Continuation of Answers

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7. Avogadro's constant is 6.022×10^{23}/mol. It is the number of particles in one mole of a substance.
8. **a.** 54.94 g/mol Mn
   b. 112.41 g/mol Cd
   c. 74.92 g/mol As
   d. 87.62 g/mol Sr
9. Yes. The atom is normally neutral because the protons and electrons are balanced. If an atom loses electrons, it will have a net positive charge.
10. The average atomic mass for nitrogen is 14.01 u, so nitrogen-14 is more commonly found.
11. 3.0 g Fe × 1 mol Fe/55.85 g Fe = 0.054 mol Fe; 2.0 g S × 1 mol S/32.07 g S = 0.062 mol S. Because the number of moles of sulfur is greater, the number of atoms of sulfur is greater.
12. The graph is a straight line because a direct relationship exists between the amount of an element in moles and the element's mass in grams.
13. 0.48 mol Pt × 195.08 g Pt/1 mol Pt = 94 g Pt
14. 3.1 mol Hg × 200.59 g Hg/1 mol Hg = 62 g Hg
15. 11 g Si × 1 mol Si/28.09 g Si = 0.39 mol Si
16. 205 g He × 1 mol He/4.00 g He = 51.3 mol He

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2. Each energy level can hold a certain number of electrons, depending on the number of orbitals in that level. The energy levels are filled in order, from the inner to the outer levels. Each orbital can hold a maximum of two electrons.
3. When an electron jumps between levels, the atom either gains or loses energy in the form of photons.
4. The third energy level can hold 18 electrons: 2 in the *s* orbital, 2 in each of 3 *p* orbitals (for 6 total), and 2 in each of 5 *d* orbitals (for 10 total).
5. Each rung of the ladder represents an energy level. Electrons can be only on the rungs, not between rungs. A ladder is not a good model for an atom because electrons exist in three-dimensional orbitals.
6. In Bohr's model, the electrons travel along fixed paths. In the modern model, electrons behave more like waves on a string than like particles.
7. Nitrogen has 7 electrons, so there are 2 in the first level and 5 in the second level. Thus, nitrogen has 5 valence electrons.