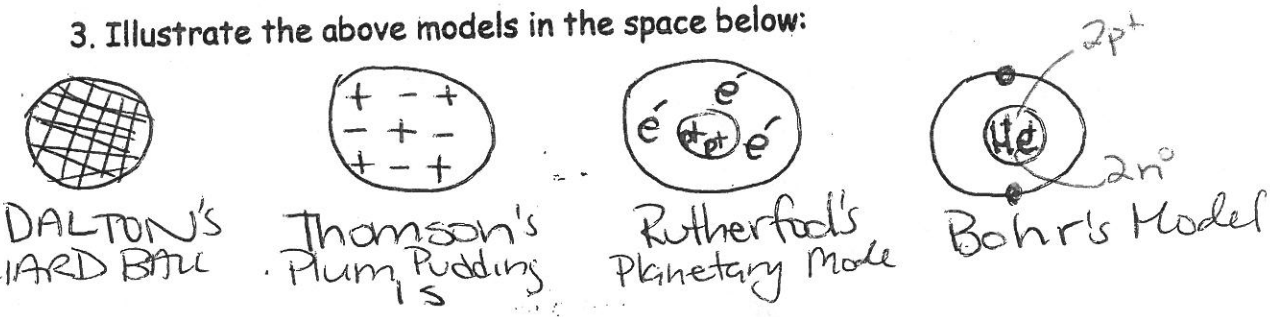
Part II

1. Be sure to define the following subatomic terms:
a. proton - +1 ve particle found in nucleus
b. neutral - neutral particle found in nucleus
c. electron - -ve particle found outside of the nucleus
d. isotope - an atom with varying numbers of neutrons.
e. atomic number - designated by the number of protons in an atom
f. mass number - number of protons + neutrons in an atom

2. Describe the following <u>models</u> of the atom :
a. Dalton - solid sphere ; billiard ball
b. Thomson - plum pudding
c. Rutherford + nucleus ē electrons surrounding it
d. Bohr → "planetary" model ē electrons in <u>orbits</u> outside nucleus
e. Quantum → electrons reside in "orbitals" of different energy levels outside of the nucleus

3. Illustrate the above models in the space below:



DALTON'S BILLIARD BALL | Thomson's Plum Pudding | Rutherford's Planetary Model | Bohr's Model

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QUANTUM Mechanic Model

Part III

1. Explain what is unique about the Quantum Mechanic Model of the atom.

you can not pin point the exact location of an electron. No two electrons have the same 4 quantum #'s

2. Give the "electron configuration" for the following elements:
a. K = $(1s^2 2s^2 2p^6 3s^2 3p^6 4s^2)$
b. Ba = $(1s^2 2s^2 2p^6 3s^2 3p^6 4s^3 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2)$
c. Fe = $(1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6)$
d. As = $(1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3)$
e. Br = $(1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5)$

3. For the above re-write the configurations using the "CORE NOTATION" method.

a. K = ([Ar] $4s^1$)

b. Ba = ([Xe] $6s^2$)

c. Fe = ([Ar] $4s^2 3d^6$)

d. As = ([Ar] $4s^2 3d^{10} 4p^3$)

e. Br = ([Ar] $4s^2 3d^{10} 4p^5$)

4. Write the electron configuration for the most common ion of the above atoms using "CORE NOTATION"

a. K^+ = ($1s^2 2s^2 2p^6 3s^2 3p^6$) ⇒ ([Ne] $3s^2 3p^6$)

b. Ba^{2+} = ($1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$) ⇒ ([Kr] $5s^2 4d^{10} 5p^6$)

c. Fe^{3+} = ($1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$) ⇒ ([Ar] $3d^5$)

d. As^{3-} = ($1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$) ⇒ ([Ar] $4s^2 3d^{10} 4p^6$)

e. Br^- = ($1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$) ⇒ ([Ar] $4s^2 3d^{10} 4p^6$)

5. Draw the ORBITAL DIAGRAM of the following atoms:

		1s	2s	2p	3s	3p	4s	3d	4p
11	a. Na =	⊗	⊗	⊗⊗⊗	⊗	○○○	○	○○○○○	○○○
20	b. Ca =	⊗	⊗	⊗⊗⊗	⊗	⊗⊗⊗	⊗	○○○○○	○○○
26	c. Fe =	⊗	⊗	⊗⊗⊗	⊗	⊗⊗⊗	⊗	⊗⊗⊗⊗⊗	○○○
15	d. P =	⊗	⊗	⊗⊗⊗	⊗	○○○	○	○○○○○	○○○
17	e. Cl =	⊗	⊗	⊗⊗⊗	⊗	⊗⊗⊗	○	○○○○○	○○○

Part IV

1. What are four characteristics of a metal?

i. Shiney (lustre)

ii. malleable

iii. ductile

iv. good contuctor of electricity

2. Which of the following elements is more metalic?

a. Zirconium or Lanthium

b. Tungsten or Cobalt

c. Silver or Gold

3. For the NON-METALS, which element would appear first in a chemical formula?

a. Sulphur or Oxygen
b. Bromine or Chlorine
c. Carbon or Nitrogen

4. What are the charges that go along with the elements found in Group 1, Group 2, Group 13, and Group 17? Group 1 = +1, Group 2 = +2, Group 13 = +3, Group 17 = -1

5. Which of the following elements(Cs, Au, Pb or At) has the: (4 marks)

a. largest radius — Cs
b. most metallic character — Cs
c. most electrons — At
d. greatest ioniztion energy? — At

6. Explain the term "ISOELECTRONIC" and show an example of TWO electron configurations that are ISOELECTRONIC.

"Isoelectronic" means having the same number of electrons → $K^{+1} = (1s^2 2s^2 2p^6 3s^2 3p^6)$
→ $Ar = (1s^2 2s^2 2p^6 3s^2 3p^6)$

7. Metalic character increases as you move left and down on the periodic table.

8. Ionization energy increases as you move up and right on the periodic table.

9. Atomic radii increases as you move left and down on the periodic table.

10. The reactivity of the Alkali metals increases as you go DOWN the family on the periodic table.

11. The density of the Noble Gases Increases as you go DOWN the family on the periodic table.