CHE30S
Quiz

Name _____
Date _____

Pressure, Temperature and Volume of Gases

1. Complete the following sentence: If the pressure of a gas is kept constant, when the temperature of the gas increases, the volume of the gas _**increases**_.

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2. Describe the concept of absolute zero.

/2 **It is at 0 K or -273^{o}C and it is the coldest temperature possible where a gas has no volume and no pressure.**

3. A sample of gas is kept at a constant volume. Determine the pressure of the gas at 32 ºC if the pressure at 2 ºC is 105 kPa.

/3 **2 + 273 = 275 K = T1** **32 + 273 = 305 K = T2**

Gay – Lussac's Law

$$\frac{P1}{T1} = \frac{P2}{T2}$$

$$\frac{105\ kPa}{275} = \frac{P2}{305}$$

$$\frac{(105)(305)}{275} = P2$$

P2 = 116.45 kPa

4. Salvage divers use lift bags containing air to bring objects to the surface of the water. A lift bag contains 145 L of air at the bottom of a lake where the temperature is 278 K and the pressure is 6.00 atm. The bag will burst if the volume of the air exceeds 750 L. Determine if the bag will burst if it is brought to the surface where the temperature is 289 K and the pressure is 1.00 atm.

/4

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

$$V_2 = \frac{P_1V_1T_2}{T_1P_2}$$

$$V2 = \frac{(6)(145)(289)}{(278)(1)}$$

V2 = 904.4 L

Therefore it will burst.

5. Write a one sentence summary for each of the three gas laws we have discussed this unit. (Boyle's, Charles, and Gay-Lussac)

/3

Boyles – Pressure and volume are inversely related
Charles – Volume and Temperature are directly related
Gay-Lussac – Pressure and temperature are directly related

6. If a balloon is filled to a pressure of 1 atm; what is the balloons pressure in mmHg?

/1

$$1 \text{ atm} \times \frac{760 \text{ mmHg}}{1 \text{ atm}} = \textbf{760 mmHg}$$

7. A bike tire's pressure is supposed to be 14.9 psi, you measure the tire and your gauge reads 745mmHg at 20^{o}C, what do you need to heat the tire to to get the correct pressure?

/3

14.9 psi x $\frac{(760\text{mmHg})}{(14.7\text{ psi})}$ = 770.3 mmHg

20^{o}C + 273 = 293 K

$$\frac{P1}{T1} = \frac{P2}{T2}$$

$$\frac{745\text{ mmHg}}{293} = \frac{770.3\text{ mmHg}}{T2}$$

$$\frac{(770.3)(293)}{745} = T2$$

T2 = 302.95 K or 29.95 ^{o}C