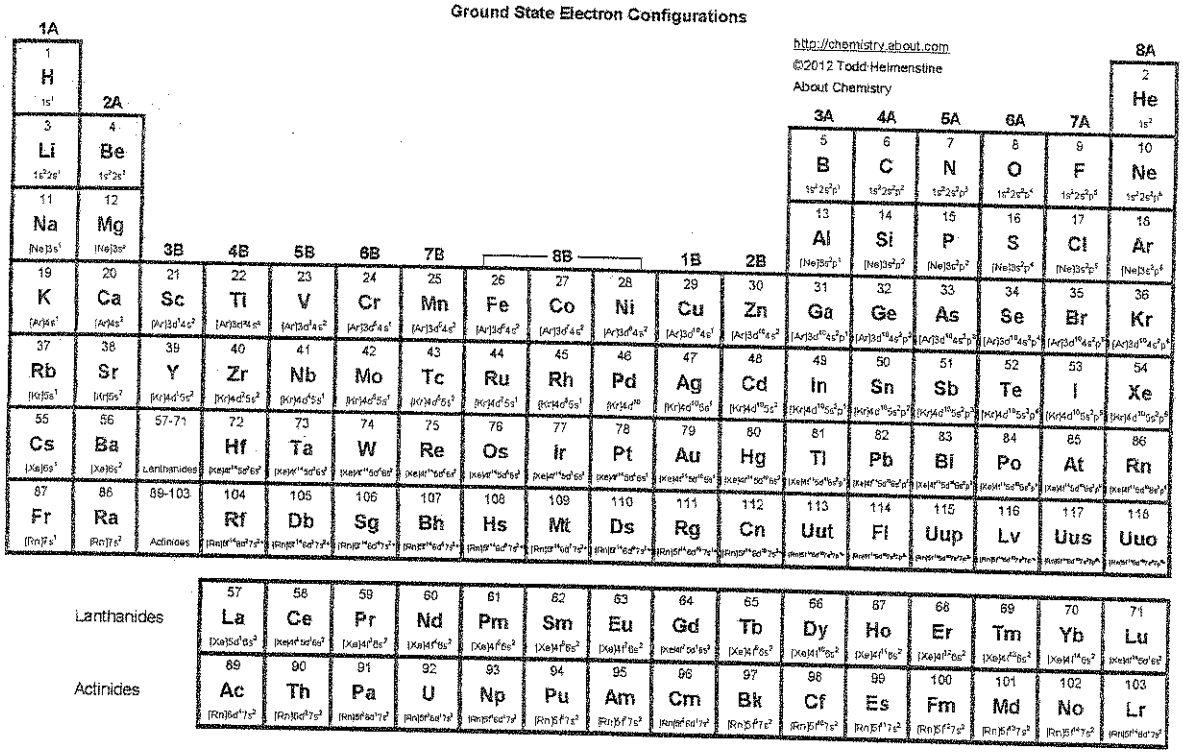
Your Name _____

ORGANIC CHEMISTRY FOR HEALTH AND NUTRITION
FINAL EXAM
MAY 18, 2015

Periodic Table of the Elements

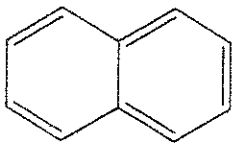
Ground State Electron Configurations



* values are based on theory and are not verified

Good luck on this exam!
Please try to relax. Remember it is your job to simply SHOW ME WHAT YOU KNOW.

1. Convert the following from Line Bond Notation to a Lewis Structure. (4 pts)



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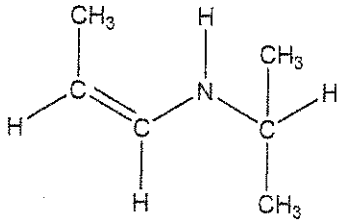
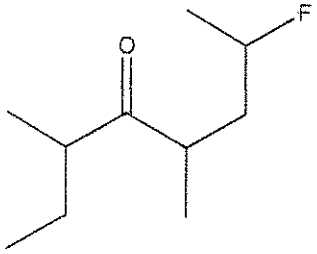
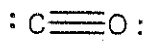


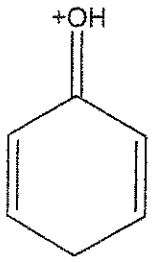
3. Give the official IUPAC name of the molecule shown below. (4 pts)



4. Fill in all missing non-zero formal charges on the molecule shown below. (4 pts)

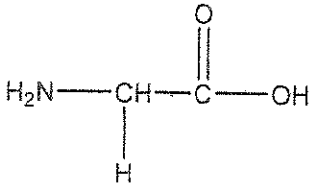


5. Draw a resonance structure for the molecule shown below. If your resonance structure has any formal charges, be sure to show them clearly. (4 pts)

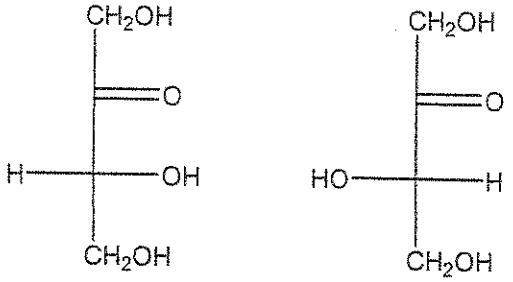


6. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would covert to the structure on the right and how the structure on the right would covert to the structure to the left. (4 pts)

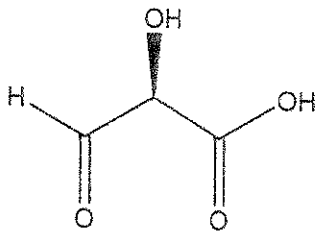
7. Draw the structure of the polymer that would form upon polymerization of the following amino acid with itself. (4 pts)



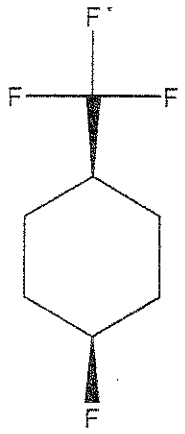
8. What is the relationship between the following two molecules? Are they identical, enantiomers or diasteriomers? (2 pts)



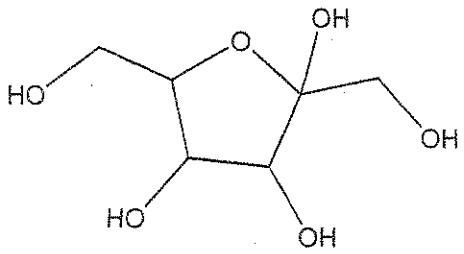
9. Determine the R/S configuration of each chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon. (4 pts)



10. Draw both chair conformations of the following cyclohexane compound and circle the one that is lower in energy. (8 pts)



11a. Label the anomeric carbon on the sugar shown below. (6 pts)
b. Is this a reducing sugar?
c. Is it in its alpha or beta form?



12. Glycogen, a polymer of glucose, is shown below (4 pts)
a. Label the 1,4 linkages with stars *.
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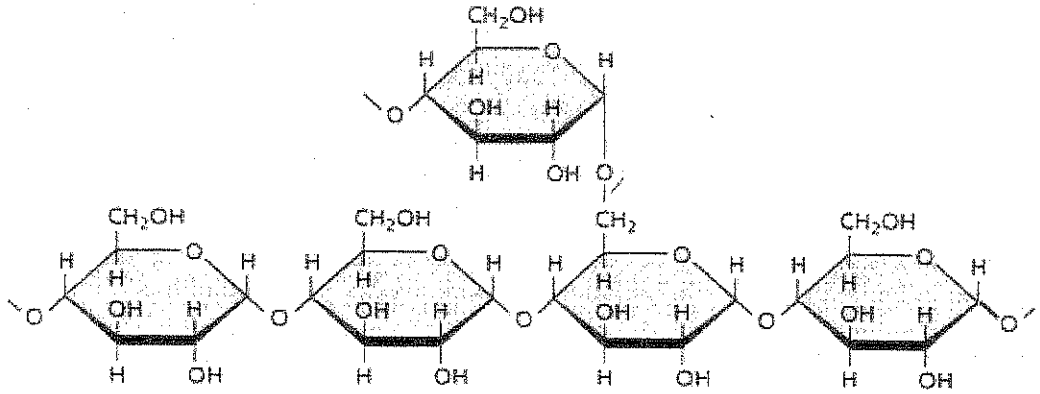
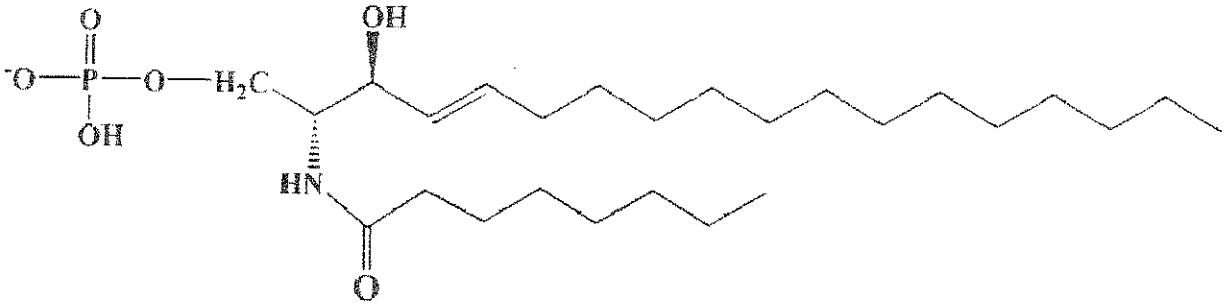
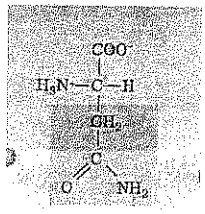


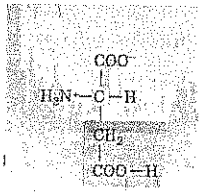
13. The following diagram depicts a spingolipid. (4 pts)
    a. Carefully circle and label the hydrophilic part(s).
    b. Carefully circle and label the non-polar part(s).
    c. Which end faces an aqueous environment?



14. Construct a **tripeptide** ASN-ASP-ASN from the amino acids shown below. Make sure to draw it in the form it would take in your body (at physiological pH). (8 pts)

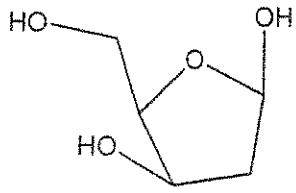


Asparagine (Asn, N)

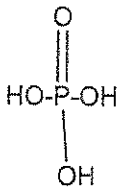


Aspartic acid (Asp, D)

15. Given the structures below, draw deoxyribose 5-diphosphate (4 pts):

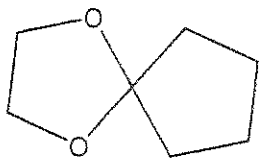


deoxyribose

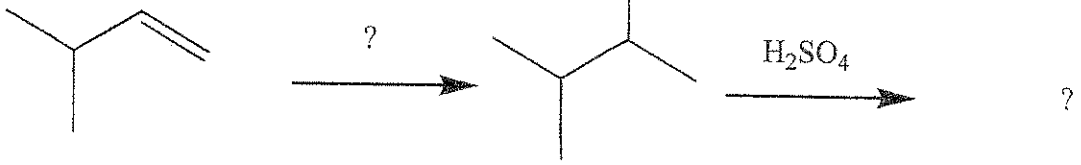


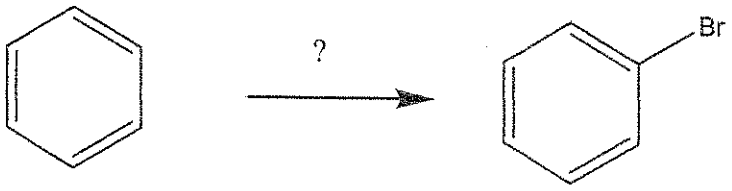
phosphoric acid

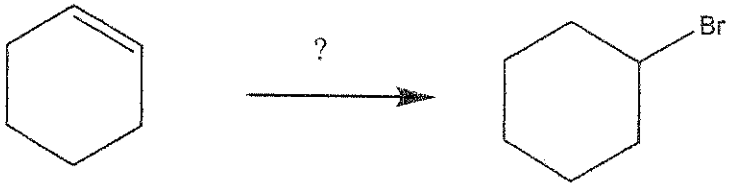
16a. What functional group is shown below? (4 pts)
    b. Draw the structures of the ketone and alcohol(s) that were used to synthesize this compound:



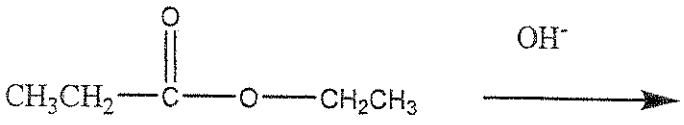
17. Fill in the missing reagent(s) or products in the reactions shown below (28 pts)

a. 

b. 

c. 

d. ? $\xrightarrow[\text{metal catalyst}]{H_2}$ CH_3OH $\xrightarrow{K_2Cr_2O_7}$?

e. 

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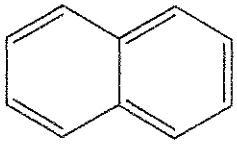

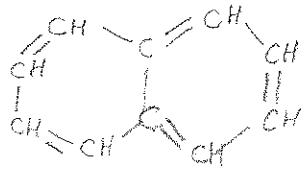

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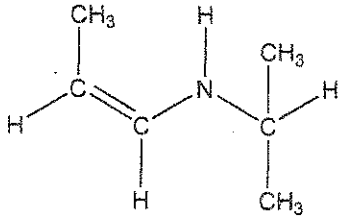

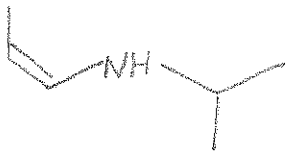

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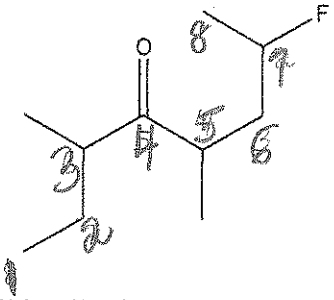

7-fluoro-3,5-dimethyl-4-octanone

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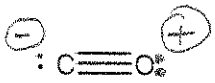

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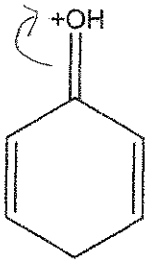

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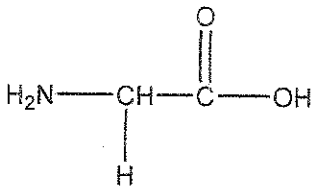

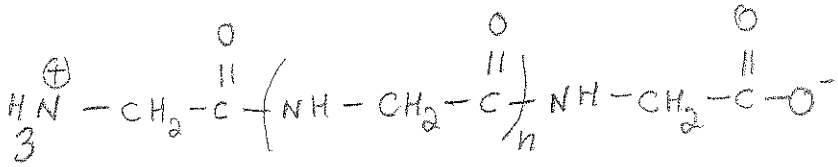

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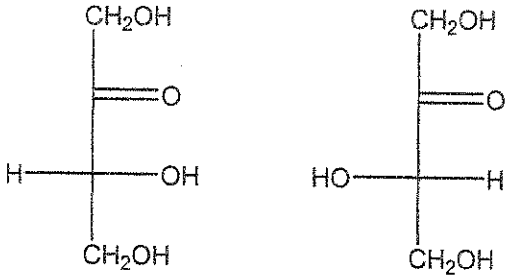

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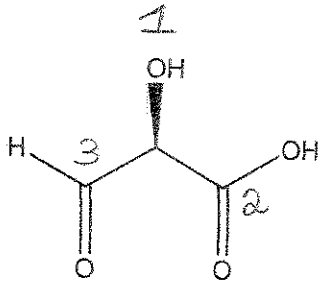

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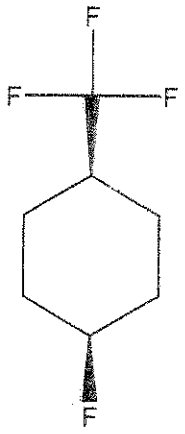
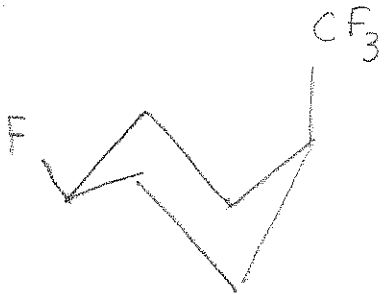
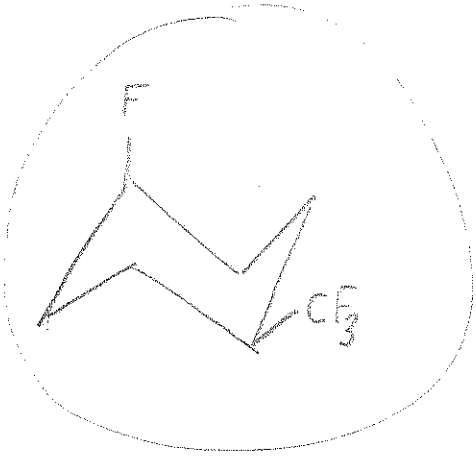


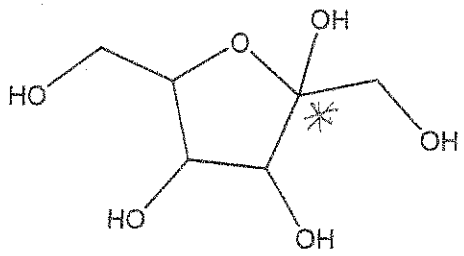




11a. Label the anomeric carbon on the sugar shown below. (6 pts)

b. Is this a reducing sugar? yes

c. Is it in its alpha or beta form? beta



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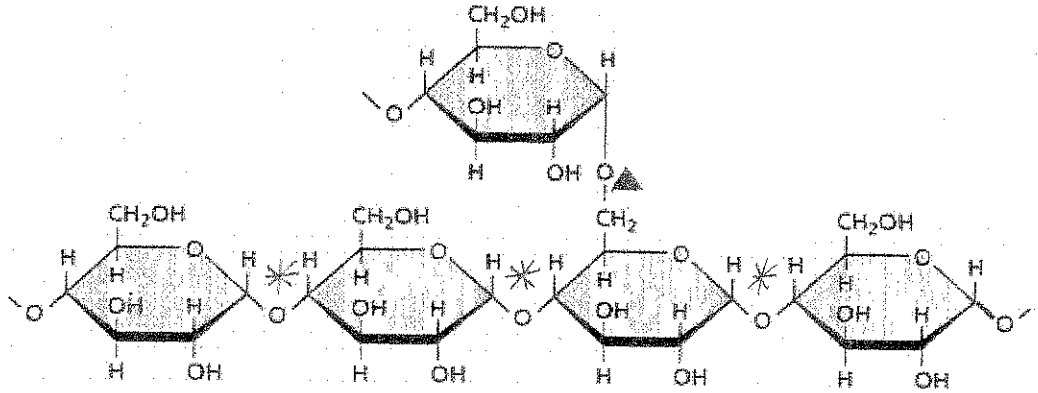

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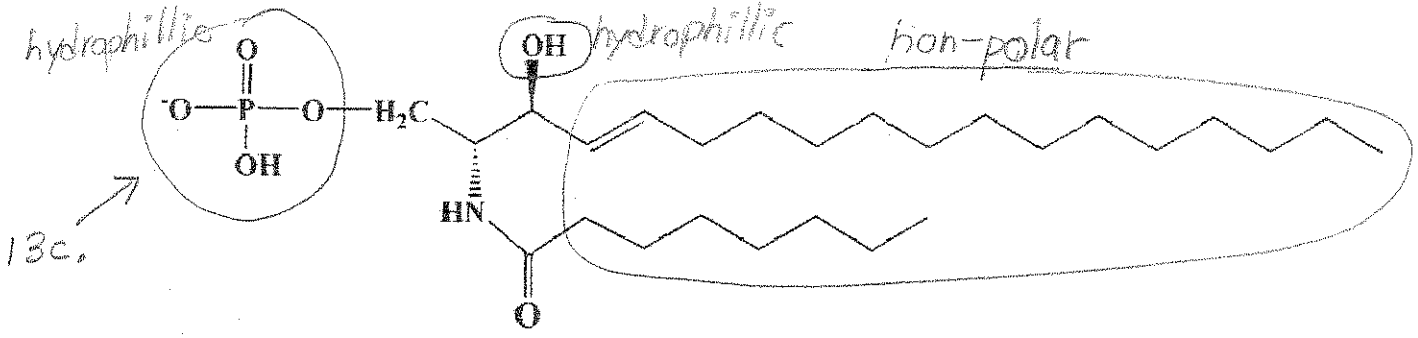

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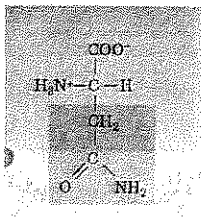
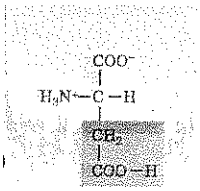
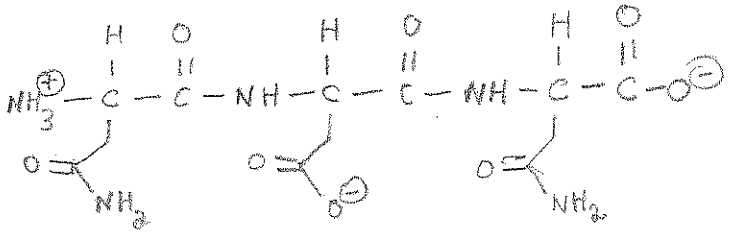

Asparagine (Asn, N)


Aspartic acid (Asp, D)



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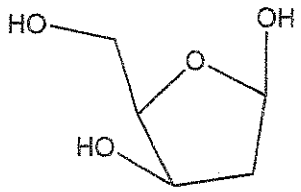
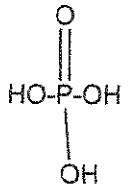
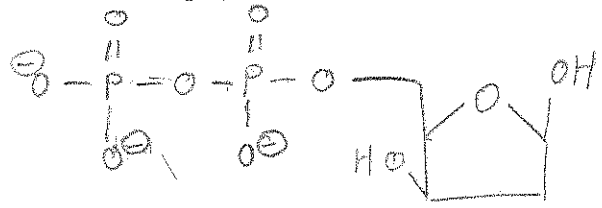
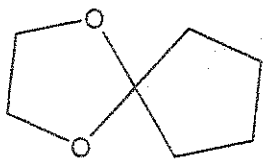

deoxyribose


phosphoric acid



16a. What functional group is shown below? (4 pts) acetal
   b. Draw the structures of the ketone and alcohol(s) that were used to synthesize this compound:



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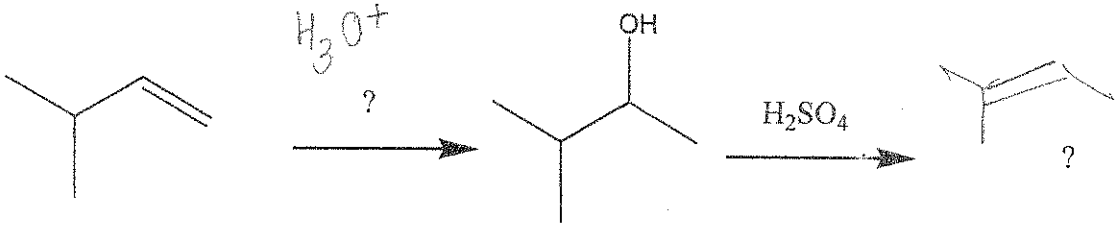
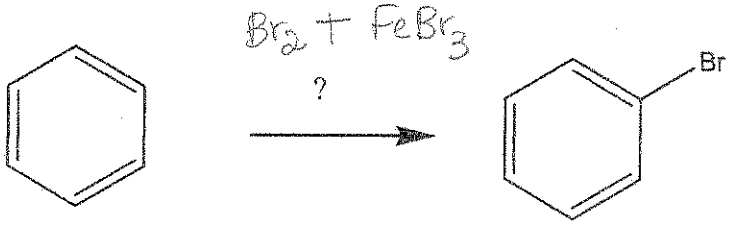
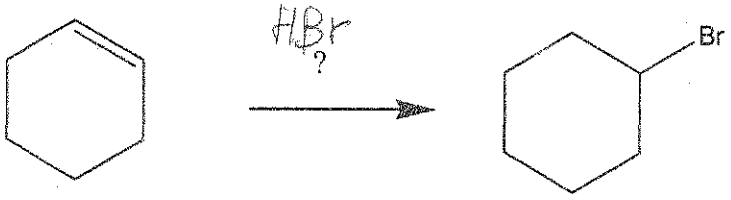
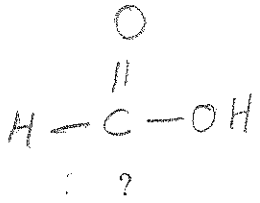
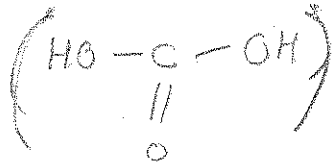
a. 

b. 

c. 

d. ? $CH_2=O$ $\xrightarrow[\text{metal catalyst}]{H_2}$ CH_3OH $\xrightarrow{K_2Cr_2O_7}$ 



e.