Lesson Check Answers

1. look up the group number of that element
2. An atom loses valence electrons.
3. An atom gains valence electrons.
4. Atoms of nonmetallic elements tend to gain electrons; atoms of metallic elements tend to lose electrons.
5. **a.** 1 **b.** 4 **c.** 2 **d.** 6
6. *See below
7. **a.** lose 2 **b.** gain 1 **c.** lose 3 **d.** gain 2
8. **a.** potassium cation, K^+ **b.** zinc cation, Zn^{2+} **c.** fluoride anion, F^-
9. Cd^{2+}: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10}$

6. a. $K\cdot$ b. $Mg:$ c. $\cdot\ddot{C}:$ d. $:\ddot{O}\cdot$

*The book uses “hybrid” orbitals that we will discuss in chapter 8.

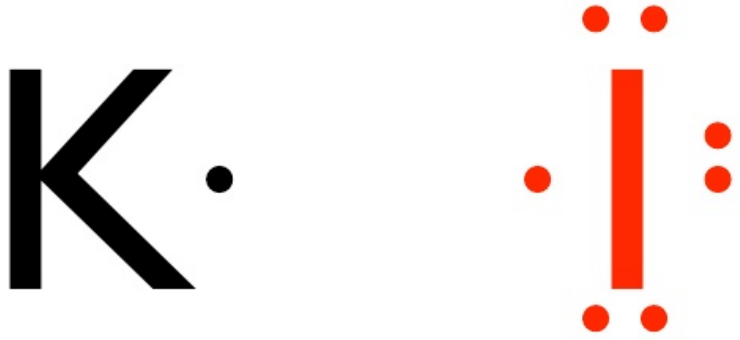
Sample Problems

FIGURE 7.7 Each ion is surrounded by ions of opposite charge.

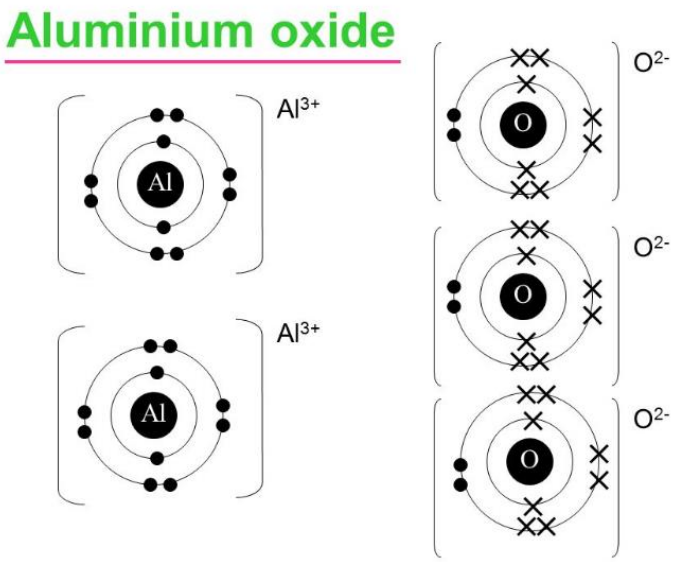
10a. KI

Potassium + Iodine

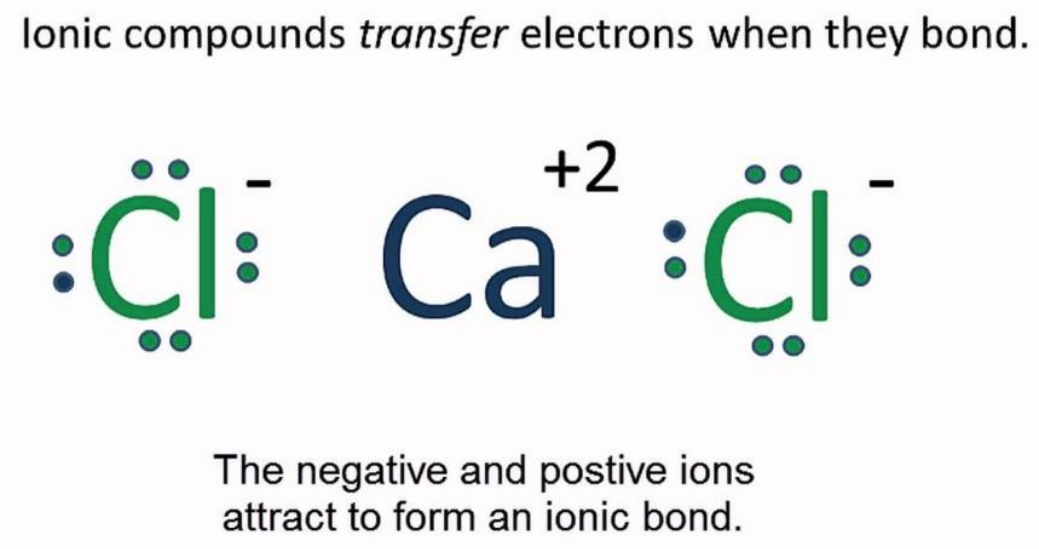
First, write the Lewis Diagram for each element.



10b. Al_2O_3


Aluminium oxide
Al3+
Al
Al3+
Al
O2-
O
O2-
O
O2-
O

11.


Ionic compounds *transfer* electrons when they bond.
Cl -
Ca +2
Cl -
The negative and postive ions
attract to form an ionic bond.

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12. electrically neutral

13. usually solids at room temperature; have high melting points; conduct an electric current when melted or dissolved in water

14. **a.** K_2S **b.** CaO **c.** Na_2O **d.** AlN

15. **a.** $BaCl_2$ **b.** MgO **c.** Li_2O **d.** CaF_2

16. Acceptable answers should describe a solid containing positive sodium ions and negative chloride ions in an alternating, regular, and repeating three-dimensional pattern.

17. The ions are free to move.

18. Na^+: $1s^2 2s^2 2p^6$ K^+: $1s^2 2s^2 2p^6 3s^2 3p^6$

19. **a.** not likely, both form cations

b. not likely, helium is a noble gas

c. LiCl

d. NaI

Lesson Check Answers

20. metal cations surrounded by a sea of mobile valence electrons

21. The properties of alloys are often superior to their component elements.

22. ductile: can be drawn into wires; malleable: can be hammered into different shapes

23. Under pressure, the cations in a metal slide past each other. The ions in ionic crystals are forced into each other by the rigid structure.

24. The arrangements are orderly and allow the individual items (fruit or cations) to be closely packed.

25. *Sample answer:* Sterling silver used in jewelry is 92.5% silver and 7.5% copper; bronze used in casting is 7 parts copper and 1 part tin.

26. Metal cations are surrounded by free-floating electrons. When metals are hammered or drawn, the cations move past each other.