Answers to Exercise 5.2
Writing Electron Configurations and Counting Valence Electrons

1.

(a) $1s^2\ 2s^2\ 2p^1$ (b) $1s^2\ 2s^2\ 2p^6$

(c) $1s^2\ 2s^2\ 2p^6\ 3s^2$ (d) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$

2.

(a) $[Ne]\ 3s^2\ 3p^1$ (b) $[Ar]\ 4s^2\ 3d^5$

(c) $[Kr]\ 5s^2\ 4d^{10}\ 5p^5$ (d) $[Xe]\ 6s^2\ 4f^7$

3.

(a) 3 (b) 7

(c) 7 (d) 9

The 4d electrons in I are not valence electrons. 4d is a full subshell <u>and</u> there are electrons in a shell outside of it (n=5).

4.

(a) $1s^2$ (b) $[He]\ 2s^2\ 2p^6$

(c) $[Ne]\ 3s^2\ 3p^6$ (d) $[Kr]\ 5s^2\ 4d^{10}\ 5p^6$

Even when the noble gas abbreviation is used, you must explicitly show the valence electrons. This means that [He] is not an acceptable answer for 4(a), [Ne] is not an acceptable answer for 4(b), etc.

5. Write the ground state electron configuration for each of the following cations. Use the noble gas abbreviation.

(a) $[He]\ 2s^2\ 2p^6$ (b) $[Ar]\ 4s^2\ 3d^{10}\ 4p^6$

(c) $[Ar]\ 3d^8$ (d) $[Ar]\ 3d^3$

Remember to remove the electrons from the outermost shell first. So, the two 4s electrons are removed from Ni to give Ni^{2+}.