Gas Law Combo Review 1

Name: _____

1. There is a small air bubble caught under water (salt water) that has a volume of 2.75 ml when the temperature is -5.00°C. What will the volume be later in the day when the temperature rises to 28.0°C? (Assume constant pressure and # of moles)

$-5°C + 273 = 268K$

$28°C + 273 = 301K$

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

$\frac{2.75ml}{268K} = \frac{V_2}{301K}$

$V_2 = 3.08862\ mL$

$V_2 = 3.09mL$

2. A sample of gas whose volume is 2.55 litres at 100 kPa and 25°C has its volume cut to 1.00 litre. The resulting pressure of this gas is found to be 300kPa. What is the resultant change in temperature?

n is constant

$25 + 273 = 298K$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

$\frac{(100)(2.55)}{298} = \frac{(300)(1.00)}{T_2}$

$T_2 = 350.588K$

$T_2 = 351K$ or $78°C$

53 degree difference

3. What pressure will be exerted by 0.45 mol of a gas at 25.0°C if it is contained in a vessel whose volume is 0.65 L? Give the pressure in mm Hg.

$PV = nRT$

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

$= \frac{(0.15)(8.31)(298)}{0.65}$

$P = 1714.42\ kPa$

$\frac{101.3kPa}{1.00atm} = \frac{1714.42kPa}{x}$

$x = 16.924atm$

$P = 17atm$

4. An inverted measuring cup with 3.75 cups of air at a pressure of 110 kPa is brought down to the bottom of the swimming pool where the volume of air is found to be 3.20 cups. What was the pressure (in kPa) at the bottom of the pool?

$P_1V_1 = P_2V_2$

$(110)(3.75) = P_2(3.20)$

$P_2 = 128.906\ kPa$

$P_2 = 129\ kPa$

5. If a sample of gas has its volume cut to 1/3 of its original volume and its absolute temperature doubled how will the resulted pressure compare to the original pressure?

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

$\frac{P_1(6)}{(6)} = \frac{P_2(2)}{12}$

$72P_1 = 12P_2$

resulting

Volume $\frac{1}{3} \rightarrow P \times 3$

Temp $\times 2 \rightarrow P \times 2$

$P \times 6$

The pressure will increase sixfold, or six times greater.