 270 \text{ mL} = 0.27 \text{ L}$$

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

$$P = 760 \text{ torr} = 101325 \text{ Pa}$$

$$M(\text{He}) = 4 \text{ g/mol}$$

$$R = 8.314 \text{ J/mol} \times \text{K}$$

If the gas volume is expressed in liters, then the Clapeyron-Mendeleev equation is written as:

$$PV = \frac{1000mRT}{M}$$

$$m = PVM/1000RT$$

$$m = (101325 \text{ Pa} * 0.27 \text{ L} * 4 \text{ g/mol}) / (1000 * 8.314 \text{ J/mol} * \text{K} * 300\text{K}) = 109431 / 2494200 = 0.044 \text{ g}$$

Answer provided by www.AssignmentExpert.com