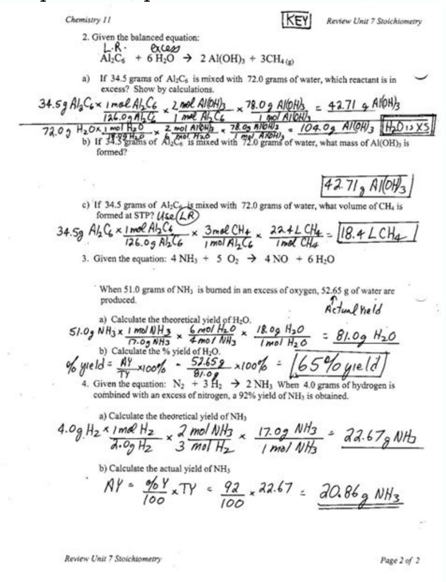
Stoichiometry chapter 9 section 1 worksheet answers

1. The cutting edge of a knife that has been sharpened has a smaller surface area than a dull knife. Since pressure is force per unit area, a sharp knife will exert a higher pressure with the same amount of force and cut through material more effectively. 3. Lying down distributes your weight over a larger surface area, exerting less pressure on the ice compared to standing up. If you exert less pressure, you are less likely to break through thin ice. 9. Earth: 14.7 lb in–2; Venus: 1.30 × 103 lb in−2 11. (a) 101.5 kPa; (b) 51 torr drop 13. (a) 264 torr; (b) 35,200 Pa; (c) 0.352 bar 15. (a) 623 mm Hg; (b) 0.820 atm; (c) 83.1 kPa 17. With a closed-end manometer, no change would be observed, since the vaporized liquid would contribute equal, opposing pressures in both arms of the manometer tube.
However, with an open-ended manometer, a higher pressure reading of the gas would be obtained than expected, since Pgas = Patm + Pvol liquid. 19. As the bubbles rise, the pressure decreases, so their volume increases as suggested by Boyle's law. flysky fs-gt5 manual 21. (a) The number of particles in the gas increases as the volume increases. (b) temperature, pressure 23. The curve would be farther to the right and higher up, but the same basic shape. 33.


Chemistry 11 KEY Review Unit 7 Stoichiometry

2. Given the balanced equation:
L.R. excess
$Al_2C_6 + 6H_2O \rightarrow 2Al(OH)_3 + 3CH_{4(g)}$

a) If 34.5 grams of Al_2C_6 is mixed with 72.0 grams of water, which reactant is in excess? Show by calculations.

34.5 g Al_2C_6 × 1 mol Al_2C_6 / 126.0 g Al_2C_6 × 2 mol $Al(OH)_3$ / 1 mol Al_2C_6 × 78.0 g $Al(OH)_3$ / 1 mol $Al(OH)_3$ = 42.71 g $Al(OH)_3$

72.0 g H_2O × 1 mol H_2O / 18.0 g H_2O × 2 mol $Al(OH)_3$ / 6 mol H_2O × 78.0 g $Al(OH)_3$ / 1 mol $Al(OH)_3$ = 104.0 g $Al(OH)_3$ $\boxed{H_2O \text{ is XS}}$

b) If 34.5 grams of Al_2C_6 is mixed with 72.0 grams of water, what mass of $Al(OH)_3$ is formed?

$\boxed{42.71\text{ g } Al(OH)_3}$

c) If 34.5 grams of Al_2C_6 is mixed with 72.0 grams of water, what volume of CH_4 is formed at STP? Use LR

34.5 g Al_2C_6 × 1 mol Al_2C_6 / 126.0 g Al_2C_6 × 3 mol CH_4 / 1 mol Al_2C_6 × 22.4 L CH_4 / 1 mol CH_4 = $\boxed{18.4\text{ L } CH_4}$

3. Given the equation: $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$

When 51.0 grams of NH_3 is burned in an excess of oxygen, 52.65 g of water are produced.
Actual Yield

a) Calculate the theoretical yield of H_2O.

51.0 g NH_3 × 1 mol NH_3 / 17.0 g NH_3 × 6 mol H_2O / 4 mol NH_3 × 18.0 g H_2O / 1 mol H_2O = 81.0 g H_2O

b) Calculate the % yield of H_2O.

% yield = AY / TY × 100% = 52.65 g / 81.0 g × 100% = $\boxed{65\% \text{ yield}}$

4. Given the equation: $N_2 + 3H_2 \rightarrow 2NH_3$ When 4.0 grams of hydrogen is combined with an excess of nitrogen, a 92% yield of NH_3 is obtained.

a) Calculate the theoretical yield of NH_3

4.0 g H_2 × 1 mol H_2 / 2.0 g H_2 × 2 mol NH_3 / 3 mol H_2 × 17.0 g NH_3 / 1 mol NH_3 = 22.67 g NH_3

b) Calculate the actual yield of NH_3

AY = %Y / 100 × TY = 92 / 100 × 22.67 = 20.86 g NH_3

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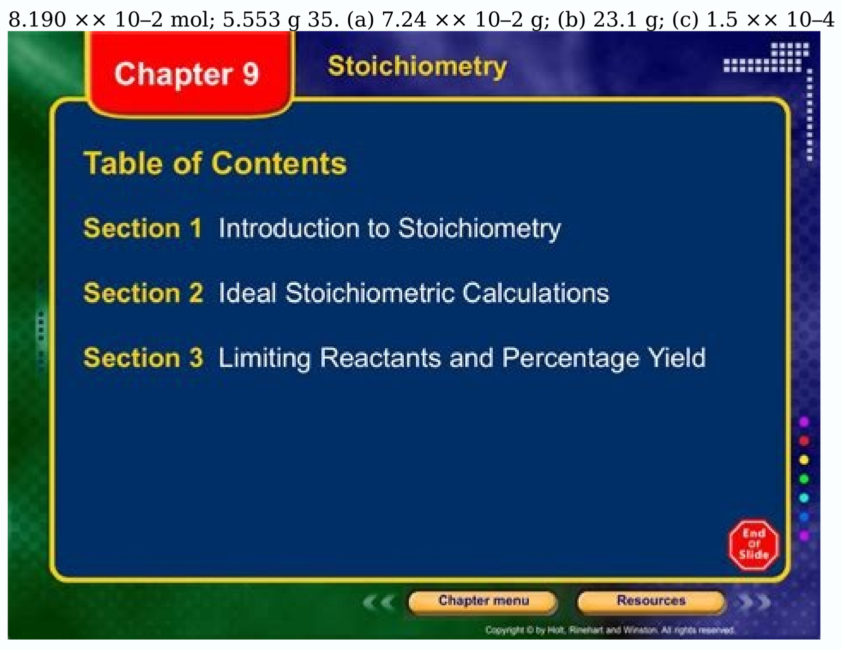
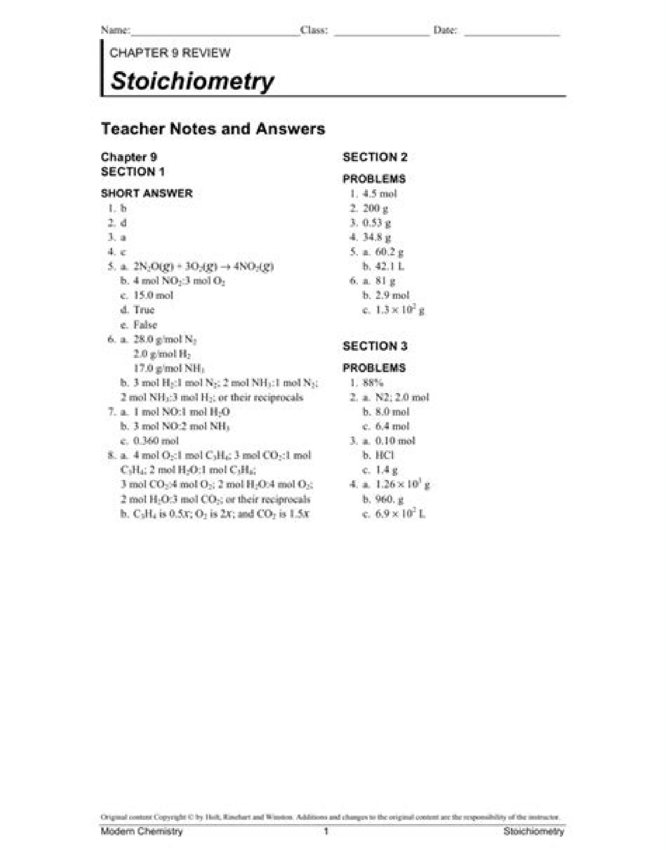
8.190 ×× 10–2 mol; 5.553 g 35. (a) 7.24 ×× 10–2 g; (b) 23.1 g; (c) 1.5 ×× 10–4 g 41.



For a gas exhibiting ideal behavior: 43. (a) 1.85 L CCl2F2; (b) 4.66 L CH3CH2F 47.
The pressure decreases by a factor of 3. 57.
141 atm, 107,000 torr, 14,300 kPa 59. CH4: 276 kPa; C2H6: 27 kPa; C3H8: 3.4 kPa 65. (a) Determine the moles of HgO that decompose; using the chemical equation, determine the moles of O2 produced by decomposition of this amount of HgO; and determine the volume of O2 from the moles of O2, temperature, and pressure. (b) 0.308 L 67.
(a) Determine the molar mass of CCl2F2. From the balanced equation, calculate the moles of H2 needed for the complete reaction. From the ideal gas law, convert moles of H2 into volume. (b) 3.72 ×× 103 L 69. (a) Balance the equation. Determine the grams of CO2 produced and the number of moles. From the ideal gas law, determine the volume of gas. (b) 7.43 ×× 105 L 73. (a) 18.0 L; (b) 0.533 atm 83. Effusion can be defined as the process by which a gas escapes through a pinhole into a vacuum. Graham's law states that with a mixture of two gases A and B: (rate Arate B)=(molar mass of Bmolar mass of A)1/2.(rate Arate B)=(molar mass of Bmolar mass of A)1/2. Both A and B are in the same container at the same temperature, and therefore will have the same kinetic energy:KEA=KEB KE=12mv2KEA=KEB KE=12mv2 Therefore, 12mAvA2=12mBvB212mAvA2=12mBvB2vA2vB2=mBmAvA2vB2=mBmA(vA2vB2)1/2=(mBmA)1/2(vA2vB2)1/2=(mBmA)1/2vAvB=(mBmA)1/2vAvB=(mBmA)1/2 91. Yes. At any given instant, there are a range of values of molecular speeds in a sample of gas. Any single molecule can speed up or slow down as it collides with other molecules. The average speed of all the molecules is constant at constant temperature. 93. H2O. Cooling slows the speeds of the He atoms, causing them to behave as though they were heavier. 95. (a) The pressure of the gas remains constant. (b) The average kinetic energy doubles. (c) The root mean square speed increases to 22 times its initial value; urms is proportional to KEavg.KEavg. 97. (a) equal; (b) less than; (c) 29.48 g mol−1; (d) 1.0966 g L−1; (e) 0.129 g/L; (f) 4.01 ×× 105 g; net lifting capacity = 384 lb; (g) 270 L; (h) 39.1 kJ min−1 101. The gas behavior most like an ideal gas will occur under the conditions that minimize the chances of significant interactions between the gaseous atoms/molecules, namely, low pressures (fewer atoms/molecules per unit volume) and high temperatures (greater kinetic energies of atoms/molecules make them less susceptible to attractive forces).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CHAPTER 9 REVIEW

Stoichiometry

Teacher Notes and Answers

Chapter 9
SECTION 1

SHORT ANSWER
1. b
2. d
3. a
4. c
5. a. $2N_2O(g) + 3O_2(g) \rightarrow 4NO_2(g)$
   b. 4 mol NO_2:3 mol O_2
   c. 15.0 mol
   d. True
   e. False
6. a. 28.0 g/mol N_2
   2.0 g/mol H_2
   17.0 g/mol NH_3
   b. 3 mol H_2:1 mol N_2; 2 mol NH_3:1 mol N_2; 2 mol NH_3:3 mol H_2; or their reciprocals
7. a. 1 mol NO:1 mol H_2O
   b. 3 mol NO:2 mol NH_3
   c. 0.360 mol
8. a. 4 mol O_2:1 mol C_3H_4; 3 mol CO_2:1 mol C_3H_4; 2 mol H_2O:1 mol C_3H_4; 3 mol CO_2:4 mol O_2; 2 mol H_2O:4 mol O_2; 2 mol H_2O:3 mol CO_2; or their reciprocals
   b. C_3H_4 is 0.5x; O_2 is 2x; and CO_2 is 1.5x

SECTION 2

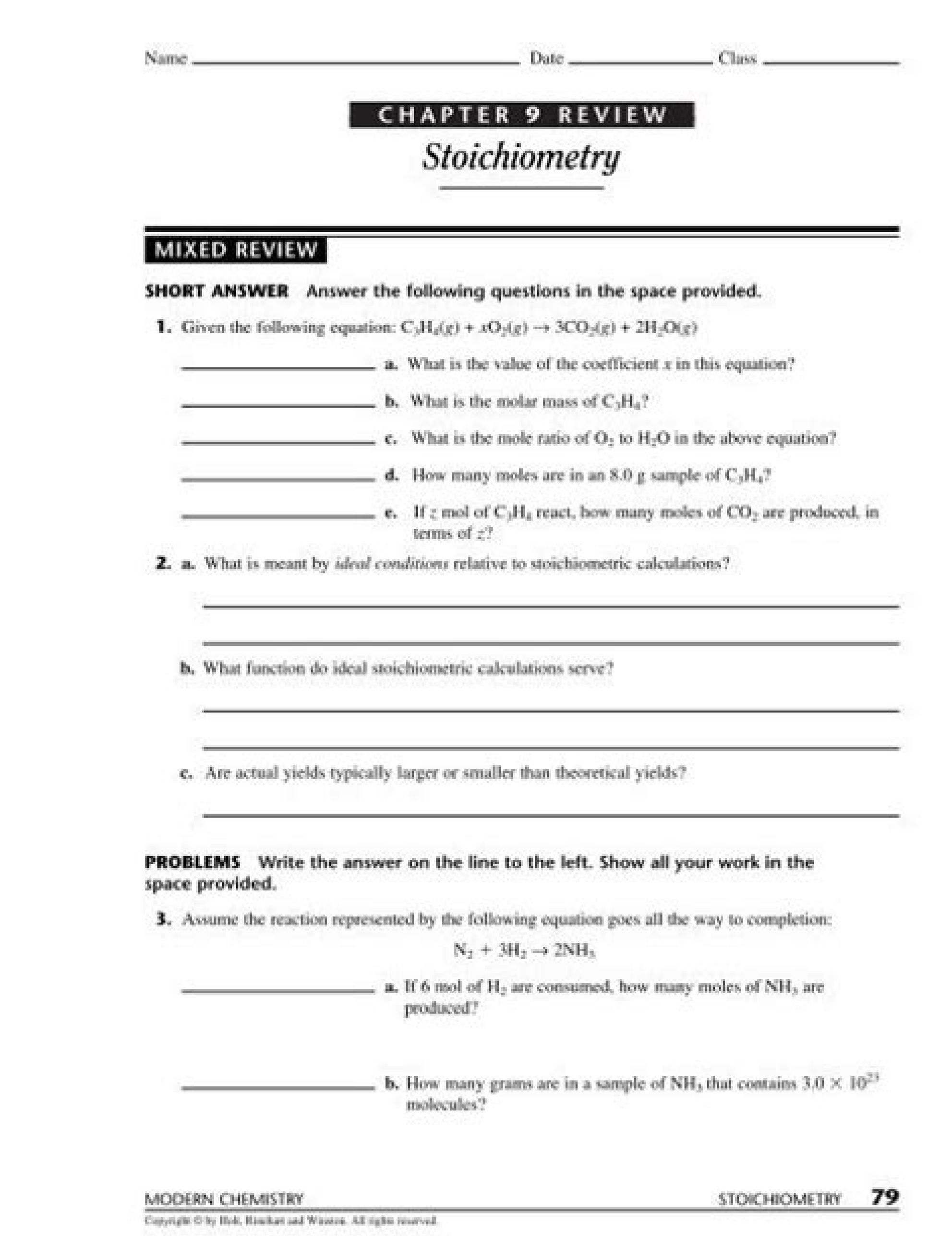
PROBLEMS
1. 4.5 mol
2. 200 g
3. 0.53 g
4. 34.8 g
5. a. 60.2 g
   b. 42.1 L
6. a. 81 g
   b. 2.9 mol
   c. 1.3×10^2 g

SECTION 3

PROBLEMS
1. 88%
2. a. N2; 2.0 mol
   b. 8.0 mol
   c. 6.4 mol
3. a. 0.10 mol
   b. HCl
   c. 1.4 g
4. a. 1.26×10^3 g
   b. 960. g
   c. 6.9×10^2 L

Modern Chemistry 1 Stoichiometry

The conditions described in (b), high temperature and low pressure, are therefore most likely to yield ideal gas behavior. 105. contabilidad de costos de ortega pérez de león 6ta edición pdf (a) A straight horizontal line at 1.0; (b) When real gases are at low pressures and high temperatures, they behave close enough to ideal gases that they are approximated as such; however, in some cases, we see that at a high pressure and temperature, the ideal gas approximation breaks down and is significantly different from the pressure calculated by the ideal gas equation. (c) The greater the compressibility, the more the volume matters. At low pressures, the correction factor for intermolecular attractions is more significant, and the effect of the volume of the gas molecules on Z would be a small lowering compressibility. At higher pressures, the effect of the volume of the gas molecules themselves on Z would increase compressibility (see Figure 9.35). (d) Once again, at low pressures, the effect of intermolecular attractions on Z would be more important than the correction factor for the volume of the gas molecules themselves, though perhaps still small. At higher pressures and low temperatures, the effect of intermolecular attractions would be larger. See Figure 9.35.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CHAPTER 9 REVIEW

Stoichiometry

MIXED REVIEW

SHORT ANSWER Answer the following questions in the space provided.

1. Given the following equation: $C_3H_4(g) + xO_2(g) \rightarrow 3CO_2(g) + 2H_2O(g)$
   ___ a. What is the value of the coefficient x in this equation?
   ___ b. What is the molar mass of C_3H_4?
   ___ c. What is the mole ratio of O_2 to H_2O in the above equation?
   ___ d. How many moles are in an 8.0 g sample of C_3H_4?
   ___ e. If z mol of C_3H_4 react, how many moles of CO_2 are produced, in terms of z?
2. a. What is meant by *ideal conditions* relative to stoichiometric calculations?
   b. What function do ideal stoichiometric calculations serve?
   c. Are actual yields typically larger or smaller than theoretical yields?

PROBLEMS Write the answer on the line to the left. Show all your work in the space provided.

3. Assume the reaction represented by the following equation goes all the way to completion:
   $N_2 + 3H_2 \rightarrow 2NH_3$
   ___ a. If 6 mol of H_2 are consumed, how many moles of NH_3 are produced?
   ___ b. How many grams are in a sample of NH_3 that contains 3.0×10^{23} molecules?

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