Review Set – Chapter 6 & 7

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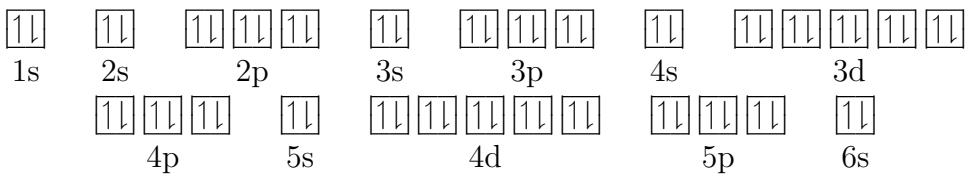
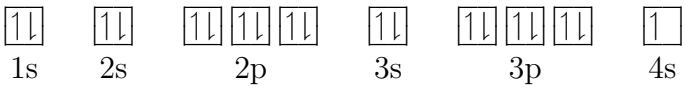
1. Write the complete electron configuration for the following atoms:
   (a) Boron – $1\,s^2\,2\,s^2\,2\,p^1$
   (b) Silver – $1\,s^2\,2\,s^2\,2\,p^6\,3\,s^2\,3\,p^6\,4\,s^2\,3\,d^{10}\,4\,p^6\,5\,s^2\,4\,d^9$
2. Write the box diagram for the following:
   (a) Barium:



   (b) Potassium:



3. Write the noble gas short-hand for the following atoms:
   (a) Calcium – $[Ar]\,4\,s^2$
   (b) Tin – $[Kr]\,5\,s^2\,4\,d^{10}\,5\,p^2$
   (c) Iodine – $[Kr]\,5\,s^2\,4\,d^{10}\,5\,p^5$
   (d) Bismuth – $[Xe]\,6\,s^2\,4\,f^{14}\,5\,d^{10}\,6\,p^3$
4. Write the four quantum numbers for the last electron in the following atom:
   (a) Vanadium – $n = 3$, $l = 2$, $m_l = 0$, $m_s = \frac{1}{2}$
   (b) Calcium – $n = 4$, $l = 0$, $m_l = 0$, $m_s = -\frac{1}{2}$
   (c) Uranium – $n = 6$, $l = 2$, $m_l = -2$, $m_s = \frac{1}{2}$

(d) Copper $-$ $n = 3$, $l = 2$, $m_l = 1$, $m_s = -\frac{1}{2}$

5. State the number of valence electrons in the following:

   (a) Antimony $-$ 5

   (b) Neon $-$ 8

   (c) Mercury $-$ 2

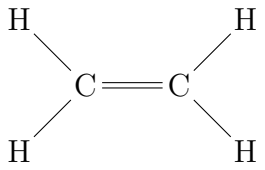
   (d) $[\mathrm{Kr}]\,5\,\mathrm{s}^2\,4\,\mathrm{d}^{10}\,5\,\mathrm{p}^2$ $-$ 4

   (e) Sodium $-$ 1

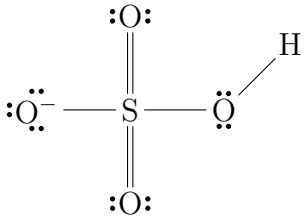
   (f) $[\mathrm{Xe}]\,6\,\mathrm{s}^1$ $-$ 1

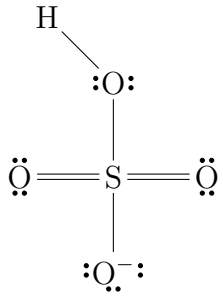
6. Draw the Lewis Structure for the following molecules. For those molecules that exhibit resonance, draw all possible resonance forms.

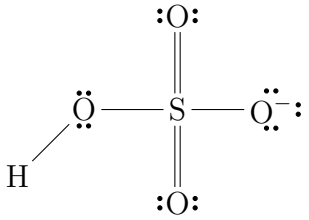
   (a) C_2H_4

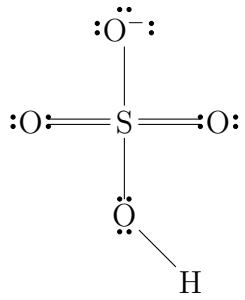


   (b) HSO_4^-

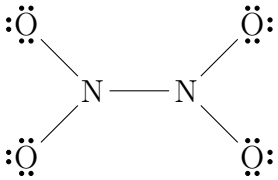




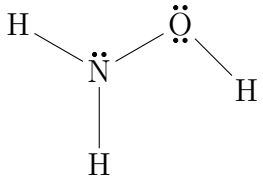




(c) N_2O_4



(d) NH_2OH



7. For the following molecules: a) predict the molecular structure; b) predict the bond angle; c) state the polarity of the molecule.

   (a) N_2O
      i. Linear
      ii. 180°
      iii. Non-polar

   (b) BF_3
      i. Triangular Planar
      ii. 120°
      iii. Non-polar

   (c) Cl_2O
      i. Bent
      ii. 109.5°
      iii. Polar

   (d) NI_3
      i. Tri-pyramid
      ii. 109.5°

iii. Polar

8. State what hybridization the center atom must use.

(a) N_2

sp^3

(b) F_2CO

sp^3

(c) $SeCl_4$

sp^3d

(d) IF_3

sp^3d

(e) PCl_5

sp^3d

(f) SF_6

sp^3d^2