Self Assessment A

This assignment is due on January 27 2012, 12:45 PM EST.

Question 1

A sample of gas occupies 2.78 x 10^3 mL at 25°C and 760 mm Hg. What volume will the gas sample occupy at the same temperature and 475 mm Hg?

- **A)** 0.130 L
- **B)** 1.04 L
- **C)** 1.74 L
- **D)** 4.45 L
- **E)** None of the above

Question 2

A steel tank contains carbon dioxide at a pressure of 13.0 atm when the temperature is 34°C. What will be the internal gas pressure when the tank and its contents are heated to 100°C.

- **A)** 38.2 atm
- **B)** 9.40 atm
- **C)** 10.7 atm
- **D)** 15.8 atm
- **E)** None of the above

Question 3

Calculate the density of nitrogen gas, in grams per liter, at STP.

- **A)** 0.625 g/L
- **B)** 0.800 g/L
- **C)** 1.25 g/L
- **D)** 2.50 g/L
- **E)** None of the above

Question 4

A gas evolved during the fermentation of alcohol had a volume of 19.4 L at 17°C and 746 mm Hg. How many moles of gas were collected?

- **A)** 1.25 mol
- **B)** 0.800 mol
- **C)** 10.5 mol
- **D)** 13.6 mol
- **E)** 608 mol

Question 5

How many grams of carbon dioxide are contained in 550 mL of this gas at STP?

- **A)** 0.0245 g
- **B)** 0.0280 g
- **C)** 1080 g
- **D)** 0.560 g
- **E)** 1.1 g

Question 6

A 1.325 g sample of an unknown vapor occupies 368 mL at 114°C and 946 mm Hg. The empirical formula of the compound is NO_2. What is the molecular formula of the compound?

- **A)** NO_2
- **B)** N_4O_8
- **C)** N_3O_6
- **D)** N_2O_4
- **E)** N_5O_{10}

Question 7

An organic compound was analyzed and found to contain 55.8% C, 7.03% H, and 37.2% O. A 1.500 g sample of the compound was vaporized and found to occupy 530 cm^3 at 100°C and 740 torr. Which of the following is the correct molecular formula of the compound?

- **A)** C_2H_3O
- **B)** $C_6H_4O_2$
- **C)** C_3H_2O
- **D)** $C_4H_6O_2$
- **E)** $C_2H_3O_2$

Question 8

What volume of chlorine gas at 646 torr and 32^{o}C would be produced by the reaction of 14.75 g of MnO_2 according to the following chemical equation?

$MnO_2(s) + 4\ HCl(aq) \longrightarrow MnCl_2(aq) + Cl_2(g) + 2\ H_2O(l)$

- **A)** 5.00 L
- **B)** 0.170 L
- **C)** 2.33 L
- **D)** 0.200 L
- **E)** None of the above

Question 9

A mixture of neon, argon, and xenon had a total pressure of 1560 mm Hg at 298 K. The mixture was found to contain 1.50 mol Ne, 2.65 mol Ar, and 1.75 mol Xe. What is the partial pressure of Xe?

- **A)** 701 mm Hg
- **B)** 658 mm Hg
- **C)** 396 mm Hg
- **D)** 463 mm Hg
- **E)** None of the above

Question 10

Deviations from the ideal gas law are smaller at:

- **A)** low temperatures and high pressures
- **B)** low temperatures and low pressures
- **C)** high temperatures and high pressures
- **D)** high temperatures and low pressures

Question 11

Which of the following correctly identifies Boyle's law?

- **A)** $PV=k_1$
- **B)** $V=k_2T$

Question 12

The magnitude of one Kelvin, one Celsius degree, and one degree on the absolute temperature scale is the same.

- **A)** True
- **B)** False

Question 13

The Kelvin temperature scale is useful when comparing:

- **A)** various gas samples at different densities
- **B)** volume of a gas sample with temperature at constant pressure
- **C)** pressure of gas samples at different volumes and constant temperature
- **D)** various liquids at constant pressure

Question 14

Which of the following is not an assumption of the kinetic theory of gases?

- **A)** Elasticity refers to the molecules random interactions resulting in no net energy change.
- **B)** Gas molecules are viewed as points due to large distances between them.
- **C)** Gas molecules can attract other gas molecules.
- **D)** Temperature in Kelvin and average kinetic energy are proportional.