Solutions to Exercises, Chapter 1

1.1

(a) 5 protons, 6 neutrons (b) 11 protons, 12 neutrons
(c) 7 protons, 7 neutrons (d) 9 protons, 10 neutrons

1.2

The nuclei of all the carbon isotopes have 6 protons, but the numbers of neutrons of ^{12}C, ^{13}C, and ^{14}C are 6, 7, and 8, respectively.

1.3

(a) Br: $[Ar]3d^{10}4s^24p^5$
(b) Sr: $[Kr]5s^2$ (Note that the 5s orbital is filled before the 4d is occupied.)
(c) Sn: $[Kr]4d^{10}5s^25p^2$

1.4

(a) 6 (b) 7 (c) 3 (d) 5 (d) 2

1.5

(a) $3s^2$ (b) $2s^22p^3$ (c) $3s^23p^3$ (d) $3s^23p^4$ (e) $4s^24p^5$

1.6

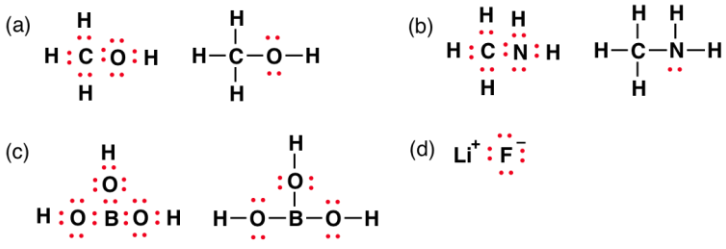
Na^+: $[He]2s^22p^6$ (or $1s^22s^22p^6$) Cl^-: $[Ne]3s^23p^6$ (or $1s^22s^22p^63s^23p^6$)

1.7

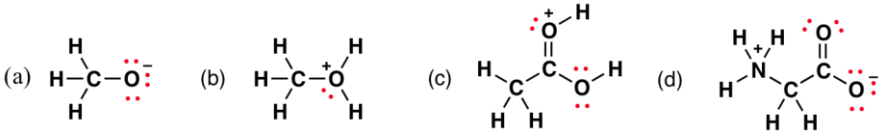
(a) covalent (b) covalent (c) covalent (d) ionic

1.8

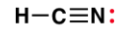
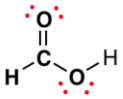
1.9



1.10

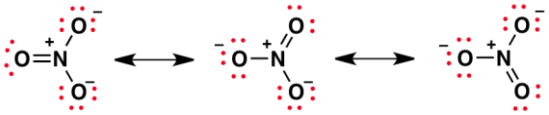


1.11

(a)  (b)  (c)  (d) 

1.12

(a) The three oxygen atoms are equivalent as shown by three Lewis structures which contribute equally.



(b) One of the lone pairs of electrons on oxygen in one of the two contributing Lewis structures is shared unequally with the positive carbon atom.