Chemistry 161a – Fall 2018 **Chapter 6 Quiz**

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Name: Vanessa Blas
10/11/18

Useful information:	$R = 0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$ Molecular weight of CO_2 = 44.01 g/mol

The sublimation of dry ice (solid CO_2) occurs at temperatures above 194.65 K and is given by the following chemical equation:

$$CO_2\,(s) \rightarrow CO_2\,(g)$$

You buy a party balloon with a maximum capacity of 1.50 L and place a 2.00 g piece of dry ice into the balloon at 298 K and 1.00 atm. If you tie the balloon so no gas leaks, will the balloon pop before its contents reach room temperature? Show your work.

$PV = nRT$

$2.00\text{ g} \times \frac{1\text{ mol } CO_2}{44.01\text{ g } CO_2} = .045$ mol CO_2

$1\text{ atm}(1.50\text{ L}) = .045(.08206)\,T$

$\frac{1.50\text{ L}}{.045(.08206)} = T$

$406.2\text{ K} = T$

in order to pop temp must be 406.2 K

$1\text{ atm}(V) = .045(.08206)(298\text{ K})$

$V = 1.1\text{ L}$

at 298 K, V = 1.10 L so balloon has not popped

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Name: Mathew Krick

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3 sig. figs

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$PV = nRT$

$2.00\,g\,CO_2(s) \times \frac{1\,mol\,CO_2}{44.011\,g\,CO_2} = 0.0454\,mol\,CO_2$

$P = 1.00\,atm$

$T = 298\,K$

$V_{max} = 1.50\,L$

$R = 0.08206\,\frac{L \cdot atm}{mol \cdot K}$

$$V = \frac{nRT}{P} = \frac{(0.0454\,mol\,CO_2)(0.08206\,\frac{L \cdot atm}{mol \cdot K})(298\,K)}{1.00\,atm}$$

$V = 1.11\,L$

The balloon will not pop because the volume of CO_2 gas produced inside the balloon is less than the maximum volume capacity of the balloon.

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Name: Kelly Key delay

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	Molecular weight of CO_2 = 44.01 g/mol

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You buy a party balloon with a maximum capacity of 1.50 L and place a 2.00 g piece of dry ice into the balloon at 298 K and 1.00 atm. If you tie the balloon so no gas leaks, will the balloon pop before its contents reach room temperature? Show your work.

$V_{max} = 1.50\,L$ 2.00 g

$T = 298\,K$ $P = 1.00\,atm$

$T_F = 194.65\,K$

$2.00\,g \times \frac{1\,mol}{44.01} = .04544\,mol$

$PV = nRT$

$V_1 \left(\frac{1.00}{1.00}\right) = (.04544\,mol)(.08206)\,(298\,K)$ @ 298 K

$V_1 = 1.11129\,L$

$V_2 = \text{" " "} \left(\frac{194.65}{298\,K}\right)$

$V_2 = .72588\,L$

The balloon will not pop because volume at both temperatures is less than the max capacity of 1.50 L

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