

Chem PreLab Test (the lab test is separate from the lab exam; the lab exam will involve a lab you design and perform. Its mark will be a % (to be determined by the school board) of entire year's lab mark.

This lab test counts for either 20 or 40% of 3rd term. Between this and the kitchen project, the one you individually perform better on, will count for more. Its mark will also fill in any absent lab mark.

It's based only on four of the five 3rd term labs and on the project, and is another way of also reviewing some important theory concepts.

Labs Covered

Le Chatelier

Calculating Kc

Calculating Ka

Redox lab

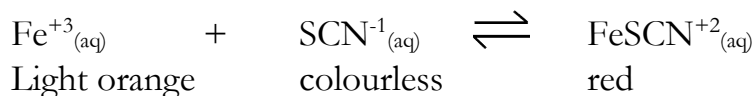
Kitchen Chemistry Project

LeChatelier Sample Questions



- a) To create the above equilibrium, did you initially need to use all three compounds?
- b) The source of $\text{Fe}^{+3}_{(\text{aq})}$ was a solution of $\text{Fe}(\text{NO}_3)_3_{(\text{aq})}$. You were also asked to observe that $\text{KNO}_3_{(\text{aq})}$ was colorless. How did help you deduce that $\text{Fe}(\text{NO}_3)_3_{(\text{aq})}$'s color was only from one ion?
- c) Which caused a deeper color to form? Adding more aqueous Fe^{+3} ? Or adding more solid KSCN?
- d) Why?
- e) How did the addition of HPO_4^{2-} favour the reverse reaction?

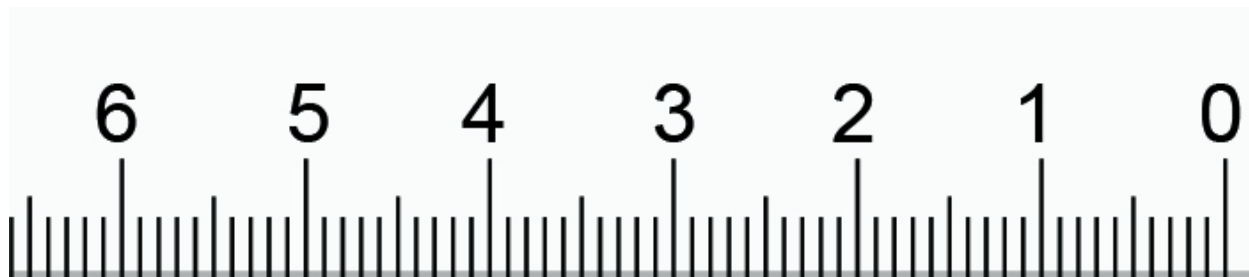
Calculating K



2. a) In this lab you kept using the same initial concentration of $\text{SCN}^{-1}_{(\text{aq})}$ but you kept using more dilute initial concentrations of $\text{Fe}^{+3}_{(\text{aq})}$. What effect did this have on the equilibrium concentration of $\text{FeSCN}^{+2}_{(\text{aq})}$?
- b) Once all 5 equilibria were created, you pulled solution out of the most concentrated one (#1) until it matched, one at a time, each of the other solutions.

By pulling out solution from solution #1, were you changing its concentration?

- c) If $h_2/h_1 > h_3/h_1$, which solution was more concentrated? Also draw test tubes to show what we mean by h_2 and h_1 .
- d) If the ruler you were using to measure height looked like this, how would you report a height, in cm, that landed exactly on the 3 line? Uncertainty?



- e) Percent error associated with the measurement?
- f) What was the main error source in *the design of this experiment*?

Calculating K_A of HCH_3CO_2 (acid in vinegar) This is also the basis of June

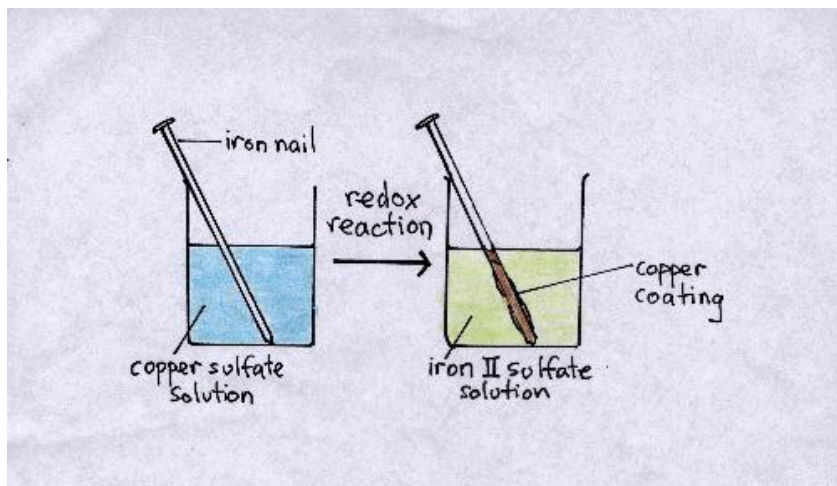
Lab Exam

3. To calculate K_A you need the equilibrium concentrations of $\text{H}^{+}_{(\text{aq})}$, $\text{CH}_3\text{CO}_2^{-}_{(\text{aq})}$, and of $\text{HCH}_3\text{CO}_2_{(\text{aq})}$
- a) What did you do in the lab to get $[\text{H}^{+}_{(\text{aq})}]$?

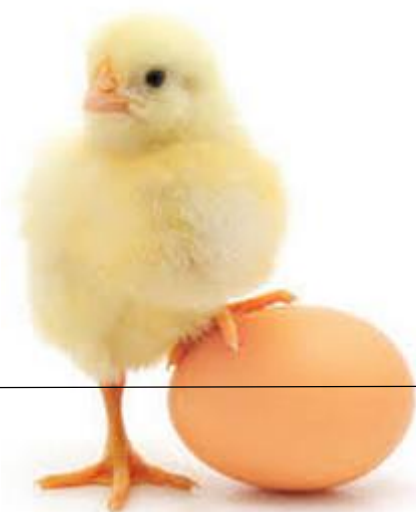
- b) What did you do in the lab to get $[\text{CH}_3\text{CO}_2^-]_{(\text{aq})}$?
- c) What did you do in the lab to get $[\text{HCH}_3\text{CO}_2]_{(\text{aq})}$?
- d) How did you know when all the $\text{HCH}_3\text{CO}_2_{(\text{aq})}$ had been neutralized by NaOH?
- e) If you wait several minutes the pink color of phenolphthalein fades. What side-reaction could be causing this?
- f) What's more accurate than pH paper?
- g) Use actual H^+ to find the % error associated with a pH paper reading of 3.0 if an instrument reveals the $\text{H}^+_{(\text{aq})}$ to really be 2.75.

4. Redox lab

The redox reaction was:

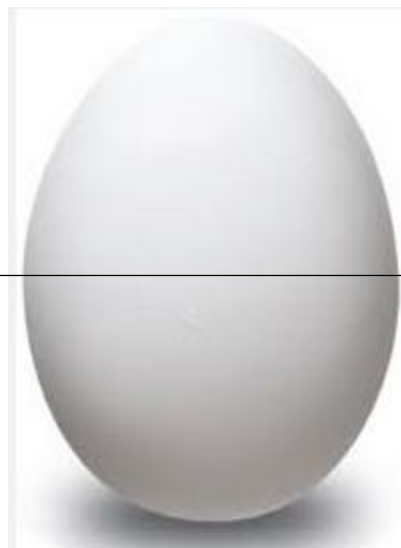


- a) Did the sulfate ion play any role in the reaction?
- b) What evidence did we have that the iron nail was being oxidized?
- c) What solid product was formed from the reduction?
- d) How many significant figures have to be used for the amount of Cu formed, if the original mass of Fe was 1.45 g and the remaining amount was 1.01 g?
- e) If you had been asked to weigh the amount of Cu formed, think of **two** experimental error sources that could be encountered.



5. Kitchen Chemistry

a) When cooking a hard-boiled egg, which type of molecule in the egg becomes even more dense due to intermolecular bonds?



- b) Where does the yolk go if you don't keep rotating it?
- c) In which position should the egg be when rotating it to make it perfectly centered after it's hard-boiled?

- d) When cooking pasta, what two types of molecules in the pasta are absorbing water?
- e) Which one forms a network that tries to keep granules of the other trapped in?
- f) What could be added to the pasta to make the network stronger and prevent stickiness?
- g) When cooking pasta when do we add the noodles to the water solution in the pot?
- h) How do you get a toast to burn on just one side without using a freezer or adding anything to it?
- i) What does specific heat have to do with the trick used in (h)?

