PRACTICE TEST: GASES NAME _____

This practice test covers **some** of the types of questions you may see on the test. Use your notes, book, worksheets, labs, and warm-ups to prepare for the exam. Also look at presentations and links at www.Breslyn.org.

1. The volume of a gas is doubled while the temperature is held constant. What happens to the pressure of the gas (you may need to put hypothetical values in the equation to test your idea)?

The pressure will halve. Because volume and pressure are inversely proportionate, as volume increases, the pressure will decrease by the same proportion, in this case, ½ or half. You can plug hypothetical numbers in and see what happens (say P_1 is 10, V_1 is 10, and V_2 is 20. If the volume goes from 10 to 20, what happened to P_2?).

2. Convert -95°C to Kelvin: -95 + 273 = 178°K Convert 67°C to Kelvin: 67 + 273 = 340°K

3. The pressure on 17.50L of gas changes from 43kPa to 45 kPa. What is the new volume?

$P_1V_1 = P_2V_2$
(43kPa)(17.5L) = (45kPa)V_2
V_2 = 16.7L

4. If a sample of gas occupies 2.3 L at 47 °C, what will it's volume be at 127 °C if the pressure does not change?

$V_1/T_1 = V_2/T_2$
2.3L / 320°K = V_2 / 400°K
V_2 = 2.9L

5. What volume will 157.5g of oxygen gas (O_2) occupy at -155°C and a pressure of 166.5 kPa?

PV = nRT
(166.5kPa) (V) = (4.9mol) (8.314) (118 K)
V = 28.8 L

Note: the GFM of O_2 is 32 g/mol.

6. How many moles are in 12 L of O_2 gas? How many molecules?

12 / 22.4 = 0.5mol
0.5 mol x 6.02 x 10^{23} = 3.01 x 10^{23} molecules

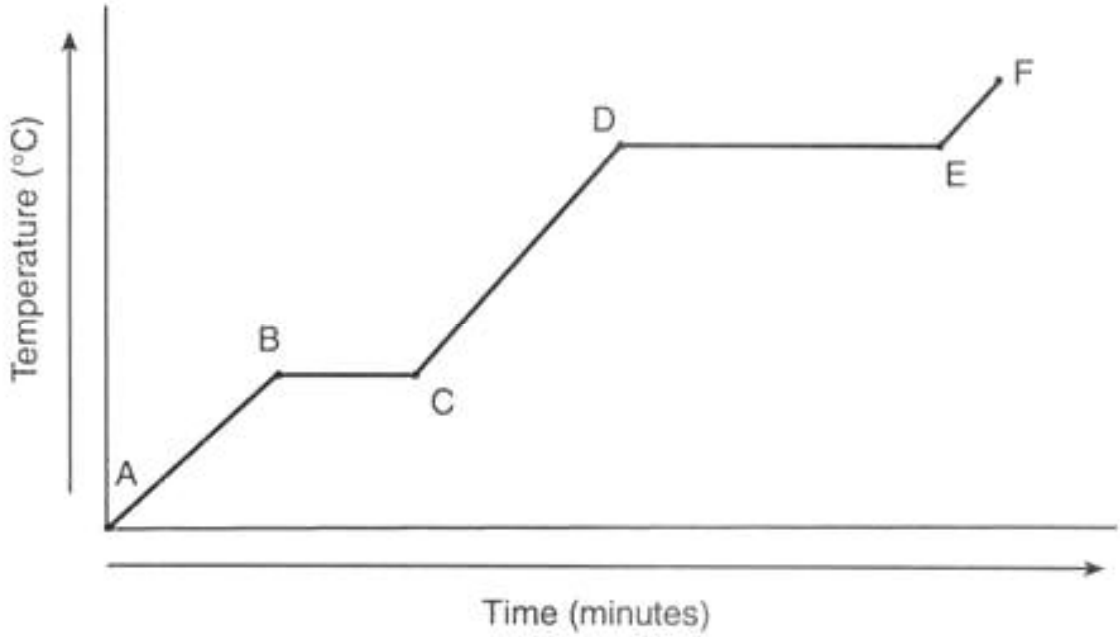
7. Using Kinetic Molecular Theory and the Gas Laws, explain why the tires on a car appear deflated in the winter. Include a diagram showing pressure, volume, and temperature.

During the winter, the air molecules in the tire slow down due to colder temperatures. The resulting slowing of the molecules leads to less frequent collisions with the tire rubber, thus decreasing the pressure of the tire. The tire deflates due to this decrease in pressure.

8. An iceberg is said to store more heat than a glass of boiling water. Based on a definition of heat, explain why this is so. What can you say about temperature?

Heat is the sum of kinetic energy stored in an object. Temperature is the average kinetic energy of these molecules. An iceberg has far more molecules than a glass of boiling water, and even though each molecule in the iceberg has less energy than the molecules in the boiling water, it still has more total energy. However, the molecules in the boiling water, on average, have greater energy than the molecules in the iceberg. Thus, the boiling water has a higher temperature.

9. On a heating curve, what do the flat lines represent? What would this look like in a data table? What is happening at C → D ?



The flat lines represent changes in state. In a data table, the time values would continue to increase while the temperature would stay constant. C – D represents the liquid stage.

10. Assuming the graph above represents water, label the temperatures at each point and label the state(s) that exist between points.

A: below 0°C
B and C: 0°C
C to D: temperature is rising
D and E: 100°C
E to F: above 100°C

A – B: solid
B – C: solid and liquid
C – D: liquid
D – E: liquid and gas
E – F: gas

11. Using Kinetic Molecular Theory and the Gas Laws, explain why your ears pop when you go to the top of a mountain. Include a diagram showing pressure, volume, and temperature.

You can consider inside your ear a closed system, like an empty plastic bottle. When you go up a mountain the pressure of the air outside your ear is decreasing (because there is less atmosphere pushing down above you). The air in your ear remains at the same pressure but is now greater than the outside pressure. When you swallow or yawn you allow air inside your ear to quickly release, making a popping sound.