## **Gases Practice Questions**

## **Multiple Choice**

2. Ammonia gas is produced commercially from the reaction of nitrogen and hydrogen. What volume of ammonia caproduced from the reaction of 5.5 x 10³ kg of N <sub>2</sub> and 1.5 x 10³ kg of H <sub>2</sub> 7 Assume the reaction is 100% efficient and product is collected at 325 K and 2.5		partial pressure of helium is 0.22 atm. What is the mole fraction of methane?
produced from the reaction of 5.5 x 10 <sup>3</sup> kg of N <sub>2</sub> and 1.5 x 10 <sup>3</sup> kg of H <sub>2</sub> /2 Assume the reaction is 100% efficient and product is collected at 325 K and 25 atm.  N <sub>2</sub> (g) + 3H <sub>2</sub> (g) -> 2NH <sub>3</sub> (g)  a. 7.0 x 10 <sup>3</sup> L  b. 1.4 x 10 <sup>4</sup> L  c. 1.8 x 10 <sup>4</sup> L  d. 4.2 x 10 <sup>5</sup> L  e. 5.2 x 10 <sup>5</sup> L  e. 5.2 x 10 <sup>5</sup> L  3. If a gas effuses 1.73 times faster than Kr, what is its molar mass?  a. 16.0 g/mol  b. 28.0 g/mol  c. 36.6 g/mol  d. 55.4 g/mol  e. 126.9 g/mol  4. Sulfur burns in oxygen with a deep blue flame to produce sulfur dioxide. If 5.85 g S <sub>6</sub> and 1.00 atm of O <sub>2</sub> completel in a 5.00 L flask (at 25°C), determine the partial pressure of SO <sub>2</sub> (at 25°C) and the total pressure in the flask. S <sub>6</sub> 80(g)> 8SO <sub>2</sub> (g)  a. O <sub>2</sub> = 0 atm, SO <sub>2</sub> = 1.00 atm, total pressure = 1.00 atm  b. O <sub>2</sub> = 0.093 atm, SO <sub>2</sub> = 0.917 atm, total pressure = 1.00 atm  c. O <sub>2</sub> = 0.107 atm, SO <sub>2</sub> = 0.9917 atm, total pressure = 1.00 atm  d. O <sub>2</sub> = 0.855 atm, SO <sub>2</sub> = 0.145 atm, total pressure = 1.00 atm  e. O <sub>2</sub> = 0.917 atm, SO <sub>2</sub> = 0.163 atm, total pressure = 1.00 atm  d. O <sub>2</sub> = 0.955 atm, SO <sub>2</sub> = 0.163 atm, total pressure = 1.00 atm  e. O <sub>2</sub> = 0.917 atm, SO <sub>2</sub> = 0.650 atm, total pressure = 1.00 atm  d. At a given temperature, molecules of different gases  a. have the same average kinetic energy. d. have the same density.  b. have the same average velocity. e. have identical masses.  c. have the same diameter.  7. An unknown mass of ammonium perchlorate, NH <sub>4</sub> ClO <sub>4</sub> , is placed in an evacuated 1.00 L flask and heated to 251°C this temp. the NH <sub>4</sub> ClO <sub>4</sub> was placed in the flask? 2NH <sub>4</sub> ClO <sub>4</sub> (s) -> N <sub>2</sub> (g) + Cl <sub>2</sub> (g) + 2O <sub>2</sub> (g) + 4H <sub>2</sub> O <sub>2</sub> (g)  a. 0.149 g b. 0.419 g c. 0.682 g d. 1.67 g e. 3.19 g  8. In an experiment, argon is allowed to effuse through a tiny opening into an evacuated 5.00x10 <sup>2</sup> mL flask for 30.0 which point the pressure in the flask is found to be 15.0 mmlg. This is repeated using an unknown gas at the san temperature and pressure. After 30.0s, the pressure is found to be 47.4 mmHg. What is its molar mass?  a. 4.00 g/mol  b. 16.0 g/		a. 0.23 b. 0.29 c. 0.50 d. 0.77 e. 3.5
3. If a gas effuses 1.73 times faster than Kr, what is its molar mass?  a. 16.0 g/mol  b. 28.0 g/mol  c. 36.6 g/mol  d. 55.4 g/mol  e. 126.9 g/mol  4. Sulfur burns in oxygen with a deep blue flame to produce sulfur dioxide. If 5.85 g S <sub>8</sub> and 1.00 atm of O <sub>2</sub> completed in a 5.00 L flask (at 25°C), determine the partial pressure of SO <sub>2</sub> (at 25°C) and the total pressure in the flask. S <sub>8</sub> 80 <sub>2</sub> (g)> 850 <sub>2</sub> (g)  a. 0 <sub>2</sub> = 0.107 atm, SO <sub>2</sub> = 1.00 atm, total pressure = 1.00 atm  b. 0 <sub>2</sub> = 0.093 atm, SO <sub>2</sub> = 0.917 atm, total pressure = 1.00 atm  c. 0 <sub>2</sub> = 0.107 atm, SO <sub>2</sub> = 0.145 atm, total pressure = 1.00 atm  e. 0 <sub>2</sub> = 0.917 atm, SO <sub>2</sub> = 0.145 atm, total pressure = 1.08 atm  e. 0 <sub>2</sub> = 0.917 atm, SO <sub>2</sub> = 0.145 atm, total pressure = 1.08 atm  5. A mass of 5.0 grams of dry ice, CO <sub>2</sub> (s), is sealed in an evacuated 2.0 L plastic soda bottle. What is the pressure insibottle when the CO <sub>2</sub> is heated to 35°C?  a. 0.16 atm  b. 1.4 atm  c. 8.9 atm  d. 18 atm  e. 63 atm  6. At a given temperature, molecules of different gases  a. have the same average kinetic energy.  b. have the same dameter.  7. An unknown mass of ammonium perchlorate, NH <sub>4</sub> ClO <sub>4</sub> , is placed in an evacuated 1.00 L flask and heated to 251°C. Whis temp. the NH <sub>4</sub> ClO <sub>4</sub> decomposes violently. The gaseous products exert a pressure of 466 mmHg at 251°C. Whis f NH <sub>4</sub> ClO <sub>4</sub> was placed in the flask? 2NH <sub>4</sub> ClO <sub>4</sub> (s)> N <sub>2</sub> (g) + Cl <sub>2</sub> (g) + 2O <sub>2</sub> (g) + 4H <sub>2</sub> O(g)  a. 0.149 g  b. 0.419 g  c. 0.682 g  d. 1.67 g  e. 3.19 g  8. In an experiment, argon is allowed to effuse through a tiny opening into an evacuated 5.00x10 <sup>2</sup> mL flask for 30.0s which point the pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the same temperature and pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the same temperature and pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the same temperature and pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown g	2.	produced from the reaction of $5.5 \times 10^3$ kg of $N_2$ and $1.5 \times 10^3$ kg of $H_2$ ? Assume the reaction is $100\%$ efficient and the product is collected at $325$ K and $25$ atm. $N_2(g) + 3H_2(g)> 2NH_3(g)$
a. 16.0 g/mol b. 28.0 g/mol c. 36.6 g/mol d. 55.4 g/mol e. 126.9 g/mol 4. Sulfur burns in oxygen with a deep blue flame to produce sulfur dioxide. If 5.85 g S <sub>8</sub> and 1.00 atm of O <sub>2</sub> completel in a 5.00 L flask (at 25°C), determine the partial pressure of SO <sub>2</sub> (at 25°C) and the total pressure in the flask. S <sub>8</sub> 802(g)> 8SO <sub>2</sub> (g)  a. O <sub>2</sub> = 0 atm, SO <sub>2</sub> = 1.00 atm, total pressure = 1.00 atm  b. O <sub>2</sub> = 0.093 atm, SO <sub>2</sub> = 0.917 atm, total pressure = 1.00 atm  c. O <sub>2</sub> = 0.107 atm, SO <sub>2</sub> = 0.893 atm, total pressure = 1.00 atm  e. O <sub>2</sub> = 0.955 atm, SO <sub>2</sub> = 0.163 atm, total pressure = 1.00 atm  e. O <sub>2</sub> = 0.917 atm, SO <sub>2</sub> = 0.163 atm, total pressure = 1.00 atm  e. O <sub>2</sub> = 0.917 atm, SO <sub>2</sub> = 0.163 atm, total pressure = 1.00 atm  e. O <sub>3</sub> = 0.16 atm  b. 1.4 atm  c. 8.9 atm  d. 18 atm  e. 63 atm  6. At a given temperature, molecules of different gases  a. have the same average kinetic energy.  d. have the same density.  b. have the same adiameter.  7. An unknown mass of ammonium perchlorate, NH <sub>4</sub> ClO <sub>4</sub> , is placed in an evacuated 1.00 L flask and heated to 251°C this temp. the NH <sub>4</sub> ClO <sub>4</sub> decomposes violently. The gaseous products exert a pressure of 466 mmHg at 251°C. Whisof NH <sub>4</sub> ClO <sub>4</sub> was placed in the flask? 2NH <sub>4</sub> ClO <sub>4</sub> (s)> N <sub>2</sub> (g) + Cl <sub>2</sub> (g) + 2O <sub>2</sub> (g) + 4H <sub>2</sub> O(g)  a. 0.149 g  b. 0.419 g  c. 0.682 g  d. 1.67 g  e. 3.19 g  8. In an experiment, argon is allowed to effuse through a tiny opening into an evacuated 5.00x10² mL flask for 30.0s which point the pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the san temperature and pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the san temperature and pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the san temperature and pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the san temperature and pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the san temperature and pressure	3.	
in a $5.00$ L flask (at $25^{\circ}$ C), determine the partial pressure of $SO_2$ (at $25^{\circ}$ C) and the total pressure in the flask. $S_8$ $80_2(g) \cdots 880_2(g)$ a. $0_2 = 0$ atm, $SO_2 = 1.00$ atm, total pressure = $1.00$ atm b. $0_2 = 0.093$ atm, $SO_2 = 0.917$ atm, total pressure = $1.00$ atm c. $0_2 = 0.107$ atm, $SO_2 = 0.893$ atm, total pressure = $1.00$ atm d. $0_2 = 0.855$ atm, $SO_2 = 0.145$ atm, total pressure = $1.00$ atm e. $0_2 = 0.917$ atm, $SO_2 = 0.163$ atm, total pressure = $1.00$ atm 5. A mass of $5.0$ grams of dry ice, $CO_2(s)$ , is sealed in an evacuated $2.0$ L plastic soda bottle. What is the pressure insibottle when the $CO_2$ is heated to $35^{\circ}C$ ? a. $0.16$ atm b. $1.4$ atm c. $8.9$ atm d. $1.8$ atm e. $6.3$ atm 6. At a given temperature, molecules of different gases a. have the same average kinetic energy. d. have the same density. b. have the same diameter. 7. An unknown mass of ammonium perchlorate, $NH_4CIO_4$ , is placed in an evacuated $1.00$ L flask and heated to $251^{\circ}C$ . Who of $NH_4CIO_4$ was placed in the flask? $2NH_4CIO_4(s) \rightarrow N_2(g) + CI_2(g) + 2O_2(g) + 4H_2O(g)$ a. $0.149$ g b. $0.419$ g c. $0.682$ g d. $1.67$ g e. $3.19$ g 8. In an experiment, argon is allowed to effuse through a tiny opening into an evacuated $5.00 \times 10^2$ mL flask for $30.0 \times 10^2$ mL flask for $30.0 \times 10^2$ mL flask is found to be $47.4$ mmHg. What is its molar mass? a. $4.00$ g/mol b. $16.0$ g/mol c. $28.0$ g/mol d. $32.0$ g/mol e. $83.8$ g/mol 9. $25.0$ L of $H_2$ at $50.0$ atm and $25^{\circ}C$ expands to $65.0$ L and is subsequently heated to $35^{\circ}C$ . What is the new pressure flask? (vapor pressure $10.0 \times 10^2$ mL $10.0$		· ·
<ul> <li>c. 0<sub>2</sub> = 0.107 atm, SO<sub>2</sub> = 0.893 atm, total pressure = 1.00 atm</li> <li>d. 0<sub>2</sub> = 0.855 atm, SO<sub>2</sub> = 0.145 atm, total pressure = 1.00 atm</li> <li>e. 0<sub>2</sub> = 0.917 atm, SO<sub>2</sub> = 0.163 atm, total pressure = 1.08 atm</li> <li>5. A mass of 5.0 grams of dry ice, CO<sub>2</sub>(s), is sealed in an evacuated 2.0 L plastic soda bottle. What is the pressure insibottle when the CO<sub>2</sub> is heated to 35°C?</li> <li>a. 0.16 atm</li> <li>b. 1.4 atm</li> <li>c. 8.9 atm</li> <li>d. 18 atm</li> <li>e. 63 atm</li> <li>6. At a given temperature, molecules of different gases</li> <li>a. have the same average kinetic energy.</li> <li>d. have the same density.</li> <li>b. have the same average velocity.</li> <li>e. have identical masses.</li> <li>c. have the same diameter.</li> <li>7. An unknown mass of ammonium perchlorate, NH<sub>4</sub>ClO<sub>4</sub>, is placed in an evacuated 1.00 L flask and heated to 251°C this temp. the NH<sub>4</sub>ClO<sub>4</sub> decomposes violently. The gaseous products exert a pressure of 466 mmHg at 251°C. Who of NH<sub>4</sub>ClO<sub>4</sub> was placed in the flask? 2NH<sub>4</sub>ClO<sub>4</sub>(s)&gt; N<sub>2</sub>(g) + Cl<sub>2</sub>(g) + 2O<sub>2</sub>(g) + 4H<sub>2</sub>O(g)</li> <li>a. 0.149 g</li> <li>b. 0.419 g</li> <li>c. 0.682 g</li> <li>d. 1.67 g</li> <li>e. 3.19 g</li> <li>8. In an experiment, argon is allowed to effuse through a tiny opening into an evacuated 5.00x10² mL flask for 30.0s which point the pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the san temperature and pressure. After 30.0s, the pressure is found to be 47.4mmHg. What is its molar mass?</li> <li>a. 4.00 g/mol</li> <li>b. 16.0 g/mol</li> <li>c. 28.0 g/mol</li> <li>d. 32.0 g/mol</li> <li>e. 83.8 g/mol</li> <li>9. 25.0 L of H<sub>2</sub> at 50.0atm and 25°C expands to 65.0 L and is subsequently heated to 35°C. What is the new pressure flask? (vapor pressure H<sub>2</sub>O(f) = 31.8 mm Hg)</li> <li>a. 30.1 atm</li> <li>b. 1.15 atm</li> <li>c. 1.48 atm</li> <li>d. 1.69 atm</li> <li>e. 1.73 atm</li> <li>1. Which conditions will cause the greatest deviation from the ideal gas law?</li> <li>a. 100 atm and 10 K</li></ul>	4.	in a 5.00 L flask (at 25°C), determine the partial pressure of $SO_2$ (at 25°C) and the total pressure in the flask. $S_8(s) + 8O_2(g)> 8SO_2(g)$ a. $O_2 = 0$ atm, $SO_2 = 1.00$ atm, total pressure = 1.00 atm
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<ul> <li>6. At a given temperature, molecules of different gases a. have the same average kinetic energy. d. have the same density.</li> <li>b. have the same average velocity. e. have identical masses.</li> <li>c. have the same diameter.</li> <li>7. An unknown mass of ammonium perchlorate, NH<sub>4</sub>ClO<sub>4</sub>, is placed in an evacuated 1.00 L flask and heated to 251°C this temp. the NH<sub>4</sub>ClO<sub>4</sub> decomposes violently. The gaseous products exert a pressure of 466 mmHg at 251°C. Who of NH<sub>4</sub>ClO<sub>4</sub> was placed in the flask? 2NH<sub>4</sub>ClO<sub>4</sub>(s) ·-&gt; N<sub>2</sub>(g) + Cl<sub>2</sub>(g) + 2O<sub>2</sub>(g) + 4H<sub>2</sub>O(g) a. 0.149 g b. 0.419 g c. 0.682 g d. 1.67 g e. 3.19 g</li> <li>8. In an experiment, argon is allowed to effuse through a tiny opening into an evacuated 5.00x10² mL flask for 30.0s which point the pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the san temperature and pressure. After 30.0s, the pressure is found to be 47.4mmHg. What is its molar mass? a. 4.00 g/mol b. 16.0 g/mol c. 28.0 g/mol d. 32.0 g/mol e. 83.8 g/mol</li> <li>9. 25.0L of H<sub>2</sub> at 50.0atm and 25°C expands to 65.0L and is subsequently heated to 35°C. What is the new pressure? a. 19.9 atm b. 25.2 atm c. 26.9 atm d. 28.4 atm e. 31.2 atm</li> <li>10. A 10.0 L flask is used to collect 0.500 moles of N<sub>2</sub> and 0.180 moles of O<sub>2</sub> over water at 30°C. What is the pressure flask? (vapor pressure H<sub>2</sub>O(I) = 31.8 mm Hg) a30.1 atm b. 1.15 atm c. 1.48 atm d. 1.69 atm e. 1.73 atm</li> <li>11. Which conditions will cause the greatest deviation from the ideal gas law? a. 100 atm and 500 K c. 0.001 atm and 500 K e. 0.001 and 273 K b. 100 atm and 10 K d. 0.001 and 10 K</li> <li>12. What volume of O<sub>2</sub> at 22°C and 1.00atm contains the same number of molecules as 0.400L H<sub>2</sub> at 45°C and 1.00atm</li> </ul>	5.	bottle when the CO <sub>2</sub> is heated to 35°C?
<ul> <li>a. have the same average kinetic energy.</li> <li>b. have the same average velocity.</li> <li>c. have the same diameter.</li> <li>7. An unknown mass of ammonium perchlorate, NH<sub>4</sub>ClO<sub>4</sub>, is placed in an evacuated 1.00 L flask and heated to 251°C this temp. the NH<sub>4</sub>ClO<sub>4</sub> decomposes violently. The gaseous products exert a pressure of 466 mmHg at 251°C. Who of NH<sub>4</sub>ClO<sub>4</sub> was placed in the flask? 2NH<sub>4</sub>ClO<sub>4</sub>(s)&gt; N<sub>2</sub>(g) + Cl<sub>2</sub>(g) + 2O<sub>2</sub>(g) + 4H<sub>2</sub>O(g)</li> <li>a. 0.149 g</li> <li>b. 0.419 g</li> <li>c. 0.682 g</li> <li>d. 1.67 g</li> <li>e. 3.19 g</li> <li>8. In an experiment, argon is allowed to effuse through a tiny opening into an evacuated 5.00x10² mL flask for 30.0s which point the pressure in the flask is found to be 15.0mmHg. This is repeated using an unknown gas at the sam temperature and pressure. After 30.0s, the pressure is found to be 47.4mmHg. What is its molar mass?</li> <li>a. 4.00 g/mol</li> <li>b. 16.0 g/mol</li> <li>c. 28.0 g/mol</li> <li>d. 32.0 g/mol</li> <li>e. 83.8 g/mol</li> <li>9. 25.0L of H<sub>2</sub> at 50.0atm and 25°C expands to 65.0L and is subsequently heated to 35°C. What is the new pressure?</li> <li>a. 19.9 atm</li> <li>b. 25.2 atm</li> <li>c. 26.9 atm</li> <li>d. 28.4 atm</li> <li>e. 31.2 atm</li> <li>10.0 L flask is used to collect 0.500 moles of N<sub>2</sub> and 0.180 moles of O<sub>2</sub> over water at 30°C. What is the pressure flask? (vapor pressure H<sub>2</sub>O(<i>I</i>) = 31.8 mm Hg)</li> <li>a30.1 atm</li> <li>b. 1.15 atm</li> <li>c. 1.48 atm</li> <li>d. 1.69 atm</li> <li>e. 1.73 atm</li> <li>11. Which conditions will cause the greatest deviation from the ideal gas law?</li> <li>a. 100 atm and 500 K</li> <li>c. 0.001 atm and 500 K</li> <li>e. 0.001 and 273 K</li> <li>b. 100 atm and 10 K</li> <li>d. 0.001 and 10 K</li> <li>12. What volume of O<sub>2</sub> at 22°C and 1.00atm contains the same number of molecules as 0.400L H<sub>2</sub> at 45°C and 1.00atm</li> </ul>		
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a. $100$ atm and $500$ K c. $0.001$ atm and $500$ K e. $0.001$ and $273$ K b. $100$ atm and $10$ K d. $0.001$ and $10$ K l2. What volume of $O_2$ at $22^{\circ}$ C and $1.00$ atm contains the same number of molecules as $0.400$ L H $_2$ at $45^{\circ}$ C and $1.00$ atm		
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	12.	

1. A mixture of methane and helium is placed in a 2.0 L flask at  $27^{\circ}$ C. The partial pressure of CH<sub>4</sub> is 0.72 atm and the