Unit 7: Gases and Solutions

Chapter 12: Gases

12.1: Characteristics of Gases

(Practice on pg. 421)
1. 7.37×10^6 Pa **2.** 92.48 mmHg **3.** 0.9869 atm

(Section Review on pg. 422)
8. 0.57 atm **9.** 610.5 Pa **10.** 1.3×10^{-3} Pa

12.2: The Gas Laws

(Practice on pg. 425)
1. 142 mL **2.** 6.58 mL **3.** 8.1×10^5 L **4.** 1.4×10^2mL

(Practice on pg. 428)
1. 0.67 L **2.** 815 mL **3.** −11.0 °C **4.** 1.64×10^3 L

(Practice on pg. 431)
1. 1.29 atm **2.** 325 K or 52°C **3.** 491 K or 218°C

(Section Review on pg. 432)
5. 31.0 mL **6.** 0.894 L **7.** 114 kPa **8.** 323 K
9. 5.00 L **12.** 20.0 mL

12.3: Molecular Composition of Gases

(Practice on pg. 435)
1. 7.97×10^{-2} mol **2.** 0.137 mol **3.** 1500 kPa **4.** 2.73×10^4 L

(Practice on pg. 438)
1. N_2 has a higher speed; 1.069 times faster **2.** 1.9×10^3 m/s **3.** 48.6 g/mol
4. $^{235}UF_6$ diffuses at 1.0043 times the speed of $^{238}UF_6$.

(Practice on pg. 442)
1. 11.4 L **2.** 2.08×10^5 L H_2O **3.** 3.87 g Na

(Section Review on pg. 442)
7. 0.781 mol **8.** 1.1×10^3 kPa **9.** 5.3×10^{-3} mol SO_2
10. Gas B has three times more speed than gas A. **11.** 15.0 L **12.** 21.2 L
14. 2.22 L N_2 and 1.11 L O_2; 1.31 g/L

(Chapter Review on pg. 445−447)
30. $P_{total} = P_A + P_B + P_C$ **31.** 101325 N **32.** 13.3 kPa **35.** 113 mL
36. 175 kPa **37.** 1100 mL **39.** 66.3 mL **41.** 93.3 mL
43. 0.570 L **45.** 3.1 L **47.** 152 kPa **49.** 26 kPa
49. 26 kPa **51.** 8.4 atm **53.** 0.0486 mol **54.** 266 kPa
55. 2.5 mol **56.** 4.0×10^3 L **57.** $M = 64$ g/mol; SO_2
58. $M = 128$ g/mol; HI **59.** 1.91×10^3 m/s **60.** 10.4 L **61.** 0.484 g Mg
63. **(a)** CO **(b)** 37.5 mL CO **(c)** 412.5 mL CH_3OH **64.** 2.28×10^3 L
65. 2.64 L

(Standardize Test Prep on pg. 450 & 451)

1. A **2.** G **3.** A **4.** The volume does not change and remains at 100 mL.
5. Through the process of diffusion, gas molecules are in constant motion, moving from areas of high concentration to areas of low concentration, even when there is no noticeable movement of air.
6. The gas in the cylinder is at a very high pressure. Because temperature and pressure are inversely related, the carbon dioxide becomes colder when it is released in the atmosphere.
7. G **8.** C **9.** As the gas in the balloon s heated, its volume increases to fill the balloon.
10. F **11.** B **12.** F **13.** 300 atm

Chapter 13: Solutions

13.2: Concentration and Molarity

(Practice on pg. 461)

1. 1.5 ppm **2.** 130 ppm **3.** 4250 ppm **4.** 7.4 ppm
5. 63 ppm **6.** 155 ppm **7.** 2.3 ppm

(Practice on pg. 465)

1. 0.83 M acetic acid **2.** 1.001 M HCl **3.** 0.816 M sulphuric acid **4.** 1.75 M $AgNO_3$
5. 0.2501 M $Ba(OH)_2$ **6.** 2.5 g KBr **7.** 11 g NaCl

(Practice on pg. 467)

1. 109 g HCl **2.** 0.852 g $ZnCl_2$ **3.** 451 g CdS

(Section Review on pg. 467)

5. 438 ppm Cd **6.** 1.63 ppm He **7.** 4.00 g NaOH **8.** 1.1 M LiCl
9. 0.838 M NaOCl **10.** 5.30 g $AgNO_3$ **11.** 5.8×10^3 g $Ca_3(PO_4)_2$ and 2.0×10^3 g H_2O
12. KCl
14. NaCl has a higher molarity. There are more moles in 55 g of NaCl than in 55 g of KCl per Litre of water.

(Chapter Review on pg. 488−491)

24. Measure out 7.31 g of NaCl (from calculations using $n = CV$ and $m = nM$) in a beaker. Dissolve it in about 100 mL of distilled water, and transfer the content to a 250 mL volumetric flask. Rinse out the beaker and stirring rod, and pour the rinsed water into the volumetric flask. Repeat rinsing a few times. Add water to the volumetric flask until the mark. Cap and shake.
33. around −5.6°C **37.** 1.1 ppm **39.** 5×10^{-2} g Cl_2 **41.** 0.776 M NaOH
43. 2.0 mol $AgNO_3$ **45.** 0.123 M H_3PO_4 **47.** 6.27 g HCl **49.** 5.4 M NaCl
51. 163 g $C_6H_{12}O_6$ **52.** 0.500 M $Ba(NO_3)_2$ and 0.500 M $BaCl_2$ **53.** 52.1 mL
54. 0.0309 M $AgNO_3$ **67.** Mass of solute that can dissolve in 100 g of water at a given temperature
68. The maximum solubility of a particular solute at any temperature
69. More soluble at higher temperatures
70. $NaNO_3$ is most soluble at 10°C. $NaOOCCH_3$ is the most soluble at 60°C. KNO_3 is the most soluble at 80°C.
71. Only slightly more
72. KNO_3, since the curve shows the greatest change between the temperature range shown in the graph.

(Standardize Test Prep on pg. 492 & 491)

1. B **2.** H **3.** A **4.** Heat causes the water to evaporate, while the salt stays behind. The water is then condensed for use as portable water. **5.** The two rates are identical.
6. Increased partial pressure of a gas on the surface of a liquid increases the solubility of that gas in the liquid. (Henry's Law) **7.** G **8.** C
9. The combination of lower water volume and increased temperature due to hot weather means that the amount of available oxygen is reduced. **10.** G **11.** C **12.** H
13. The soap molecules have a polar end and a non-polar end, so they can completely enclose a droplet of oil while remaining soluble in water.