Chapter 5 & 10 Study guide

Scientists: Know

-Thompson:
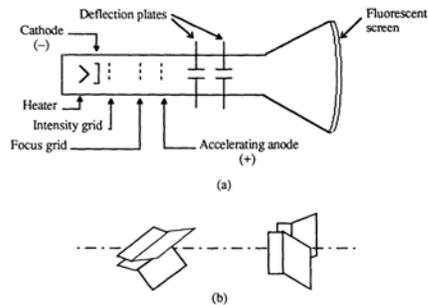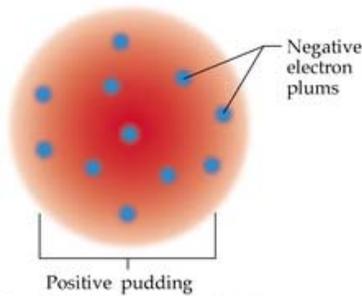1. Cathode Ray Tube.

Figure 1. Cathode-ray tube: (a) schematic, (b) detail of the deflection plates.
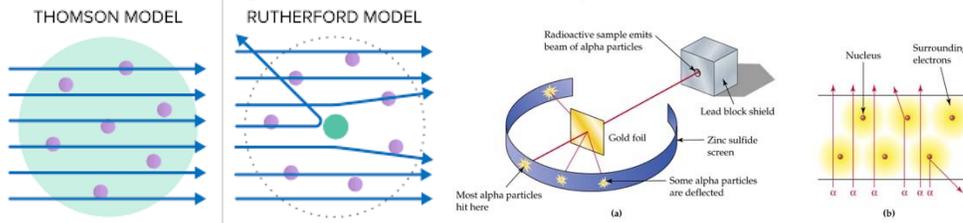
2. Plum Pudding model.

3. Discovered electrons.

-Rutherford:
1. Predicts continuous spectra of light.
2. God- foil experiment (Very rarely were the alpha particles deflected) 99.9 Passed through.

3. Electrons can be anywhere therefore atomic spectra should be continuous.

-Bohr:
1. electrons are in orbits.
2. explains line spectra.
3. can't explain why quantized.
4. Fails for greater than 1E.
5. e.) Because electrons are only allowed in specific orbitals, only specific colors of light would be emitted. Because it can only absorb and emit a certain amount of energy.


6.
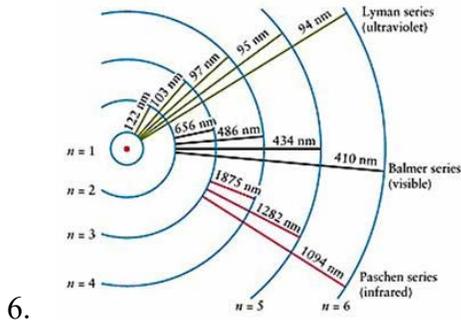
-Bohrs Flaws:
1. Can't explain why its quantized.
2. Fails for greater than 1E.

-de Broglie:
1. Explained why e- are in orbits because only certain wavelengths are allowed. If the wavelength fits inside the orbit exactly then the electron can be that distance from the nucleus (Constructive Interference.) If not, then it is destructive interference.
2. If light can behave like a wave and a particle, then an e- can behave like a particle of light
3. fails for greater than 1E
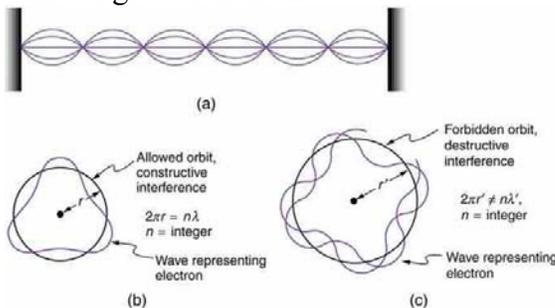
4.

-Schrodinger:
1. Quantum mechanics
2. Derived mathematics to describe electrons- focused on electrons
3. Fixed Heisenberg's Problems
4. Work does not allow for momentum and position of electrons to be known at the same time.
5. 4 Principle quantum numbers result.

-Dalton:
(6 statements) (2 flaws)
1. Elements are composed of minute, indivisible particles called atoms.
2. Atoms of the same elements are alike in mass and size.
3. Atoms of different elements have different masses and size.
4. Compounds are formed by the union of two or more atoms of different elements.
5. Elements combined in simple numerical ratios (the law of definite composition.)
6. Atoms can combine in different ratios (law of definite proportions.)

-Daltons Flaws:
1. Atoms are divisible in nuclear reaction.
2. Not all atoms of an element have same mass.

-Lavosier:
a.) Qualitative ---------> Quantitative
 (makes observation) (Measures everything.)
b.) Disproved Phlogiston
c.) Conservation of mass: Neither create or destroy matter (in a chemical reaction)
-Measured a reaction in a sealed jar and the mass stayed the same before, and after the reaction occurred.
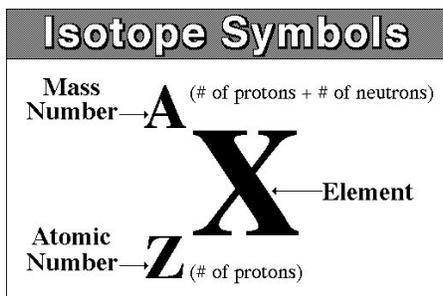
Define:
1. The Four Fundamental Properties of electrical charges
    a) Charge two types, positive, and negative.
    b) Unlike charges attract + Like charges repel
    c) Charges may be transferred from one object to another by contact or induction.
    d) The less distance between two charges the greater the force of attraction, the greater the force of attraction between unlike charges.

Define:
1. Protons: +1 charge, 1 atomic mass unit, Protons in each element is unique, ½ the mass of each element, Located in the Nucleus.
2. Neutrons: No charge, -1 Atomic mass unit, located in the nucleus, not important in Chem. 101, but is important in isotopes.
3. Electrons: -1 Charge, $1/2000^{th}$, Located in a large cloud, Responsible for formation of chemical bonds and cations and anions.

Define:
   1. Isotope Notation
(Mass Number (Sum of protons and neutrons))
(Atomic Number (Number of Protons))
(Charge (#Protons - #Electrons))

Isotope Symbols

Mass Number→A (# of protons + # of neutrons)

X ←Element

Atomic Number→Z (# of protons)

Define:
   1. Cation: Positively charged Ion.
   2. Anion: Negatively charged Ion.
   3. Relative mass: a measure of how heavy atoms are.
   4. Atomic mass: The mass of an atom of a chemical element expressed in atomic mass units. It is approximately equivalent to the number of protons and neutrons in the atom.
   5. Atoms: Basic building blocks of matter, Neutral has same number of Protons as Number of electron

Know:
   1. Know how to find weighted average.

Calculating a Weighted Average

• To find a weighted average, EACH VALUE is MULTIPLED by its PERCENTAGE and the results are ADDED together.

• For Average Atomic Mass, the equation looks like this:

• Average AMN = Σ (Atomic Mass x Percentage)

• Σ = sigma = "find the sum of"