Solutions to 430 January 2007

1. a) The atom is mostly empty space.

   b) Some alpha particles came close enough to be repelled by the nucleus, but not close enough to hit the nucleus. The actual curved deflection is a compromise between its original straight line motion and a repulsive force, 90^{O} to the motion.

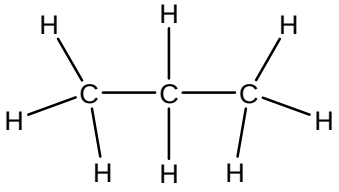
   c) Some hit the nucleus which is positive(just like the alpha particles) and also where most of the mass is concentrated.

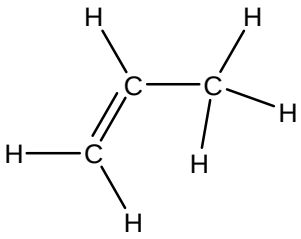
2. a) Rn
   b) alkali metal
   c) electronegativity
   d) Ne

3. a) Ca: 

   b) Ca^{+2} Cl^{-} Cl^{-}

   c) $Ca + 2\,Cl \rightarrow CaCl_2$

4. 



5. 0.4889(288) + 0.3781(290) + 0.1330(295) = 289.69.

6. Ionic compounds are usually formed by reacting a metal with a non metal. The non-metal accepts electrons from a metal. The resulting compound consists of oppositely charged ions which attract each other (forming ionic bonds)and form a geometrical pattern known as a crystal. They do not form separate molecules.

   Covalent compounds do form separate molecules in which a non metal atom shares electrons with one or more nonmetals . Each pair of shared electrons is known as a covalent bond.

7. $0.329(313) + 0.671x = 315.013$
   $x = 316$

   3 moles (316g/mole) = 948 g.

8. a) 28 g/mole
   b) 100 g/mole
   c) 68 g/mole

9. 1) b
   2) c

10. $(NH_4)_3PO_4$

11. +2

12. 1 cm^3 of alcohol = 0.76 g

    0.76 g (mole/46 g) = 0.0016 moles

    0.0016 moles (6.02×10^{23} molecules/mole) = 9.95×10^{21} molecules

13. Convert to moles(8/150), then apply the ratio(1/2). Answer = 0.027 moles.

14. Convert to moles(120/180), then apply the ratio(6/1). Finally convert moles(4) of oxygen to grams of oxygen. Answer = 128 grams.

15. Not covered on this year's exam.