6.2

What does the nucleus determine about an atom?	The mass and the number of electrons needed to give the atom electric neutrality.
What part of an atom is involved in chemical reactions?	The outer part (i.e. the electrons). Not the nucleus.
Define electronic structure.	How electrons are distributed about the nucleus.
Define electromagnetic energy.	Energy carried through space or matter by means of wavelike oscillations of magnetic and electric fields.
Give the name and symbol for cycles/second.	Hertz (v)
Distinguish between Hz and frequency.	Frequency refers to cycles per some time. Hz refers to cycles per **second**.
Give the equation for velocity of EM radiation.	$c = \lambda \times v = 3.0 \times 10^8$ m/s (also known as the speed of light).
List the classes of EM radiation in the EM spectrum (from lowest frequency to highest).	Radio waves, infrared, visible, ultraviolet, x-rays, gamma rays. (RIVUX G)
Which is faster, radio waves or gamma rays?	They are both the same speed ($c = 3 \times 10^8$)
What is a photon?	A photon is a short wave. All EM radiation consists of small small packets (photons) of waves.
Give the equation for the energy of a photon.	$E=hv$, where E=Energy, h = plank's constant, v = frequency.
What has more energy, radio waves or gamma rays?	Gamma rays. Gamma rays have a greater frequency than radio waves. Thus, according to the equation $E=hv$, a higher frequency results in a larger value of E.
What is the name for the energy of one photon?	A quantum.
Does the brightness of a light source indicate the relative energy of photons?	No. Brightness indicates the number of photons. (Each photon of a particular frequency will have the same energy).
What kinds of spectra exist?	Continuous spectra and line spectra.
What is the importance of line spectra?	It shows that an excited atom can lose only certain amounts of energy. In other words, it shows that electrons are restricted to certain energy levels.
What term describes the limited number of energy levels an electron can have?	Quantized.

6.3

Why was Hydrogen chosen by Bohr?	It is a simple model (it has only one electron, and a simple line spectrum).
Bohr's equation is $E=-k/n^2$. What does n represent?	n = quantum number (E = energy, k = konstant)
Define ground state.	The lowest energy state corresponding to n = 1.
What are the possible values of n?	n can be any whole number from 1 to infinity.
What is the technical term for the gas tubes seen in class? What were they viewed through?	Discharge tubes. Viewed through a spectroscope (a type of prism).
How can the existence of line spectra be explained?	A jump from one discrete (higher) level to another discrete (lower) level is accompanied by the release of the same amount of energy each time.
> How can this be shown graphically?	Fig. 6.13 on pg. 195
A free electron hits an orbiting electron and raises its energy level. Does this process cause a release of a photon?	No. A photon is released when the electron returns to a lower energy level.
Why did Bohr's model fail?	It did not work for atoms with more than one electron.
How was Bohr's model useful?	It introduced the idea of quantum numbers and fixed energy levels.
Hydrogen's line spectrum has 4 lines (pg 193). How many possible values are there for the release of energy from an excited hydrogen atom?	The number of possible values of E is theoretically infinite, since n ranges from 1 to infinity. (The other values of E fall outside the visible spectrum).