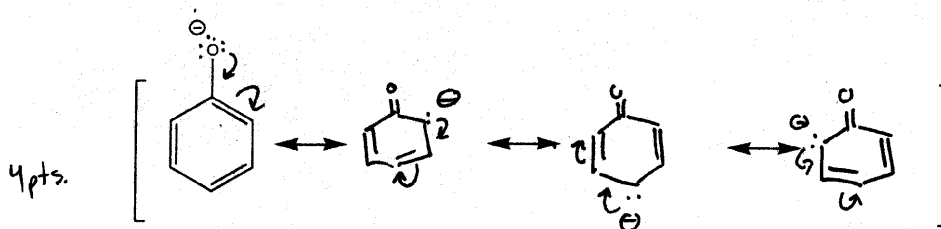
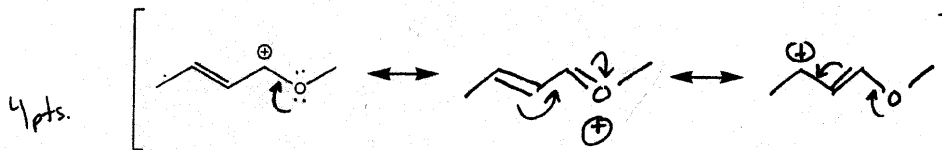


You may use molecular models. Keep your eyes on YOUR paper do not cheat in any way shape or form. Putting your name on this paper implies your adherence to the WFU code of academic conduct.

1. Using curved arrows, draw resonance forms for the following compounds:



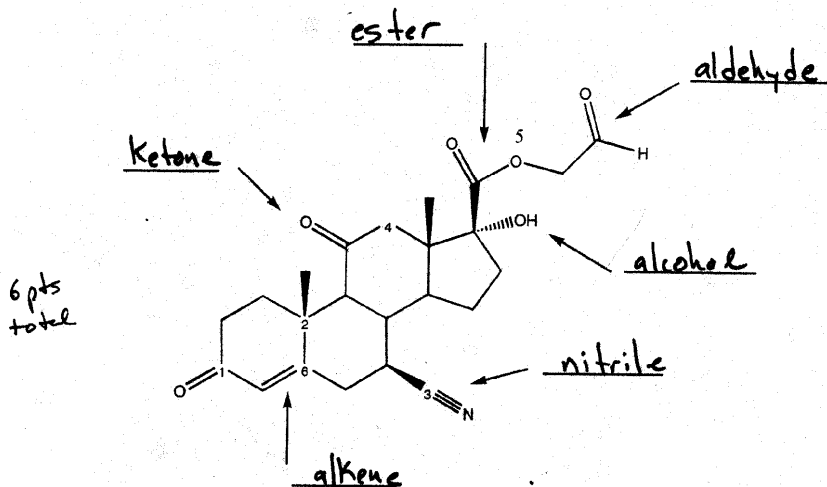
2. Consider these acids: Provide the letter in the blank that answers the question.

		pKa
A		10
B		16
C		15.7

2pt  
2pt

B Acid has the strongest base. largest pKa  
A Acid is strongest due to resonance stabilization of the anion.

3. Provide the name of the functional group in the space near the arrow. Indicate the hybridization and 1°, 2°, 3°, 4° for the numbered atoms below the structure. Indicate the most polar group.



6 pts total

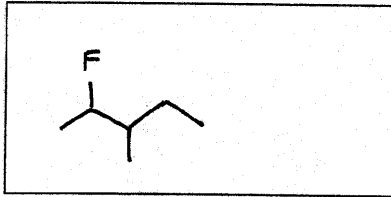
Atom	hybridization	1°, 2°, 3°, 4°
1	$sp^2$	2°
2	$sp^3$	4°
3	$sp$	1°
4	$sp^3$	2°
5	$sp^3$	2°
6	$sp^2$	3°/4°

1 pt Most polar group alcohol

4. Draw the following molecules:

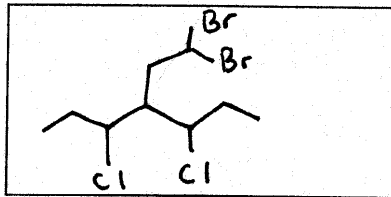
a. 2-fluor-3-methylpentane

2 pts



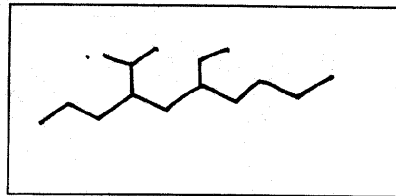
b. 4-(2,2-dibromoethyl)-3,5-dichloroheptane

2 pts



c. 4-isopropyl-6-ethyldecane

2 pts

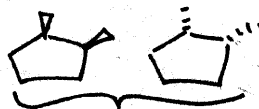


5. How many different stereoisomers can be drawn for the dimethylcyclopentanes? 7

4 pts

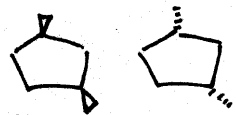


1



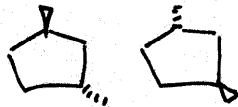
same

2



same

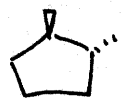
3



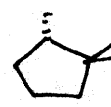
4



5

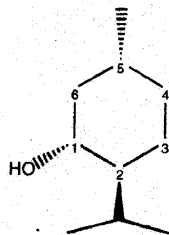


6

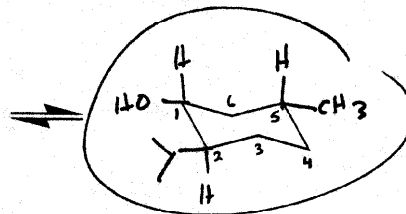
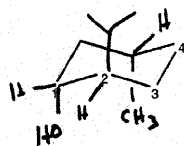


7

6. On the chair templates below draw the two chair conformations that are in equilibrium for (1)-menthol. Circle the more stable



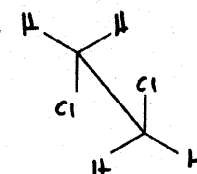
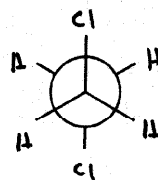
10 pts.  
stable (2)



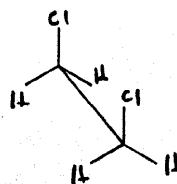
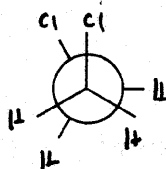
all large groups  
equatorial

7. Provide the most and least stable Newman and Saw-Horse projection for 1,2-dichloroethane. Indicate most and least stable.

2 pts

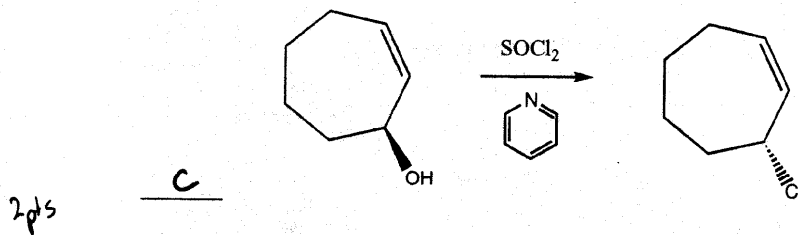
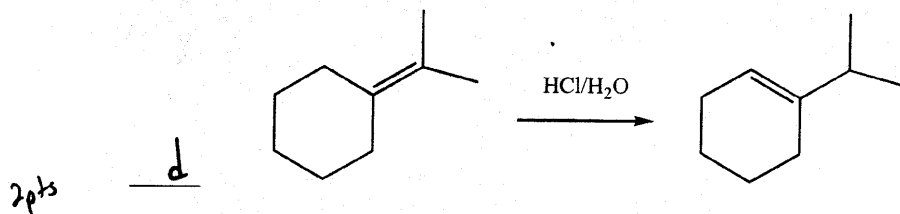
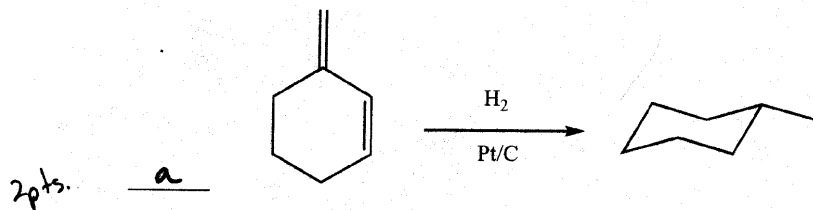


2 pts

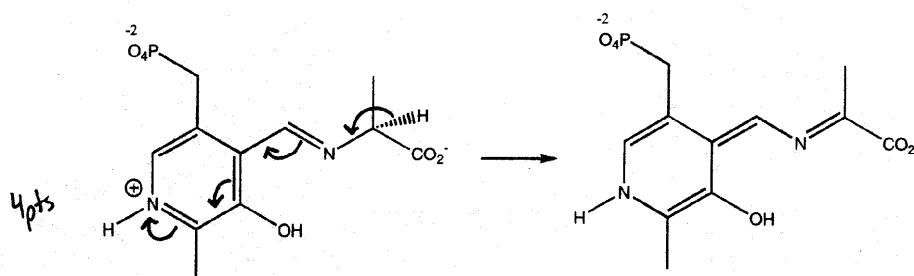
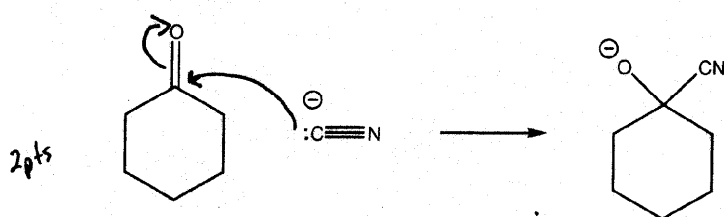
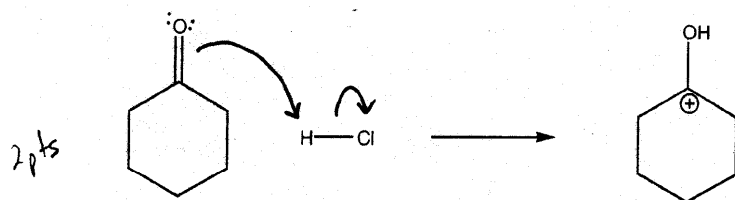


8. Classify each reaction as a(n): (put letter in blank beside reaction)

- a. addition
- b. elimination
- c. substitution
- d. rearrangement



9. On the reactant side use curved arrows to show how electrons move to produce the product.



10. Given the reaction below provide arrows that describe how one reactant is transformed. This overall reaction is exothermic with the first transition state being highest in energy. Draw the energy diagram of the reaction using A,B,C to label reactants, intermediates and products. Indicate transition state(s) with the letters TS.

