

CHAPTER 1

3. (a) solution (b) solution (c) heterogeneous
5. (a) chromatography (b) filtration
19. (a) 6 (b) 4 (c) 4 (d) 3
(e) questionable; 1, 2, or 3
23. (a) 80.0 (b) 0.7615 (c) 14.712 (d) 0.03

45. $V \text{ methanol} = 43.7 \text{ g} \times \frac{1 \text{ mL}}{0.791 \text{ g}} = 55.2 \text{ mL}$; $d \text{ slug} = \frac{25.17 \text{ g}}{4.5 \text{ mL}} = 5.6 \text{ g/mL}$

49. $5.00 \text{ L} \times \frac{10^3 \text{ mL}}{1 \text{ L}} \times 1.01 \text{ g/mL} \times 0.0500 = 252 \text{ g}$

51. $\frac{256 \text{ mg Ba(OH)}_2}{35.0 \text{ g water}} \times \frac{1 \text{ g}}{10^3 \text{ mg}} = \frac{7.31 \times 10^{-2} \text{ g}}{\text{g water}} = 0.731 \text{ g/100 g water}$; unsaturated
 $\frac{1.12 \text{ g Ba(OH)}_2}{100 \text{ g water}} \times 35.0 \text{ g water} = 0.392 \text{ g Ba(OH)}_2$

55. (a) P (b) C (c) P (d) P
67. (a) A (b) about 23°C (c) no; see answer to (a)

CHAPTER 2

3. (a) Conservation of mass (b) Constant composition
(c) neither
11. (a) Ca-41, K-41, Ar-41; Ca-40, Ca-41
(b) atomic number = number of protons = 20
(c) same mass number

15.

${}^{19}_9\text{F}$	0	9	10	9
${}^{31}_{15}\text{P}$	0	15	16	15
${}^{57}_{27}\text{Co}^{3+}$	+3	27	30	24
${}^{32}_{16}\text{S}^{2-}$	-2	16	16	18

21. (a) main-group metal (b) transition metal
(c) main-group metal (d) metalloid
(e) nonmetal
29. (a) CH_4 (b) Cl_4 (c) H_2O_2 (d) NO
(e) SiO_2

31. (a) iodine trichloride
(c) phosphine
(e) sulfur trioxide
- (b) dinitrogen pentaoxide
(d) carbon tetrabromide
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35. (a) $\text{Fe}_2(\text{CO}_3)_3$ (b) NaN_3 (c) CaSO_4 (d) Cu_2S
(e) PbO_2
37. (a) potassium dichromate
(c) barium acetate
(e) cobalt(II) nitrate
- (b) copper(II) phosphate
(d) aluminum nitride
39. (a) hydrochloric acid
(c) iron(III) sulfite
(e) sodium hypochlorite
- (b) chloric acid
(d) barium nitrite
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43. (a) $\text{Mn}(\text{NO}_2)_3$; manganese(III) nitrite
(c) $\text{Ca}(\text{HCO}_3)_2$; calcium hydrogen carbonate
- (b) BF_3 ; boron trifluoride
47. (a) only if cation and anion have same charge (e.g., +1, -1)
(b) no molecules in SrBr_2
(c) almost never except for ^1_1H (d) any anion
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57. 1st expt: % O = $\frac{3.87}{52.30} \times 100 = 7.40$; % Hg = 92.60
2nd expt: % Hg = $\frac{15.68}{16.93} \times 100 = 92.62$; % O = 7.38