

- For each of the following, indicate what each is credited for discovering
 

Aristotle- Matter continuous	Rutherford- nucleus gold foil
Democritus- Atom	Bohr- $e^-$ orbit nucleus
Dalton- 5 pt. Atomic theory	Chadwick- found neutron
Thomson- $e^-$ w/ cathode ray	Millikan- charge of $e^-$ w/ oil drop
- nucleus is the central part of the atom.
- Subatomic particles contained in the nucleus that have NO apparent charge are called neutrons.
- Subatomic particles found OUTSIDE the nucleus, having little mass, and negative charged are called electrons.
- Subatomic particles in the nucleus with a positive charge are called protons.
- Atoms of the SAME element that have the same number of protons but different number of neutrons are called isotopes.
- Atoms that have an apparent charge because of a loss of gain of electrons are called ions.
- Why are cations positive? lose  $e^-$
- Why are anions negative? add  $e^-$
- What gives the identity of the atom? protons
- How do you calculate the neutrons in an atom?  $M\# - A\#$
- What is the relative atomic mass of an atom? weighted average of isotopes
- Why do atoms form ions? to be stable
- What would make an atom stable? having 8 valence  $e^-$
- What group or family of atoms is already stable? noble gas
- Why do atoms in the same group have similar behaviors? same # valence  $e^-$
- How do metals become stable? lose  $e^-$
- How do nonmetals become stable? add  $e^-$
- What would barium look like as an ion?  $Ba^{+2}$
- What would Bromine look like as an ion?  $Br^{-1}$
- The electrons in the LAST shell of an atom are known as valence electrons.
- What is an electron configuration? organization of  $e^-$  according to energy levels
- Explain what each of these "rules" mean about electron configurations:
  - Aufbau's rule:  $e^-$  are added 1 at a time to low energy levels
  - Hund's rule: bus seat rule. If empty orbital available  $e^-$  will take it
  - Pauli Exclusion Principle: orbital holds 2  $e^-$  w/ opposite spins
- An electron in the ground state is at the lowest energy state.
- An electron in an excited state has absorbed energy.
- Describe what each of these terms mean:
  - Energy level- how many rings or how far away  $e^-$  are from nucleus
  - Orbital- shape of  $e^-$  cloud
- An orbital can hold only 2 electrons.
- Explain how you would write an abbreviated electron configuration: put noble gas on previous line in brackets
- How many orbitals and electrons do each of the following have:
  - s = 1 orbitals and 2 total electrons
  - p = 3 orbitals and 6 total electrons

c.  $d = 5$  orbitals and  $10$  total electrons

d.  $f = 7$  orbitals and  $14$  total electrons

30. Fill in the following chart:

Atom	Atom name	Atomic #	Mass #	# protons	# electrons	# neutrons
$^{56}\text{Mn}$	manganese	25	56	25	25	31
$^{32}\text{S}$	sulfur	16	32	16	16	16
$^{16}\text{O}^{2-}$	oxygen	8	16	8	10	8
$^{10}\text{Be}^{+2}$	beryllium	4	10	4	2	6
$^{75}\text{As}^{3-}$	arsenic	33	75	33	36	42
W-187	tungsten	74	187	74	74	113

31. Neon has 3 isotopes of masses 22, 21, and 20. If the isotopes have the abundance 8%, 2%, and 90% respectively, what is the average relative atomic mass of neon?

$$(22)(.08) + (21)(.02) + (20)(.90)$$

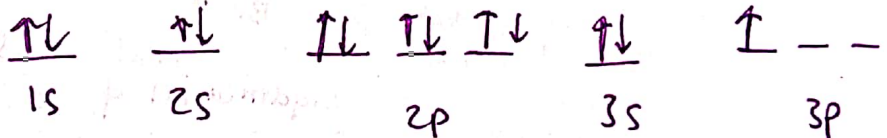
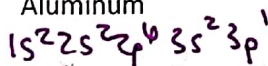
$$= 20.18$$

32. Carbon has 3 different isotopes: C-12, C-13, C-14. When looking at the periodic table, the average atomic mass is 12.011 amu. Which of the following isotopes occurs the most? Justify your answer.

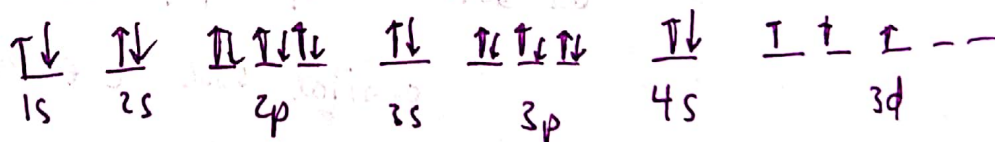
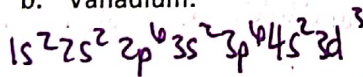
Carbon 12 is most abundant because the weighted average is closest to 12.

33. For each of the following, write an unabbreviated ground state electron configuration AND draw an unabbreviated orbital diagram:

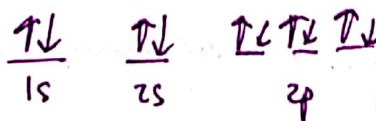
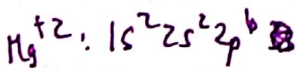
a. Aluminum



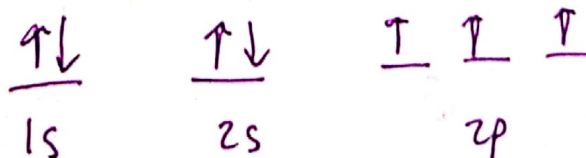
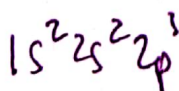
b. Vanadium:



c. A magnesium ion:

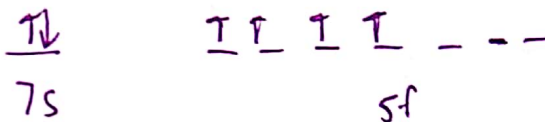
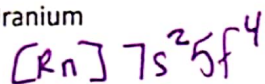


d. Nitrogen:

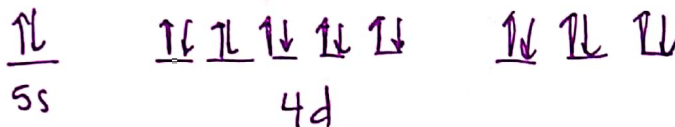
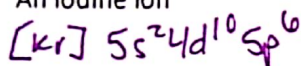


34. For each of the following, write an abbreviated ground state electron configuration AND draw an abbreviated orbital diagram:

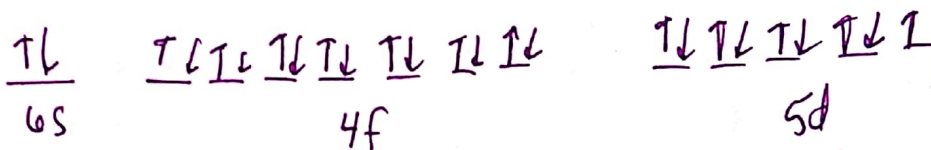
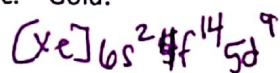
a. Uranium



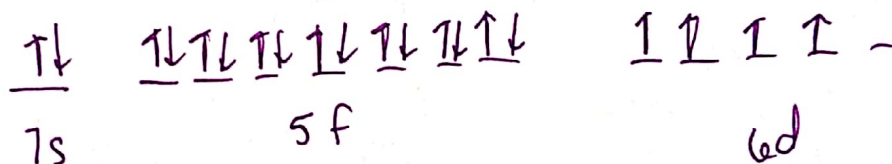
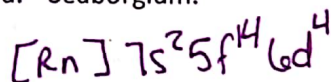
b. An iodine ion



c. Gold:



d. Seaborgium:



Write the polyatomic ions that are going to be on the test:

