Coding Exam Questions in Quest
How to use TeX

by Paul McCord

First, TeX is a mathmatical mark-up language and it is pronounced “tek”, so refer to it that way. Type in “tex user group” into google and you’ll have more to read than you ever imagined. The purpose of this document is to give you some basics that will hopefully allow you to write an exam question in Quest and render the chemistry stuff correctly.

Modes

There are 2 modes in TeX.

‘Text’ mode is just like any word processor. The only difference is you do NOT have endless fonts to use. You have serif fonts like this sentence in Times Roman. And, you have san-serif fonts like helvetica which is this sentence. The default for Quest is serif fonts which are easier to read for most people. To get new paragraphs in TeX (new lines also), you use 2 returns on your keyboard.

‘Math’ mode is for doing all things mathmatical - this includes greek letters, math equations, superscripts, and subscripts. Math mode is always sandwiched between two $’s. If I wanted to go into math mode I’d just $do this and now I’m in math mode$ now I’m out again. Spaces don’t really have any meaning in math mode other than to help you see what your doing. Math equations can be **inline** like the quadratic equation here, $0 = ax^2 + bx + c$, or displayed all by itself like this:

$$\ln\left(\frac{P_2}{P_1}\right) = \frac{\Delta H_{\text{vap}}}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

Display math mode is done by using double $’s : $$.... equation ....$$

One reason you might LEARN some of these commands is that the new Learning Modules in Quest have MathJax built in. This means you can have these beautifully rendered math equations right in your html document. HTML (the language of the web) does NOT do math equations well. MathJax is a javascript that will look through your entire html document and look for sandwiched $...$ or $$....$$, it then renders the TeX in between and you get very nice equations. So it could pay off learning a little TeX. Then again, there will eventually be some WYSIWYG editor widget that will do all this for you. When will that time come? Who knows. You can learn some TeX right now.

The table on the next 2 pages shows some common TeX codings/renderings that we chemists use.

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TeX code	display
`You can type plain text and you will get plain text.` This is NOT math mode, no $'s.	You can type plain text and you will get plain text.
`$0 = ax^2 + bx + c$` Most math equations will render just like you expect.	$0 = ax^2 + bx + c$
`${V_1\over T_1} = {V_2\over T_2}$` Here's Charles' Law which shows how to code for fractions. Make sure and use the { }'s or you'll get undesired results.	$\frac{V_1}{T_1} = \frac{V_2}{T_2}$
`$\ln \left({P_2\over P_1}\right) = {\Delta H_{\rm vap}\over R}\left({1\over T_1} - {1\over T_2}\right)$` Here is the Claussius-Clapeyron Equation which has fractions made with the \over macro and it has big parentheses () shown with the \left(and \right) macros.	$\ln\left(\frac{P_2}{P_1}\right) = \frac{\Delta H_{\rm vap}}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

`$CH_3CH_2OH$`
 	
`${\rm CH_3CH_2OH}$`
 	
note: the \rm tells TeX to render in 'roman' typeface which is your regular times type of font. See the difference in the text in math mode (italics) and roman.
	CH_3CH_2OH
	
	$\rm CH_3CH_2OH$

`$\Delta G = \Delta H - T\Delta S$`	$\Delta G = \Delta H - T\Delta S$

`$ \Delta \delta \sigma \chi \psi \Psi \pi \Pi`
`\Xi \xi \Lambda \lambda $`
 	
All greek letters are spelled out with a capital rendering the capital version.
	$\Delta\delta\sigma\chi\psi\Psi\pi\Pi\Xi\xi\Lambda\lambda$

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TeX code	display
`${\rm CH_4 + 2O2 \longrightarrow CO_2 + 2 H_2O} $` A chemical reaction - write the whole thing out in math mode.	$\mathrm{CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O}$
`{\rm aA + bB \rightleftharpoons cC + dD}` A chemical reaction showing equilibrium arrows.	$\mathrm{aA + bB \rightleftharpoons cC + dD}$

`${\rm 8H^+ + MnO_4^- + 5Fe^{2+} \longrightarrow}$`
 	
`\hfill ${\rm 5Fe^{3+} + Mn^{2+} + 4H_2O}$`
 	
LONG equations have to be split in order to fit in the narrow 2-column format of the exams. The \hfll "pushes" the line all the way to the right effectively rendering it right-justified.
	$\mathrm{8H^+ + MnO_4^- + 5Fe^{2+} \longrightarrow}$
	$\mathrm{5Fe^{3+} + Mn^{2+} + 4H_2O}$

If you want to know more on TeX, you can set up a meeting with me and I'll try to answer your questions.

- Paul

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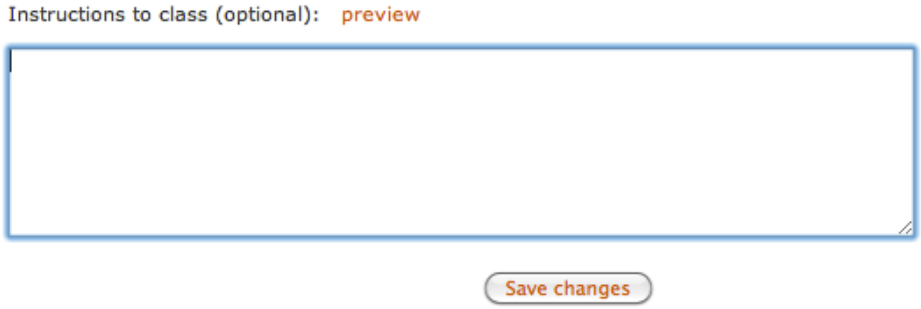
How to test your TeX without a full Install

If you want to practice some of this without doing a full install of TeX on your computer, use the preamble area to an assignment in Quest. Here are simple steps:

1. Create a homework assignment.
2. Give the assignment some start and due date to avoid constant nags by Quest to fill them in.
3. ADD at least one question to the assignment (doesn't matter which).
4. Click on the "Edit Settings" link at the top of the assignment page.
5. Type your test out TeX code into the "Instructions to Class (optional):" area. Here is a screenshot of that from Quest.



6. Click save changes.
7. Look at your preview copy of the homework and you will see the TeX you entered.
8. Repeat steps 4-7 as you change your code.