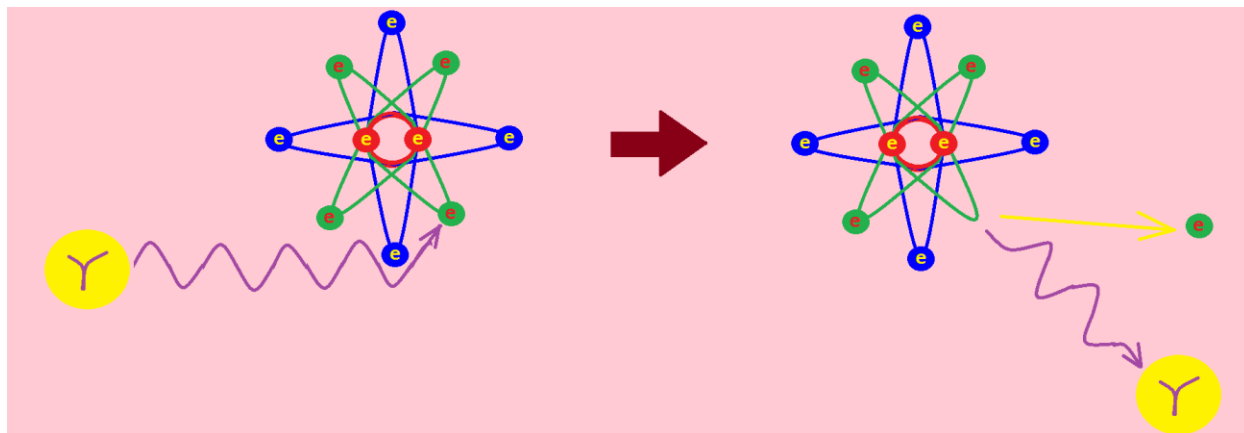


Complete on your own using only a non-programmable calculator and a pencil. You have 15 minutes in which to complete this worksheet. You'll not receive this worksheet back.

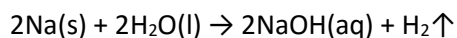
1) As discussed in class, ethyne contains 1 triple bond and one single bond per carbon atom. Each carbon atom in ethyne is in _____ geometry.

2) As discussed in class, Ni, Pt and Pd take 4 bonds per atom. When that occurs, these metals are in _____ hybridization.



3) Gamma radiation interacts with atoms in several ways to lose its energy. The illustration, above, shows one of those manners. Which energy loss mechanism is this?

4) The following reaction is a classic reaction involving the reaction of Group I elements with water:



What is the reaction product that doesn't catch fire and burns as the reaction goes to completion? Use both elemental and/or molecular symbols and spelled out. Is this product acidic or alkaline?

5) Being able to acknowledge the presence of the perfume in natural gas is an application of _____ Law.

6) The graphic at right best represents/illustrates which chemical technique:

7) Using your knowledge of chromatography and the chromatography column image at right, if you were told this was SEC (or GPC) chromatography, then you'd know that sample _____ has the lowest molecular weight.

8) Using your knowledge of chromatography and the chromatography column image above, if you were told this was Reverse Phase chromatography, then you'd know that sample _____ is the least polar sample.

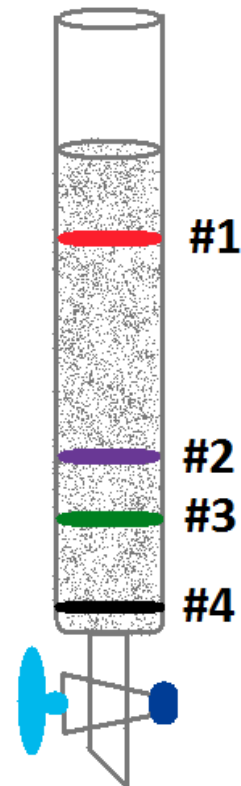
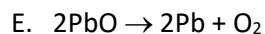
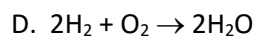
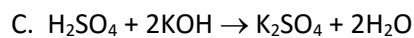
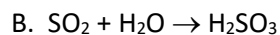
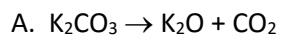
9) In the phrase "pO₂", the "p" means:

10) In the phrase "pH", the "p" stands for:

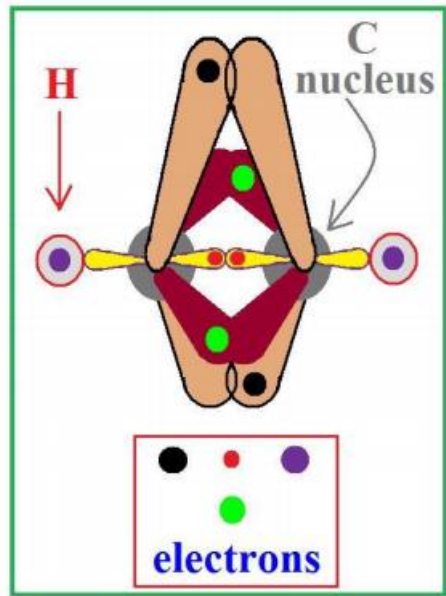
11) That "that the electrons enter each sub-orbital of a given type singly and with identical spins before any pairing of electrons of opposite spin occurs within those orbitals" is:

12) What is a quantum address for an M shell electron in a single-ringed dumb-bell –shaped d subshell that's spinning clockwise?

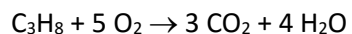
13) Name the kinds of reactions:



14) The image at right illustrates two (2) carbon atoms bonded together in such a way that each C atom will take 1 single and 1 triple bond. In what geometry are the carbon atoms? What is their hybridization?



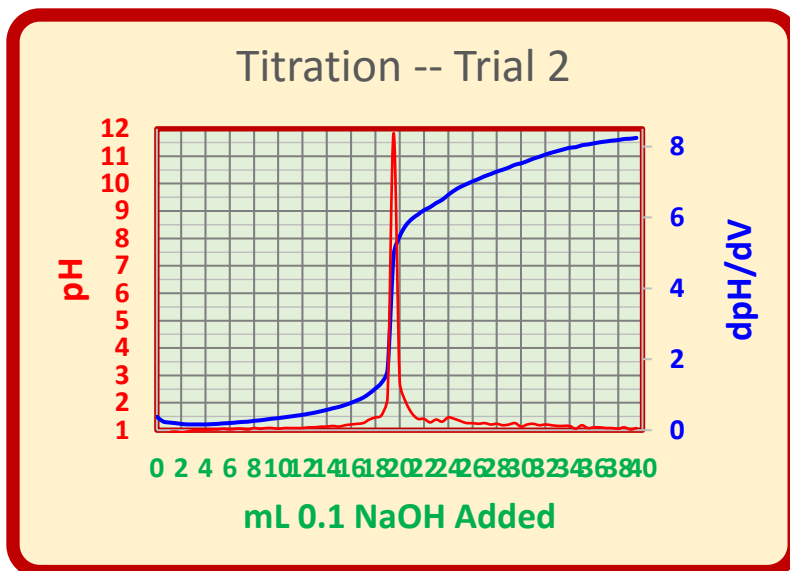
15) For this reaction, 10 g propane (C_3H_8 ; MW=44 g/mol) and 55 g oxygen (MW = 32 g/mol) are used as follows:



What's the limiting reagent based on CO_2 production? If you actually obtained 24 g CO_2 , what is your % yield? Show your work.

16) The EN for Mg is 1.2 and the EN for S is 2.5. What kind of bond really exists between Mg and S?

17) The image at right best represents the titration of which mineral acid?



18) Write out and label the formulas for the following:

A) Gay-Lussac's Law

B) Combined Gas Law

c) Universal Gas Law

D) Boyles' Law

E) Charles' Law

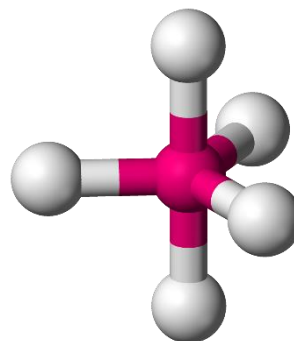
F) Poissuille's Law

19) What are the units on "R", the universal gas constant (use the units most commonly applied in CHEM 121)?

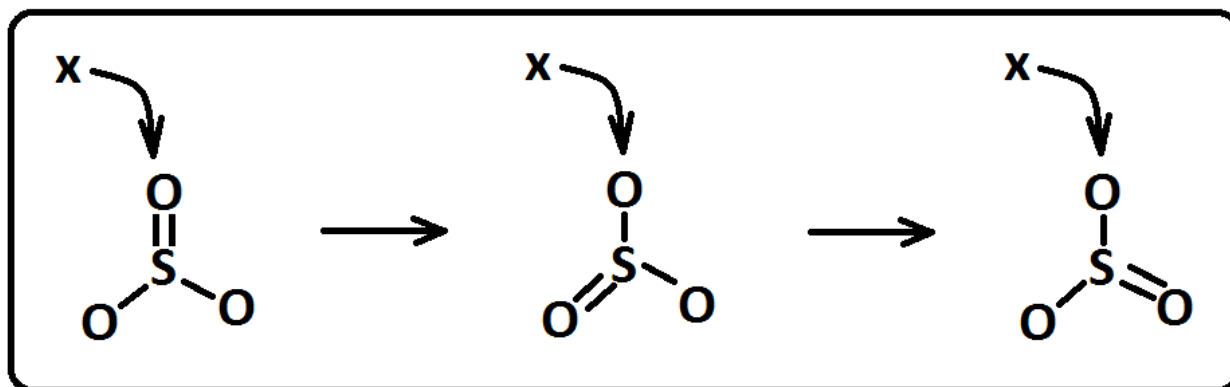
20) A _____ is the substance present in a colloid in the largest amount.

21) A _____ is the substance present in a colloid in the least amount.

22) What's the geometry and the hybridization of the model at right?



23) According to resonance theory, each bond in the sulfite ion (SO_3^{2-}) is consistent with the observation that the two bonds in the sulfite ion have the same bond length. Given that the $\text{S}=\text{O}$ bond energy is 93 kcal/bond and that the $\text{S}-\text{O}$ bond energy is 87 kcal/bond, determine the bond energy for the O labeled "X" in the diagram, below. Perform your calculation in kJ.



24) What's the most important factor in rate determination, relating to elementary reaction rates?

25) According to Fick's law, if a membrane thins to 0.125 times normal, a gas will diffuse across that membrane: