01/28/14
Workshop 2
Chem. 103, Spring 2014

Completed reports to be submitted by 02/06/2014, 2.00 PM (no late submission)

Chapter 2: Atoms and the Periodic Table

1. Short lecture on atom and subatomic particles
   a) Definitions of an atom and an element
   b) Name three subatomic particles and their charges
   c) Draw a basic structure atom showing the location of sub-atomic particles.
   Read section 2.1 (5 minutes reading 5 minutes discussion)
   d) How atomic structure is important for learning chemistry?

2. Home assignment:
   a) Make a table of three subatomic particles and write their masses and charges (Table 2.1)
   b) In a rough scale (limited to four significant figures), what is the ratio of masses of a proton to an electron and of a neutron to an electron

3. Short lecture. Read the caption of Figure 2.2. and discuss in groups to come up with concise arguments for explaining the following statements
   a) Electrons are negatively charged particles.
   b) Cathode rays can be deflected by electric field.
   c) Cathode rays can be deflected by magnetic field.

4. Read 'Radioactivity' on page 36-37 and discuss (short lecture, 5 minutes reading, and 7 minutes discussion in groups) to answer the following questions
   a) What are α, β, and γ rays?
   b) Which one amongst them is most powerful?
   c) Which observation supports the idea that atoms have dense nucleus at the center but with empty surrounding space.

5. Section 2.3 (home assignment)
   a) define i) element symbol, ii) atomic number (Z), iii) mass number (A), isotopes.
   b) Write the accepted way of indicating atomic and mass number for an element X.
   c) Home-assigned exercises: 2.15, 2.17, 2.19, 2.21 (answers at the back of the book)

6. Section 2.4 (in class exercise)
   a) How many grams are equal to 1 atomic mass unit of a substance?
   b) Calculate the average atomic mass of C (carbon) and O (oxygen) using the given abundance of individual isotopes
   c) Home-assigned exercises: 2.27, 2.29, 2.31 (answers at the back of the book)

7. Short lecture on periodic table.
   a) Home reading assignments: Read periodic classification of elements (section 2.5) and provide concise definition of i) periods, ii) groups, iii) metal, iv) nonmetal, v) metalloid, vi) alkali metal, vii) alkaline earth metal, viii) chalcogens, ix) halogens, x) transition metals, xi) noble gasses
   b) Home-assigned exercises: 2.37, 2.39, 2.41 (answers at the back of the book)

8. Read and discuss page 45 (5 minutes reading and 5 minutes discussion)
   a) Provide concise definitions of Avogadro number and Mole
   b) Draw a sketch of conversions between grams, moles, and atom numbers (Fig. 2.12 on page 47)
   c) Home-assigned problems: 2.45, 2.47, 2.53, 2.55 (answers are given at the back of the book).

9. In-class problem solving 2.65, 2.73

General guidelines of problem solving and showing your work: please use clean notebook pages to show complete work, clearly providing reasons, concise mathematical formulae (i.e. conversion factor), and explicitly showing cancellation of units (i.e. dimension analysis). In all calculations of numbers, provide the correct significant figures (please remember to follow page 15). If help needed, please indicate that in the class.