Self Assessment B

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

Question 1

Which of the following is not a characteristic of substances in the gas phase?

- **A)** Substances in the gas phase have much lower densities than the same substances would have in the liquid or solid phase.
- **B)** A mixture of substances in the gas phase will form a homogeneous solution, whereas the same mixture might not form a homogeneous solution in the liquid phase.
- **C)** Substances in the gas phase retain their shapes easily.
- **D)** Substances in the gas phase are compressible.

Question 2

The pressure of a gas was determined to be 485 cm Hg. What is the equivalent pressure in atmospheres?

- **A)** 0.64 atm
- **B)** 33.0 atm
- **C)** 6.38 atm
- **D)** 1.57 atm
- **E)** 6.46 atm

Question 3

A sample of gas occupies 3.00 L at 760 torr. Calculate the volume the gas will occupy if the pressure is changed to 1.45 atm and the temperature remains constant.

- **A)** 2.07 L
- **B)** 0.48 L
- **C)** 4.35 L
- **D)** 2280 L
- **E)** 1570 L

Question 4

A gas sample has a volume of 4.50 L when the temperature is 28 ^{o}C and the pressure is 1.00 atm. What will be the new volume of the gas when the temperature is changed to 0.0 ^{o}C and the pressure to 850 torr?

- **A)** 0.25 L
- **B)** 3.7 L
- **C)** 0.15 L
- **D)** 4.4 L
- **E)** 5.48 L

Question 5

What volume would be occupied by 0.545 mol of a gas at 75 ^{o}C and 0.678 atm?

- **A)** 60.3 L
- **B)** 28.6 L
- **C)** 4.95 L
- **D)** 33.8 L
- **E)** 23.0 L

Question 6

Calculate the density of methane, CH_4, at 18 ^{o}C and 3.65 atm.

- **A)** 39.6 g/L
- **B)** 2.45 g/L
- **C)** 0.41 g/L
- **D)** 0.71 g/L
- **E)** 1.85 g/L

Question 7

What is the molar mass of a gas whose density at STP is 3.74 g/L?

- **A)** 83.8 g/mol
- **B)** 5.99 g/mol
- **C)** 41.9 g/mol
- **D)** 1.19×10^{-2} g/mol

Question 8

What volume of oxygen can be collected at 20 ^{o}C and 730 torr from the complete reaction of 100 g of $KClO_3$, according to the chemical equation shown below?

$2\ KClO_3(s) \longrightarrow 2\ KCl(s) + 3\ O_2(g)$

A) 20.0 L
B) 30 L
C) 28 L
D) 18.9 L
E) 30.6 L

Question 9

Calculate the root-mean-square velocity of CO_2 at 0 ^oC.

A) 23.8 m/s
B) 393 m/s
C) 227 m/s
D) 12.4 m/s
E) 39.1 m/s

Question 10

Using the van der Waals equation, calculate the pressure exerted by 15.0 mol of carbon dioxide confined to a 3.00-L vessel at 56.0 ^oC. Note: Values for a and b in the van der Waals equation: a = 3.59 L^2.atm/mol, and b = 0.0427 L/mol.

A) 23.2 atm
B) 2.16 atm
C) 81.9 atm
D) 96.4 atm