

### Day 5.3 Warm-Up

1. A sample of 3.0 grams of an ideal gas at 127°C and 1.0 atmosphere pressure has a volume of 1.5 liters. Which of the following expressions is correct for the molar mass of the gas?

(A)  $\frac{(0.0821)(400)}{(3.0)(1.0)(1.5)}$

(B)  $\frac{(1.0)(1.5)}{(3.0)(0.0821)(400)}$

(C)  $\frac{(3.0)(0.0821)(400)}{(1.0)(1.5)}$

(D)  $\frac{(3.0)(0.0821)(1.5)}{(1.0)(400)}$

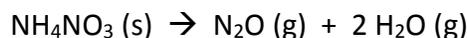
2. Equal numbers of moles of He(g), Ar(g), and Ne(g) are placed in a glass vessel at room temperature. If the vessel has a pinhole-sized leak, which of the following will be true regarding the relative values of the partial pressures of the gases remaining in the vessel after some of the gas mixture has effused?

(A)  $P_{\text{He}} < P_{\text{Ne}} < P_{\text{Ar}}$

(B)  $P_{\text{He}} < P_{\text{Ar}} < P_{\text{Ne}}$

(C)  $P_{\text{Ne}} < P_{\text{Ar}} < P_{\text{He}}$

(D)  $P_{\text{Ar}} < P_{\text{He}} < P_{\text{Ne}}$



3. A 0.03 mol sample of  $\text{NH}_4\text{NO}_3(\text{s})$  is placed in a 1 L evacuated flask, which is then sealed and heated. The  $\text{NH}_4\text{NO}_3(\text{s})$  decomposes completely according to the balanced equation above. The total pressure in the flask is measured at 400 K is closest to which of the following?

(A) 3 atm

(B) 1 atm

(C) 0.1 atm

(D) 0.03 atm

4. Attractive forces between gas molecules are most significant at

(A) Low pressures and low temperatures

(B) Low pressures and high temperatures

(C) High pressures and high temperatures

(D) High pressures and low temperatures

5. Which of the following gases deviates most from ideal behavior?
- (A)  $\text{SO}_2$
  - (B)  $\text{CH}_4$
  - (C)  $\text{H}_2$
  - (D)  $\text{N}_2$
6. Which of the following has an average atomic or molecular speed closest to that of  $\text{N}_2$  molecules at  $0^\circ\text{C}$  and 1 atm?
- (A) Ne
  - (B) Xe
  - (C)  $\text{O}_2$
  - (D) CO
7. At a given temperature, molecules of different gases
- (A) Have the same average kinetic energy
  - (B) Have the same average velocity
  - (C) Have the same diameter
  - (D) Have the same density
  - (E) Have identical masses
8. Calculate the density of methane,  $\text{CH}_4$ , at STP.
9. Write the equation for the combustion of ethane gas ( $\text{C}_2\text{H}_6$ ). How many liters of  $\text{CO}_2$  gas at 300 K and 760 mmHg are made when 20.0 grams of ethane burns completely?