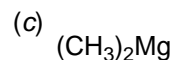
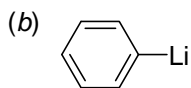
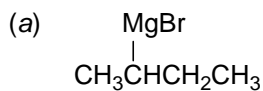


In putting my name on this test and turning it in I am certifying that it **my work alone**.

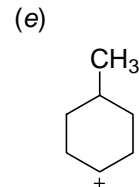
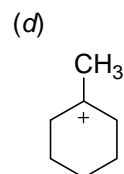
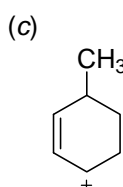
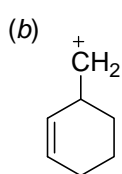
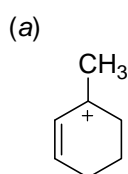
NOMENCLATURE

1. Name the following compounds (you may give common names or IUPAC names):
(6 pts)



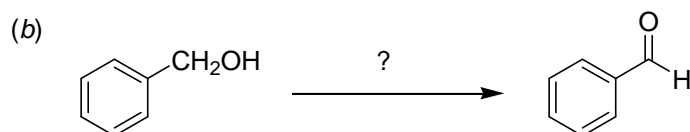
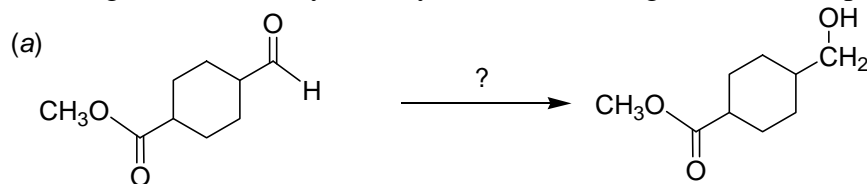
STABILITY

2. Rank the following cations in order of increasing stability (least stable first): (5 pts)



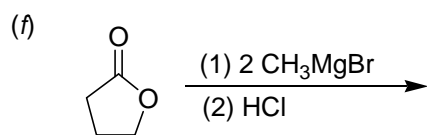
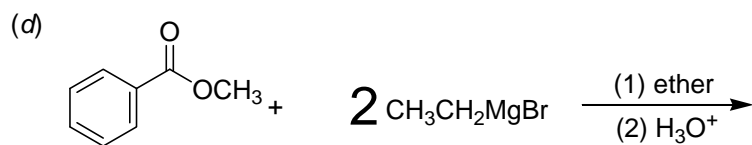
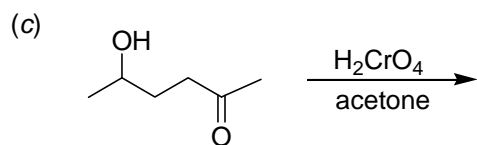
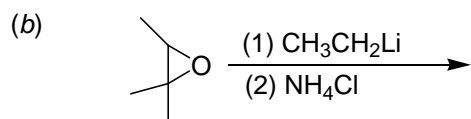
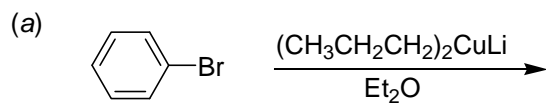
REAGENTS

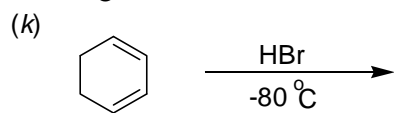
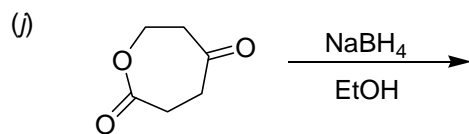
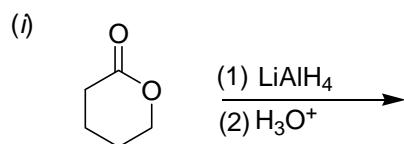
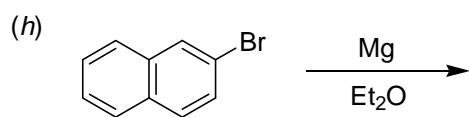
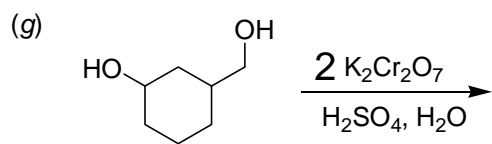
3. Give the reagent(s) necessary to carry out the following reactions: (8 pts)

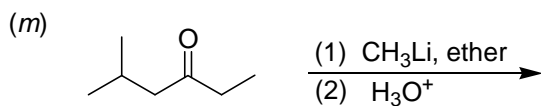
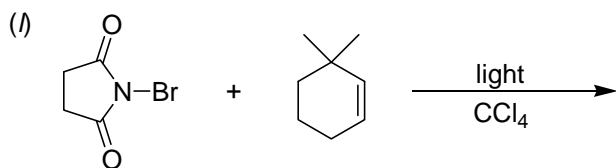


SYNTHESIS

4. Give the organic product(s) for the following reactions: (52pts total; 4pts each)

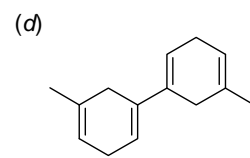
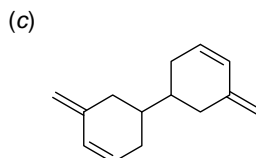
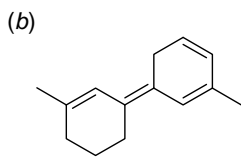
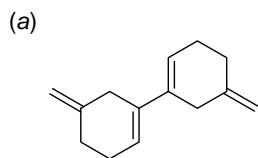






UV-vis Spectroscopy

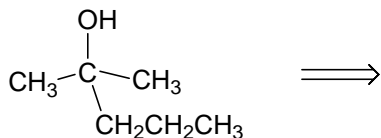
5. Which compound absorbs at the longest wavelength in the UV spectrum? (5pts)



RETRO SYNTHESIS

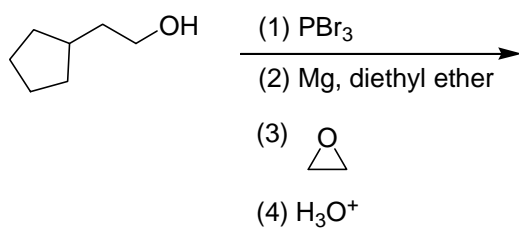
6. Write the two starting materials needed to prepare the following molecule by a Grignard reaction. (6 pts)

(*note* there are several correct answers possible, but please only give one method):



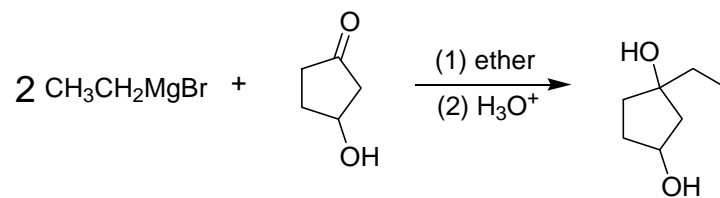
Multi-step Synthesis

7. Give the major organic product(s) for the following four-step reaction. (7 pts)



MECHANISM

8. Using curved arrows, draw the complete mechanism for the following Grignard reaction (show all steps). (7 pts)



Test #2a Spring 2007

Name: _____ (2 pts)

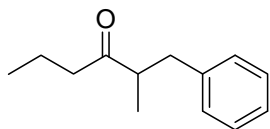
2380.004

*In putting my name on this test and turning it in I am certifying that it **my work alone** and that I have neither given nor received help to/from anyone or anything.*

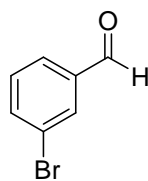
Nomenclature

1. Name the following compounds (you may give common names or IUPAC names): (3 pts)

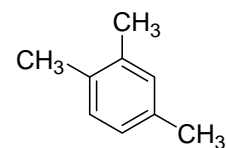
(a)



(b)



(c)



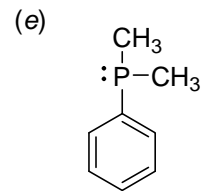
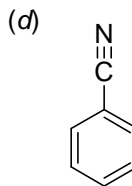
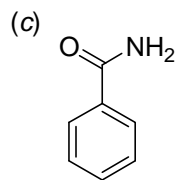
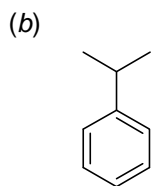
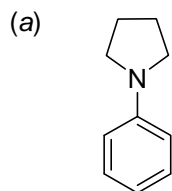
2. Draw structures for the following: (3 pts)

(a) 2,3,4-Trichlorotoluene

(b) 3,5-Dinitrobenzoic acid

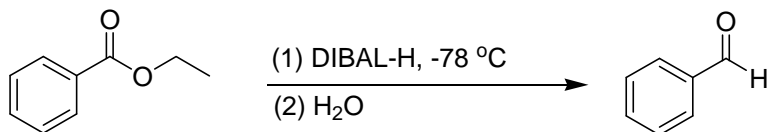
(c) butanone

3. For each of the following molecules, indicate which positions electrophilic aromatic substitution is expected to occur by labeling the attached substituents as a *meta* director or as an *ortho-para* director. (5 pts)

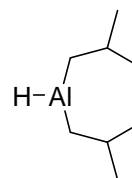


Mechanisms:

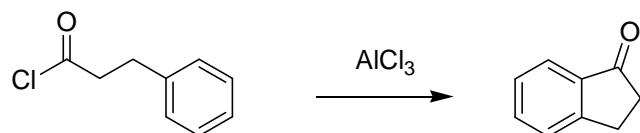
4. Using curved arrows, draw the complete **mechanism** for the following reaction (show all steps): (5 pts)



DIBAL-H is the following compound



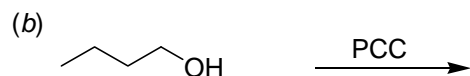
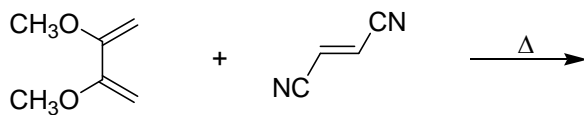
5. Using curved arrows, draw the complete **mechanism** for the following Friedel-Crafts reaction (show all steps): (5 pts)



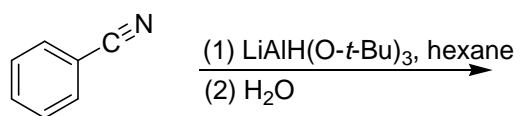
Reactions:

6. Give the major organic product(s) expected for the following reactions: (56pts total---4pts each)

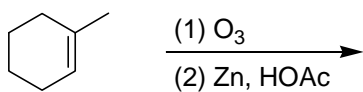
(a) show stereochemistry for the product



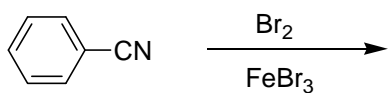
(c) reduction



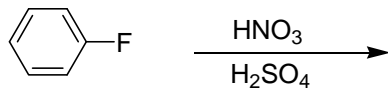
(d) ozonolysis



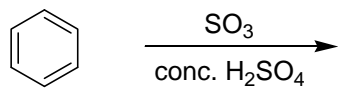
(e)



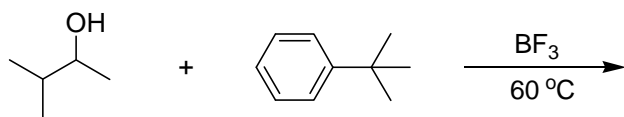
(f)



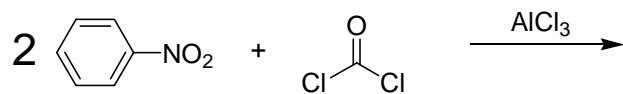
(g)



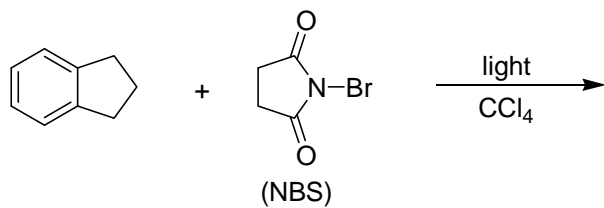
(h)



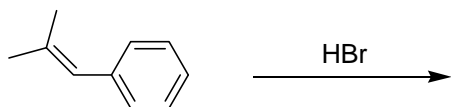
(i) Friedel-Crafts acylation



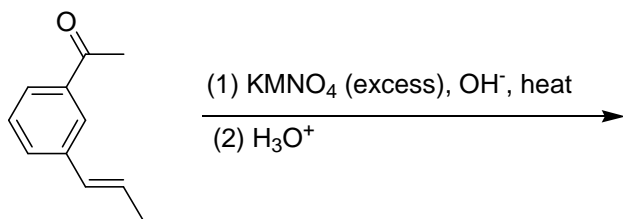
(j)



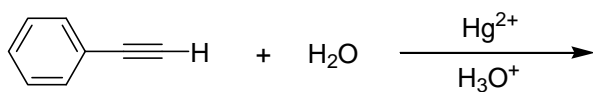
(k)



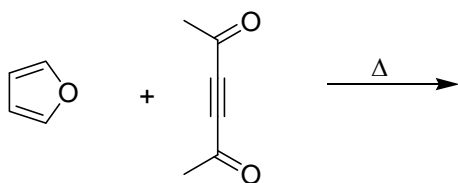
(l)



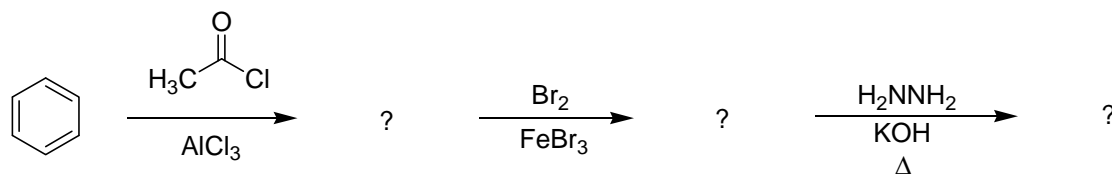
(m)



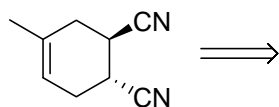
(n)



7. **(Synthesis)** Complete the following synthesis (give the product for each question mark): (6 pts)



8. **(Retro Synthesis)** Write the two starting materials needed to prepare the following Diels-Alder adduct: (5 pts)

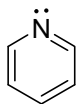


9. Label each of the following molecules as being aromatic , anti-aromatic or non-aromatic (5 pts)

(a)



(b)



(c)



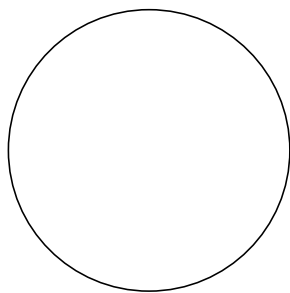
(d)



(e)



10. Using the polygon method, draw the energy diagram for the molecular orbitals of the cyclobutadiene. I have included a circle for you to use for this purpose. (5 pts)

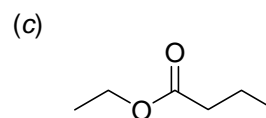
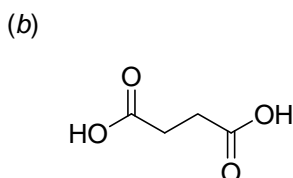
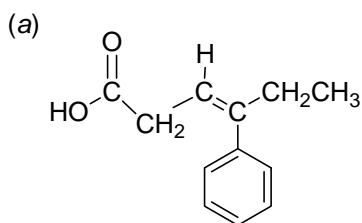


Test #3 Spring 2007
2380.003

Name: _____ (3pts)

*In putting my name on this test and turning it in I am certifying that it **my work alone** and that I have neither given nor received help to/from anyone or anything. In other words, no cheating!!!!*

1. Name the following compounds (you may give common names or IUPAC names):
(2 pts each)



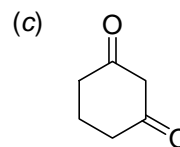
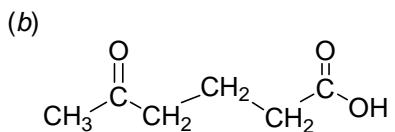
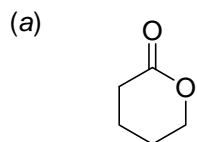
2. Draw structures for the following: (2 pts each)

(a) *N*-ethyl-*N*-phenylbutanamide

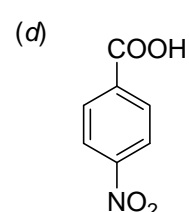
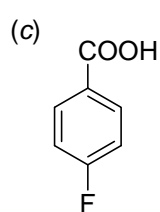
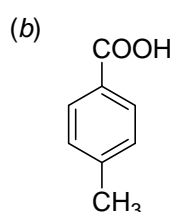
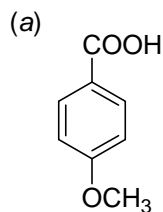
(b) sodium propanoate

(c) 2-chlorobutanenitrile

3. Circle the most acidic hydrogen in each of the following compounds. (3 pts)

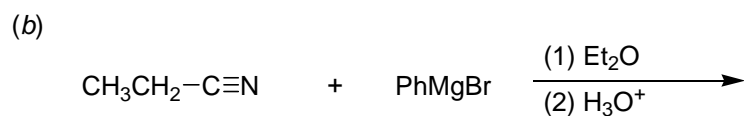
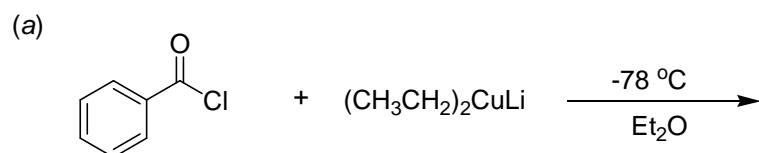


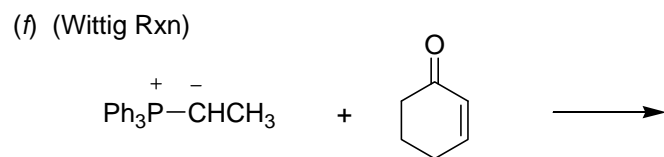
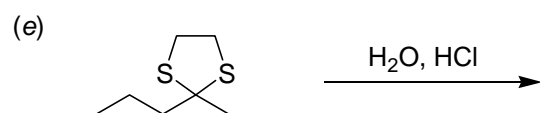
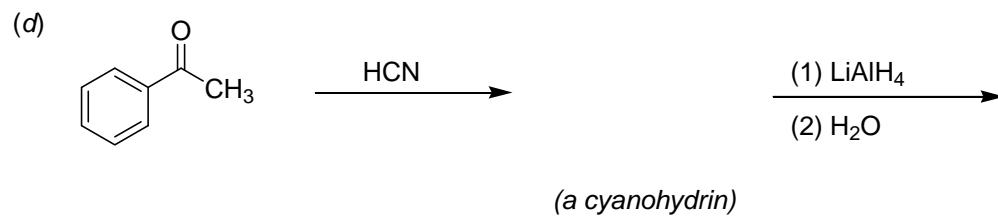
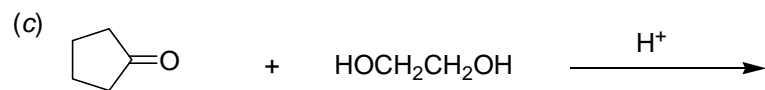
4. Place the following carboxylic acids in order of increasing acidity (least acidic first). (4 pts)



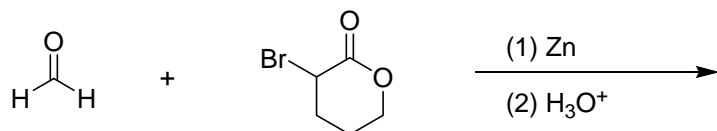
REACTIONS

5. Give the major organic product(s) expected for the following reactions: (72 pts---4 pts each)

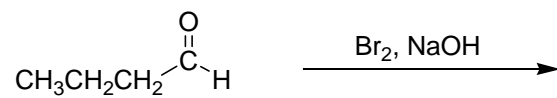




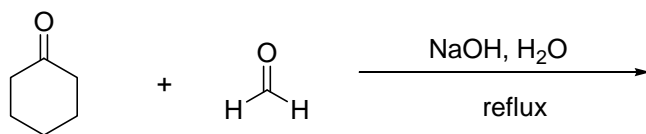
(g) Reformatsky Rxn (similar to the Grignard rxns)



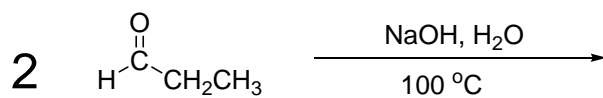
(h)



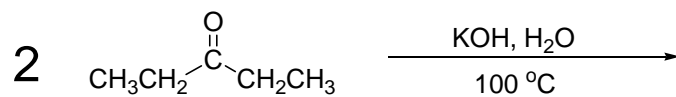
(i) Claisen-Schmidt rxn

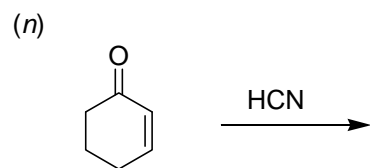
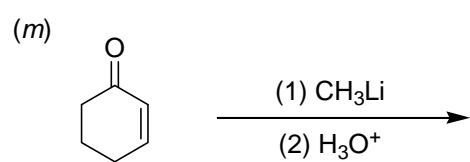
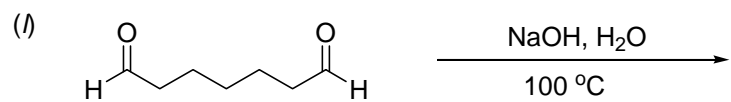


(j)

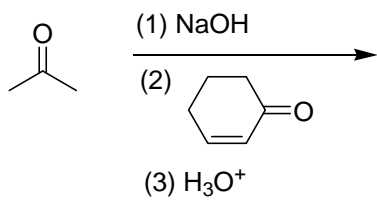


(k)

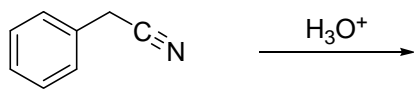




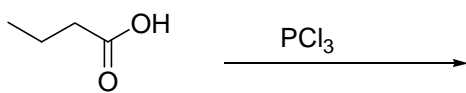
(o) Michael Addition



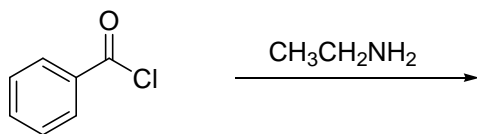
(p)



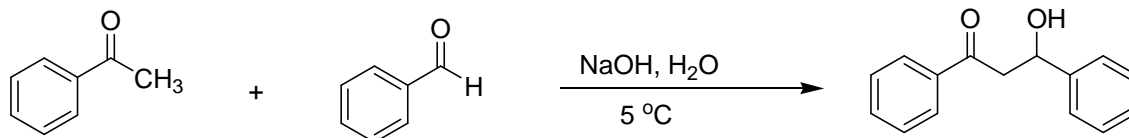
(q)



(r)

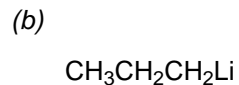
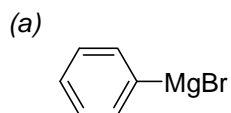


5. Using curved arrows, draw a complete mechanism that accounts for the following reaction (show all steps). (6pts)

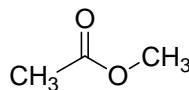
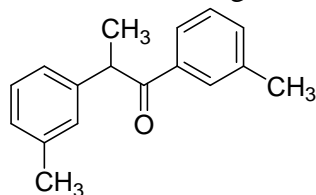


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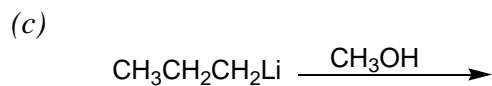
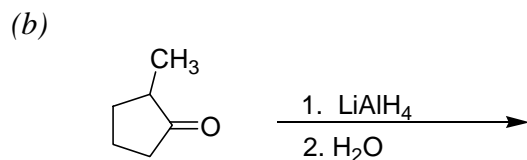
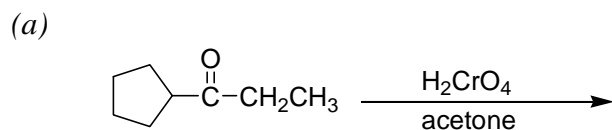
1. Using IUPAC nomenclature, name the following compounds:



2. Indicate whether the following molecules will be reduced to alcohols using NaBH_4 ?



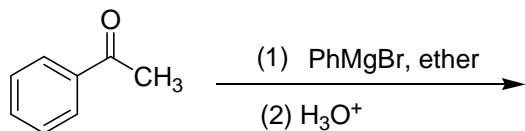
3. Give the major organic product(s) for each of the following reactions:



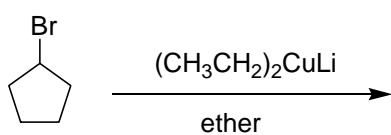
In putting my name on this quiz and turning it in I am certifying that it is **my work alone**.

1. Give the major organic product(s) for each of the following reactions: (2pts each)

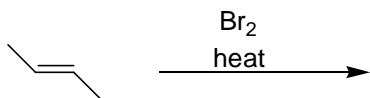
(a)



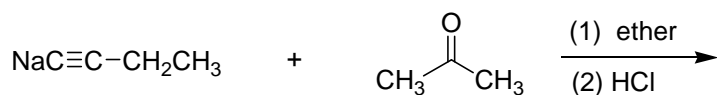
(b)



(c)



(d)

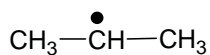


2. Rank the following radicals in increasing order of stability (*least stable first*). (2pts)

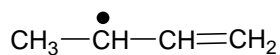
(a)



(b)



(c)



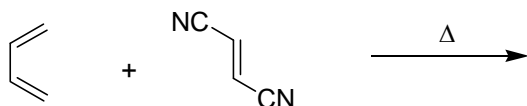
(d)



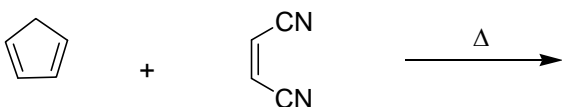
In putting my name on this quiz and turning it in I am certifying that it is **my work alone**.

1. Give the major organic product for the following Diels-Alder reactions and show stereochemistry where applicable: (2pts each)

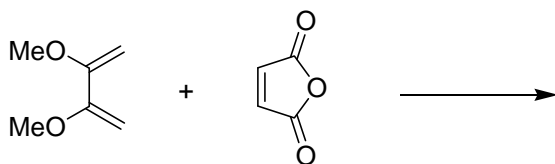
(a)



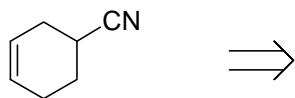
(b)



(c)



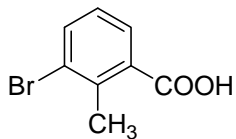
2. **Retro synthesis**. Give the two starting materials that you would use to make the following molecule via Diels-Alder reaction. (2pts)



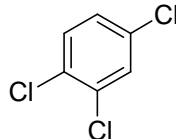
In putting my name on this quiz and turning it in I am certifying that it is **my work alone**.

1. Name the following compounds: (1pt each)

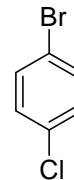
(a)



(b)



(c)



2. Draw the following compounds: (1pt each)

(a) *o*-dinitrobenzene(b) *m*-dibromobenzene

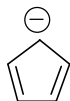
(c) 4-bromotoluene

3. Label each of the following molecules as being aromatic or anti-aromatic or non-aromatic. (1pt each)

(a)



(b)



(c)

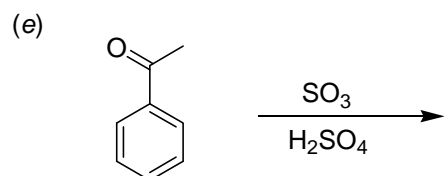
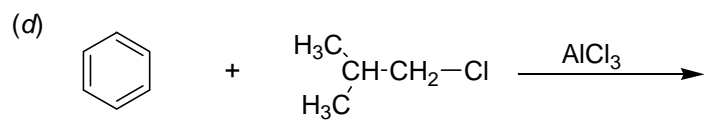
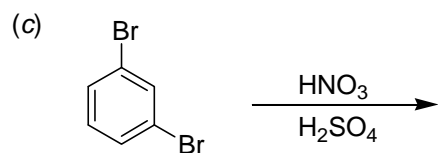
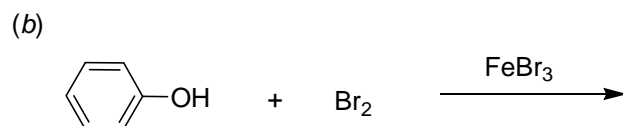
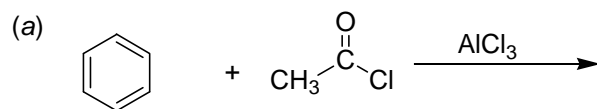


(d)



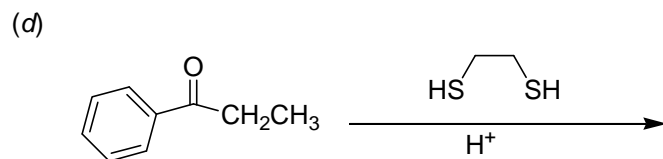
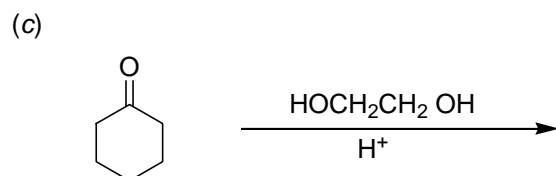
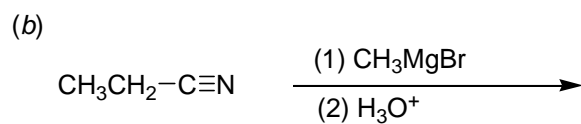
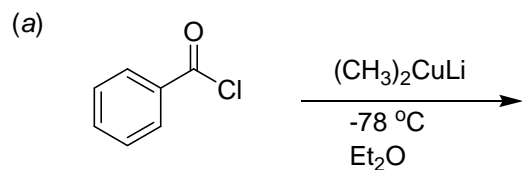
In putting my name on this quiz and turning it in I am certifying that it is **my work alone**.

1. Give the major organic product for the following reactions (2pts each).



In putting my name on this quiz and turning it in I am certifying that it is **my work alone**.

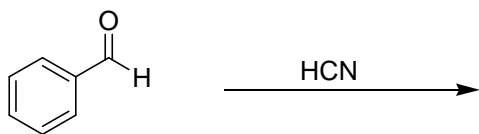
1. Give the major organic product for the following reactions (2pts each).



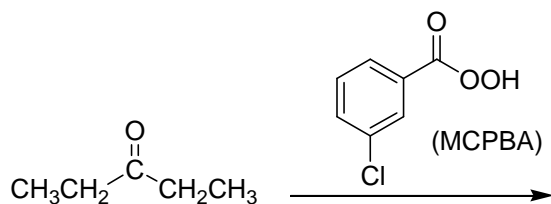
In putting my name on this quiz and turning it in I am certifying that it is **my work alone** and that I have neither given nor received help for anyone or anything.

1. Give the major organic product for the following reactions (2pts each):

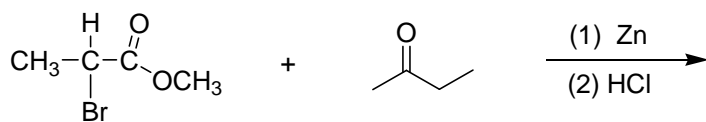
(a)



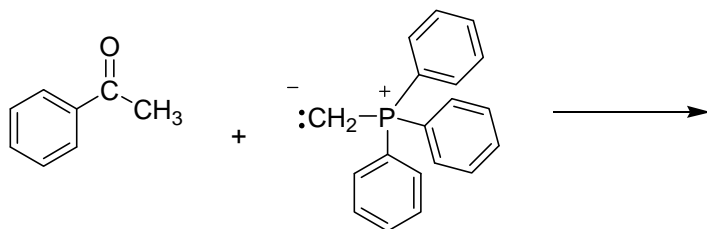
(b)



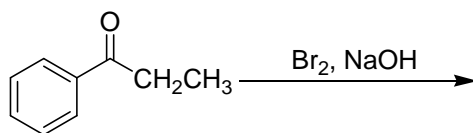
(c)



(d)



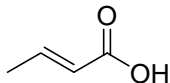
(e)



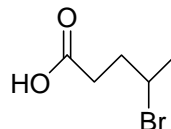
In putting my name on this quiz and turning it in I am certifying that it is **my work alone** and that I have neither given nor received help from anyone or anything.

1. Name the following compounds:

(a)

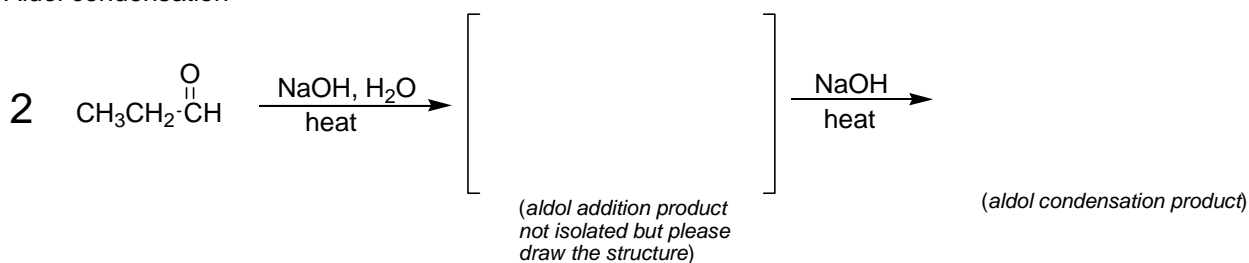


(b)

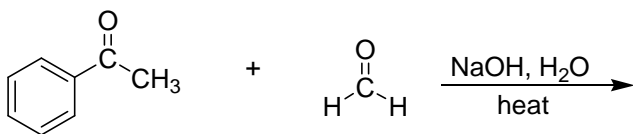


2. Give the major organic product for the following reactions:

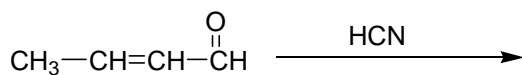
(a) Aldol condensation



(b) crossed Aldol condensation



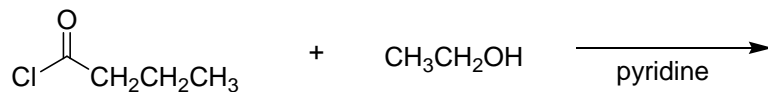
(c)



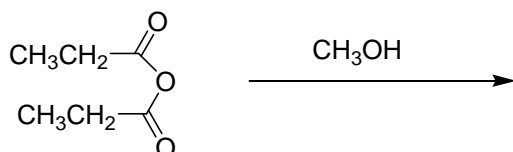
In putting my name on this quiz and turning it in I am certifying that it is **my work alone** and that I have neither given nor received help from anyone or anything.

1. Give the major organic product for the following reactions:

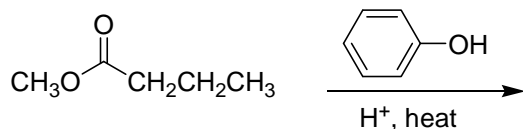
(a)



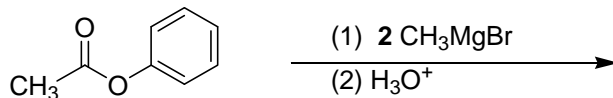
(b)



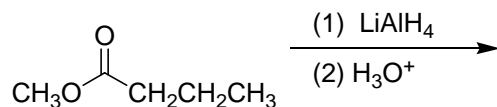
(c)



(d)



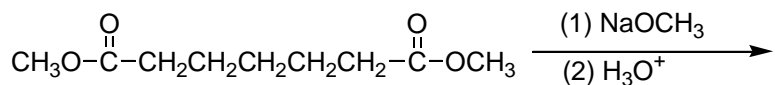
(e)



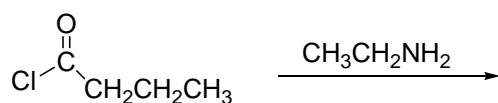
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1. Give the major organic product for the following reactions:

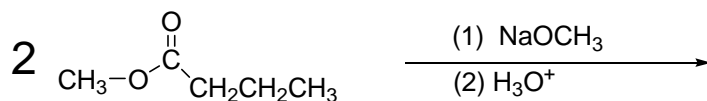
(a) Dieckmann cyclization



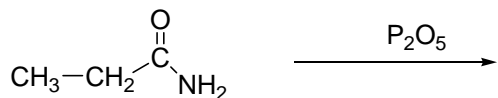
(b)



(c)

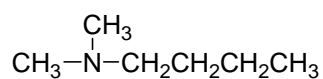


(d)

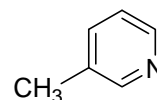


2. Name the following compounds (you may use common names or IUPAC):

(a)



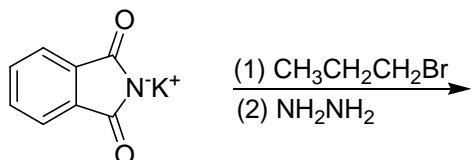
(b)



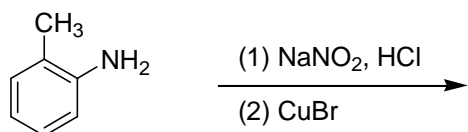
In putting my name on this quiz and turning it in I am certifying that it is my work alone and that I have neither given nor received help from anyone or anything.

Give the major organic product for the following reactions:

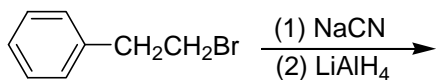
(a) Gabriel Reaction



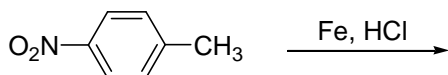
(b)



(c)



(d)



(e)

