4. a. $1s^2 2s^2$; it is likely to form an ion with a 2+ charge because by losing two valence electrons, it achieves the stable noble-gas configuration $1s^2$.

   b. $1s^2 2s^2 2p^5$; it is likely to form an ion with a 1– charge because by gaining one electron, it achieves the stable noble-gas configuration $1s^2 2s^2 2p^6$.

   c. $1s^2 2s^2 2p^6 3s^2 3p^6$; it is not likely to bond or form ions because it already has a stable noble-gas configuration.

   d. $1s^2 2s^2 2p^6 3s^2 3p^4$; it is likely to form an ion with a 2– charge because by gaining two electrons, it achieves the stable noble-gas configuration $1s^2 2s^2 2p^6 3s^2 3p^6$.

   e. $1s^2 2s^2 2p^6 3s^1$; it is likely to form an ion with a 1+ charge because by losing its one valence electron, it achieves the stable noble-gas configuration $1s^2 2s^2 2p^6$.

   f. $1s^2 2s^2 2p^3$; it is likely to form an ion with a 3– charge because by gaining three electrons, it achieves the stable noble-gas configuration $1s^2 2s^2 2p^6$.

Math Skills Transparency 8 – Determining Numbers of Ions

1. Total positive charge + Total negative charge = Zero
2. a. one
   b. two
   c. three
3. a. three
   b. one
   c. two
4. a. $(NH_4)_2SO_4$; $(2 \times 1+) + (1 \times 2-) = 0$
   b. Na_3PO_4; $(3 \times 1+) + (1 \times 3-) = 0$
   c. $Mg(HSO_4)_2$; $(1 \times 2+) + (2 \times 1-) = 0$
   d. $Al_2(CO_3)_3$; $(2 \times 3+) + (3 \times 2-) = 0$
   e. $(NH_4)_3AsO_4$; $(3 \times 11-) + (1 \times 3-) = 0$
   f. $Ca(C_2H_3O_2)_2$; $(1 \times 2+) + (2 \times 1-) = 0$
   g. NH_4NO_2; $(1 \times 1+) + (1 + 1-) = 0$

Study Guide - Chapter 7 – Ionic Compounds and Metals

Section 7.1 Ion Formation

1. chemical bond
2. nucleus
3. electrons
4. ions
5. valence
6. energy level
7. noble gases
8. octet
9. pseudo-noble gas formations
10. false
11. true
12. false
13. true
14. true
15. false
16. true
17. false

Section 7.2 Ionic Bonds and Ionic Compounds

1. c
2. b
3. a
4. c
5. c
6. d
7. a
8. b
9. b
10. b
11. b
12. high
13. high
14. hard
15. brittle
16. poor

17. good
18. good
19. true
20. true
21. false
22. false
23. true

Section 7.3 Names and Formulas for Ionic Compounds

1. monatomic
2. oxidation number
3. electrons
4. zero
5. polyatomic
6. oxyanion
7. –ate
8. –ite
9. cation
10. anion
11. subscript
12. lower right
13. one
14. e
15. d
16. b
17. c
18. a
19. sodium iodide
20. calcium chloride
21. potassium sulfide
22. magnesium oxide
23. lithium hydrogen sulfate
24. ammonium bromide
25. calcium nitride
26. cesium phosphide
27. potassium bromate
28. magnesium hypochlorite
29. lithium peroxide
30. beryllium phosphate
31. ammonium carbonate
32. sodium bromate
33. iron(III) oxide
34. iron(II) iodate
35. Be_3N_2
36. $NiCl_2$
37. $KClO_2$
38. Cu_2O
39. $MgSO_3$
40. $(NH_4)_2S$
41. $Ca(IO_3)_2$
42. $Fe(ClO_4)_3$
43. Na_3N

Section 7.4 Metallic Bonds and the Properties of Metals

1. electron sea model
2. They are free to move from one atom to another.
3. the valence electrons
4. Cations; they are positively charged.
5. The electrons are not completely lost by the metal atoms, as they are in an ionic solid.
6. They are bonded by the oppositely charged electron sea that surrounds them.
7. yes; when the metal is hammered, the delocalized electrons move, keeping the metallic bonds intact.
8. no
9. Yes; the delocalized electrons move, absorb and release protons.
10. Yes; the metallic bonds are strong.
11. no
12. Yes; when the metal is pulled, the delocalized electrons move, keeping the metallic bonds intact.
13. no
14. Yes; the delocalized electrons are mobile.