Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

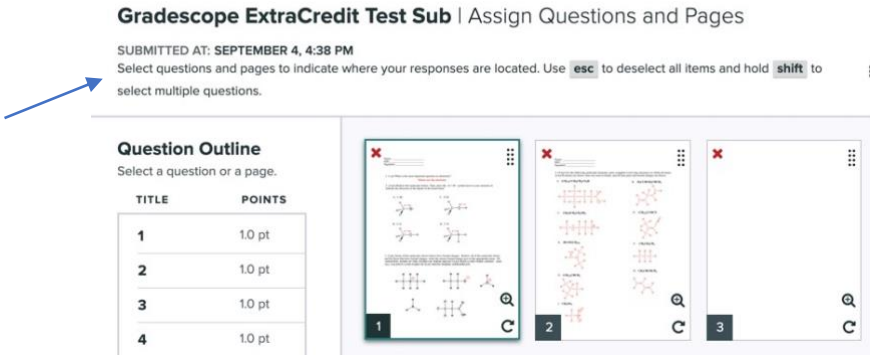
For the Gradescope portion of both weekly homework and midterm exams, you will be required to write answers to all questions, either on paper or using an electronic tablet (e.g. an iPad) and upload them to the appropriate grade scope assignment.

This is the Gradescope portion of your Midterm Exam 1. For this assignment, solve the problems on a separate sheet, and then only upload clearly labeled answers. Failure to clearly indicate the correct answer, providing multiple answers, mislabeling of problems, uploading answers in horizontal orientation, or not assigning problems to pages will result in the loss of points, so please, do this correctly!

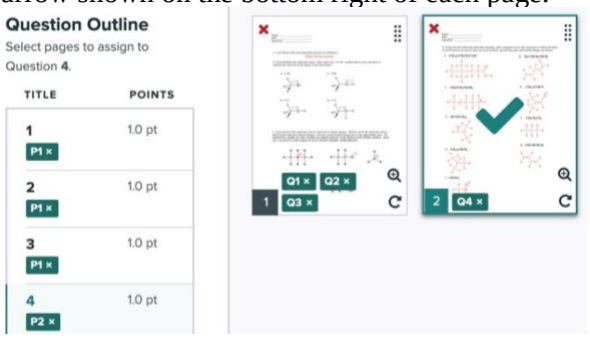
You must include your name, UT EID, and signature on each page you upload.

After answering all questions on a blank sheet and properly numbering answers, upload your work under the appropriate assignment on Gradescope.

After you upload, **you must assign where each question is on the page(s) you uploaded** so we can grade it. Note that assigning questions to specific pages in your upload does not affect your submission time: the assignment is turned in once you have uploaded the assignment and reached the Gradescope webpage below. This means you have no reason to not spend a minute or so and tell us where answers are within your submission pages. *Failure to do this will result in losing points on the assignment*. Note the blue arrow pointing out instructions.



In the picture below, you can see that questions 1-3 were assigned to page 1, and question 4 was assigned to page 2. You are required to assign all question numbers in the 'Question Outline' to the pages you uploaded, so that we always grade what you want us to grade for each question. If a question is answered on multiple pages, assign that question to all relevant pages! If the images are not rotated to be upright in your submission, please rotate them using the arrow shown on the bottom right of each page.



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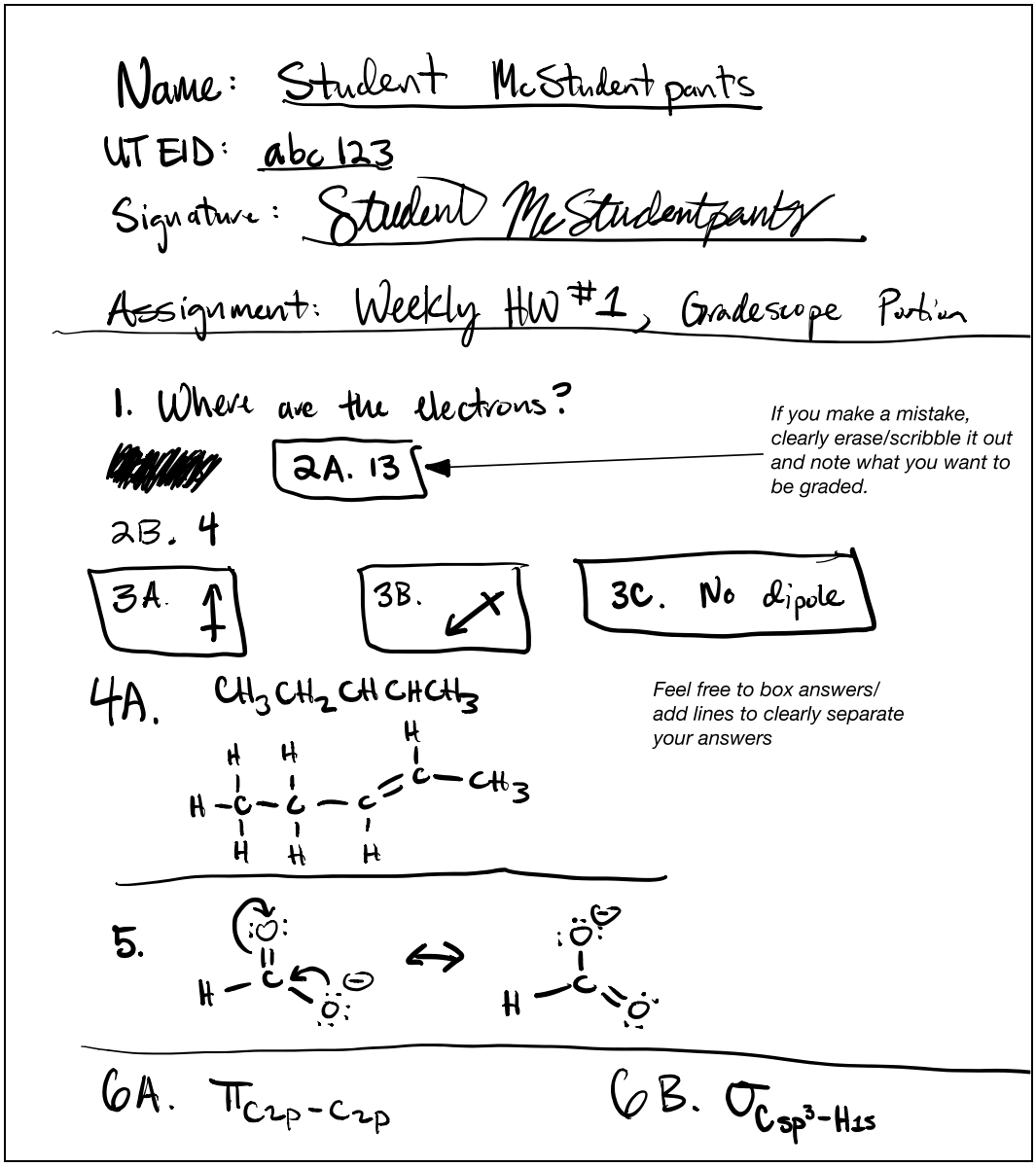
An example showing what a Gradescope submission could look like is below:

- Name
- UT EID
- Signature
- Properly numbered answers on a blank page, no need to copy the question
- Uploaded in vertical direaction



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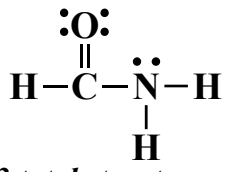
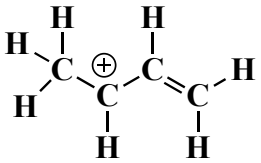
For the following molecular formula, draw complete Lewis line structures in which all atoms (even H atoms) are drawn, lines are used as bonds, all lone pairs are drawn AND ALL FORMAL CHARGES ARE INDICATED. Note you must infer the formal charges as we do not indicate them on the chemical formulas given. (8 pts each)

1. **$HOCH_2CH_2OCH_2CHCH_2$**
2. **$CHBr_2CH_2CHOHCH_2CON(CH_3)_2$**
3. **$(CH_3)_3CCH_2CCH$**

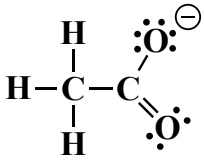
The following molecules are best represented as the hybrid of multiple contributing structures. First, redraw each molecule, then **draw additional contributing structures to the right**, including all lone pairs and formal charges. Use arrows to indicate the movement of electrons to show how the first structure can form the second contributing structure, and for the molecules with 3 total structures, draw arrows on the second structure to show the movement of electrons to form the third structure. There is **no need to draw any circles around any of these contributing strucures**. You might want to read these directions again to make sure you know what we want.



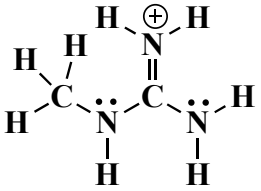
4. ***3 total structures*** (10 pts)



6. ***2 total structures*** (5 pts)

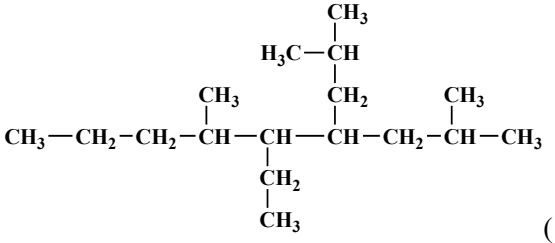


5. ***2 total structures*** (6 pts)

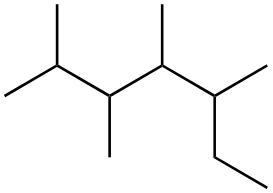


7. ***3 total structures*** (10 pts)

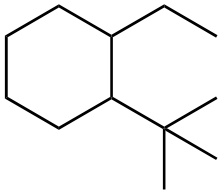
Provide an acceptable IUPAC name for the following molecules. Do not designate R or S for these.



8. (7pts)



9. (7pts)



10. (7pts)

For the following IUPAC names, draw the appropriate line angle drawing (15 pts)

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11. ***Cis*-1,2-diethylcyclohexane**

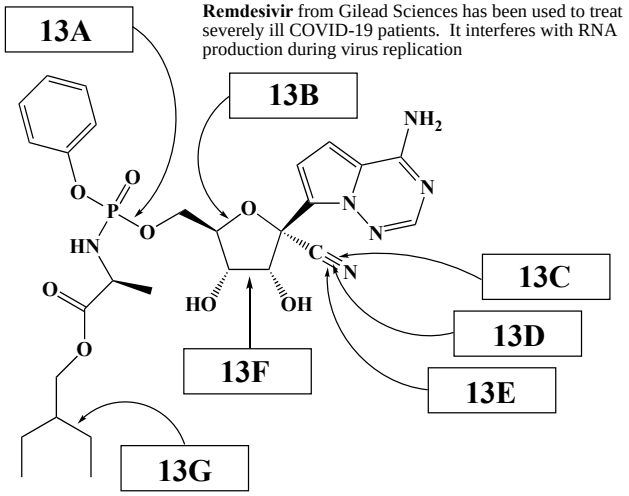
- If the molecule you drew in **11** is chiral, draw the enantiomer to the right of the original structure.

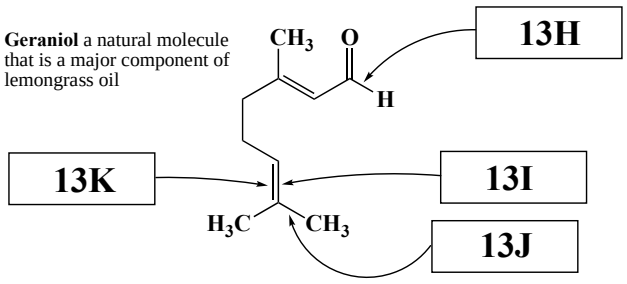
12. **(*R*)-5-Ethyl-2,4-dimethylheptane**

- You need to use wedges and dashes on this one so that you draw only the correct enantiomer.

The next question asks you to describe bonds as being derived from the overlap of hybridized orbitals.

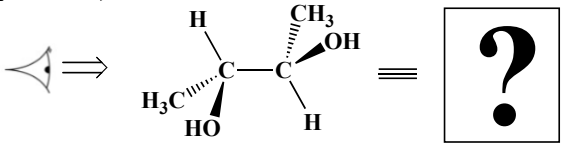
13. Describe each bond indicated with a letter as the overlap of hybridized orbitals. For example, an answer might be **S Csp^3-Csp^3** and you can answer like: **13A. S Csp^3-Csp^3** (2 pts each)



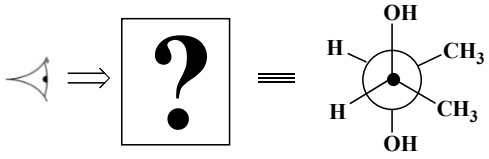


The two following questions are asking you to interconvert between line angle structures and Newman projections. For **14**, draw the Newman projection of 2,3-butanediol as seen by the eye shown. For question **15**, draw the line angle structure that generates the given Newman projection, as seen by the eye. (7 pts each)

14.

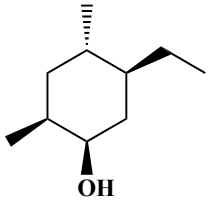


15.



Draw the alternative chair conformations of the following cyclohexane derivatives. When there is a difference in energy, circle the more stable chair conformation (i.e. the one that predominates at equilibrium). (9 pts each)

16.



17.