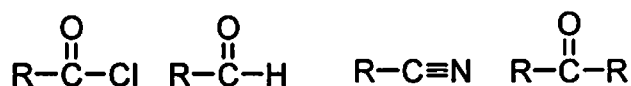


NAME: \_\_\_\_\_

If you do **not** wish to have your script placed outside my office, then please check this box \_\_\_

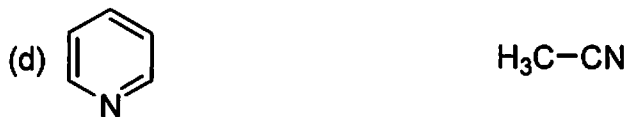
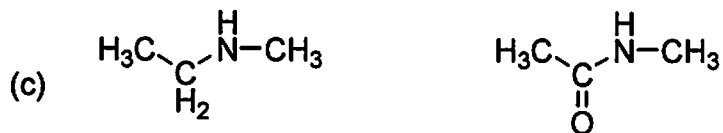
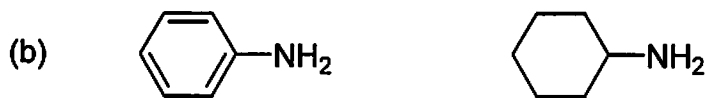
1) Name the general class of organic molecules that each of these molecules belong to, and circle the most reactive molecule with respect to undergoing nucleophilic attack. (7pts)



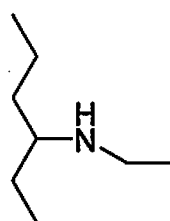
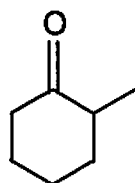
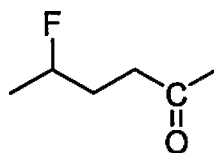
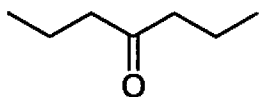
2) Name the general class of organic molecules that **each** of these molecules belong to, and draw the Lewis structure including lone pairs *for two of* the following molecules. (10.5pts)



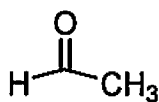
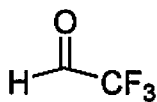
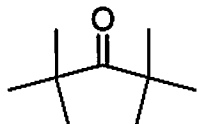
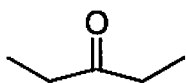
3) Circle the stronger base in the following pairs, and in a sentence explain your choice. (10pts)



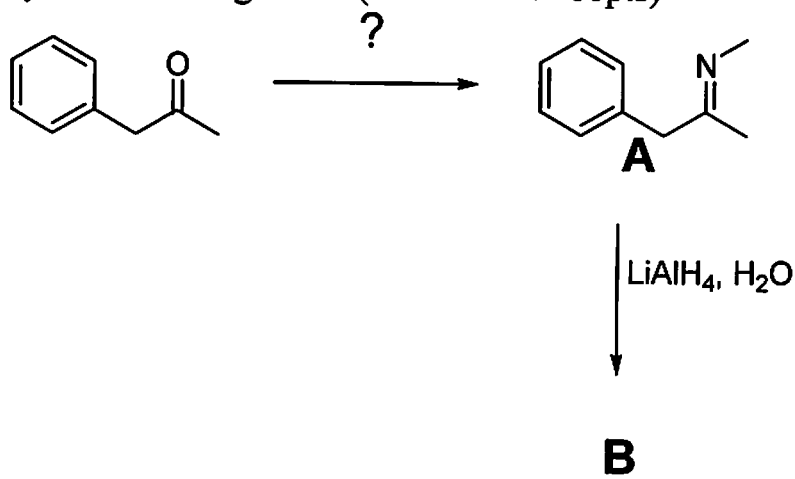
4) Name the following compounds in IUPAC acceptable terms. (12pts)



5) Explain why in both pairs, the left hand molecule is more reactive toward nucleophilic attack. (10pts)

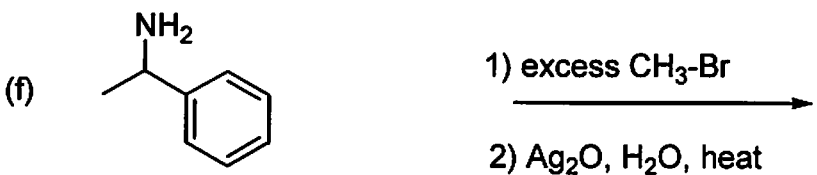
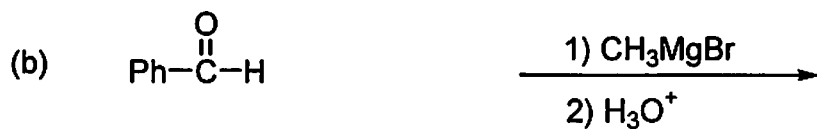


6) In an attempt to supplement his income, a young chemistry professor decided to synthesize compound **B**, commonly known as *methamphetamine* by the following route. (2+3+3+3+7=18pts)

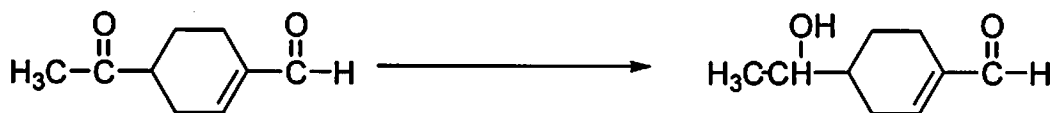
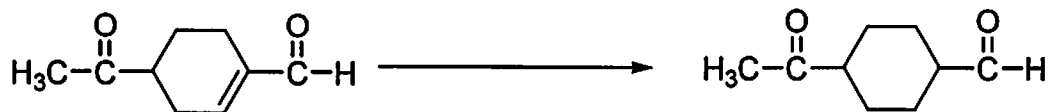
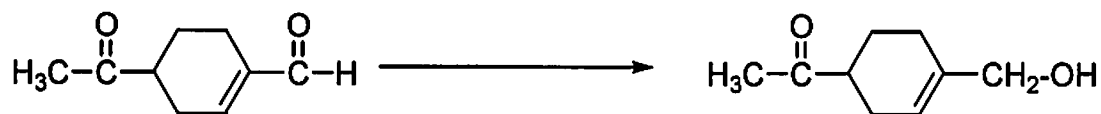


- (i) what class of organic compound is **A**?
- (ii) what reagents are needed to convert the starting material into **A**?
- (iii) draw the structure of compound **B**.
- (iv) what other reagent(s) could accomplish the transformation **A** to **B**?
- (v) Draw the mechanism for the transformation of the starting material into **A**.

7) Give the products formed in **five** of the following reactions. (15pts)



8) Give reagents for the following reductions, bearing in mind the incompatibility of some of the functional groups. (9pts)



9) Write the mechanism for the **base** catalyzed hydration of cyclohexanone (8.5pts)

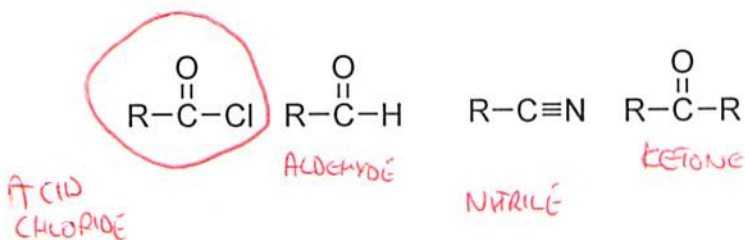
**\*Bonus question\* (up to 3pts)**

The Curtius rearrangement involves the reaction of an acid chloride with an azide anion, to eventually generate an amine. Mechanistically it is identical to the Hoffman rearrangement. Thus, draw the arrows for the key step, which is the rearrangement of the acyl azide into the isocyanate.

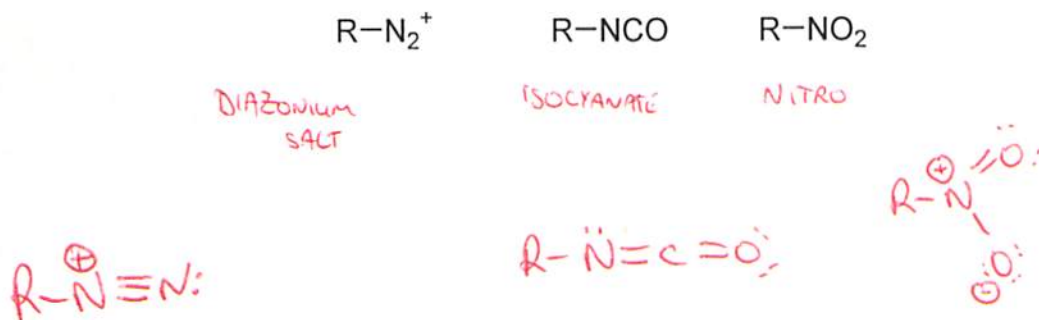


NAME: DA SILVA MIRRAIf you do **not** wish to have your script placed outside my office, then please check this box 

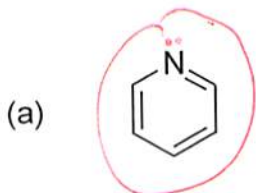
1) Name the general class of organic molecules that each of these molecules belong to, and circle the most reactive molecule with respect to undergoing nucleophilic attack. (7pts)



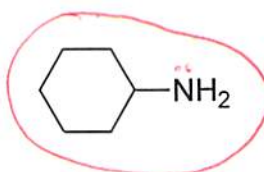
2) Name the general class of organic molecules that **each** of these molecules belong to, and draw the Lewis structure including lone pairs **for two of** the following molecules. (10.5pts)



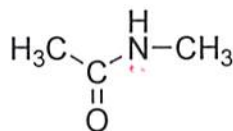
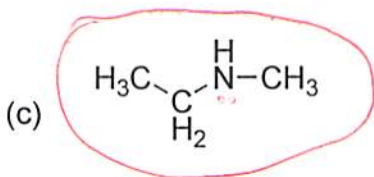
3) Circle the stronger base in the following pairs, and in a sentence explain your choice. (10pts)



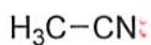
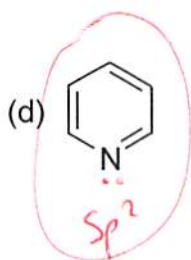
Pyridine's l.p. is involved in the aromatic sextet of  $\pi$  e<sup>-</sup>s,  $\therefore$  less available for protonation



Aniline's l.p. is delocalized around the ring,  $\therefore$  less available for protonation.

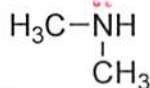
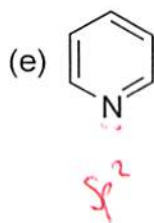


The amide's l.p. is delocalized onto the oxygen  $\therefore$  less available for protonation



$sp$

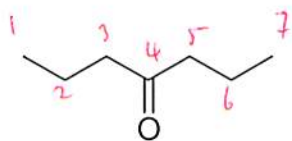
The nitrile lone pair is in a higher % s orbital,  $\therefore$  less available for protonation



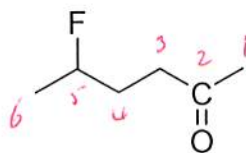
$sp^3$

The pyridine l.p. is in a higher % s orbital,  $\therefore$  less available for protonation.

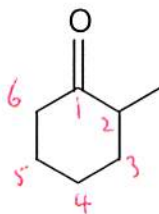
4) Name the following compounds in IUPAC acceptable terms. (12pts)



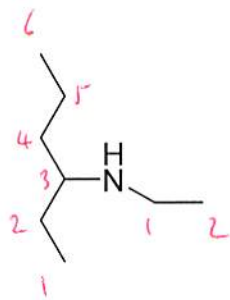
Heptan-4-one



5-Fluorohexan-2-one

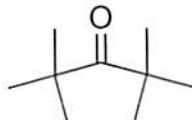
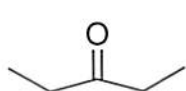


2-methylcyclohexanone

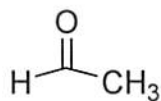
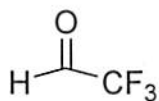


N-Ethylhexan-3-amine

5) Explain why in both pairs, the left hand molecule is more reactive toward nucleophilic attack. (10pts)

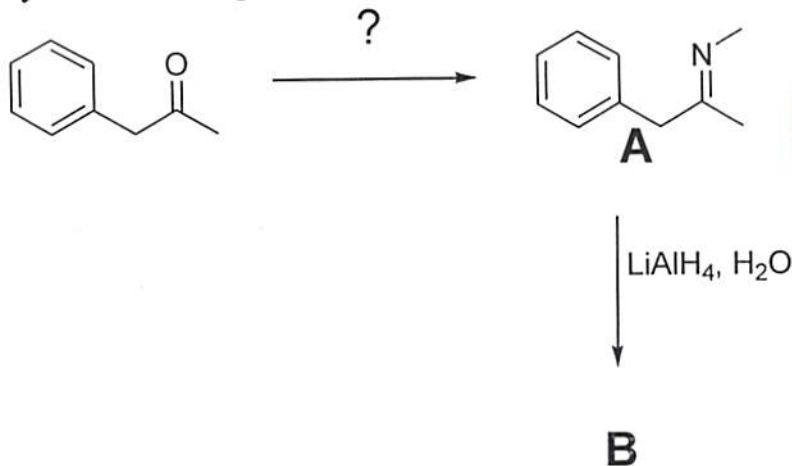


Less sterically crowded  
∴ easier for nucleophile  
to attack.



Electronically, the carbonyl  
carbon is more positively  
charged (since CF<sub>3</sub> is electron  
withdrawing) and therefore the nucleophile  
is more strongly attracted.

6) In an attempt to supplement his income, a young chemistry professor decided to synthesize compound **B**, commonly known as *methamphetamine* by the following route. (2+3+3+3+7=18pts)

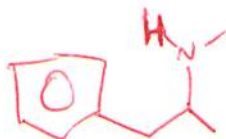


Q19.58  
in Wade  
p907

- (i) what class of organic compound is A? IMINE
- (ii) what reagents are needed to convert the starting material into A?



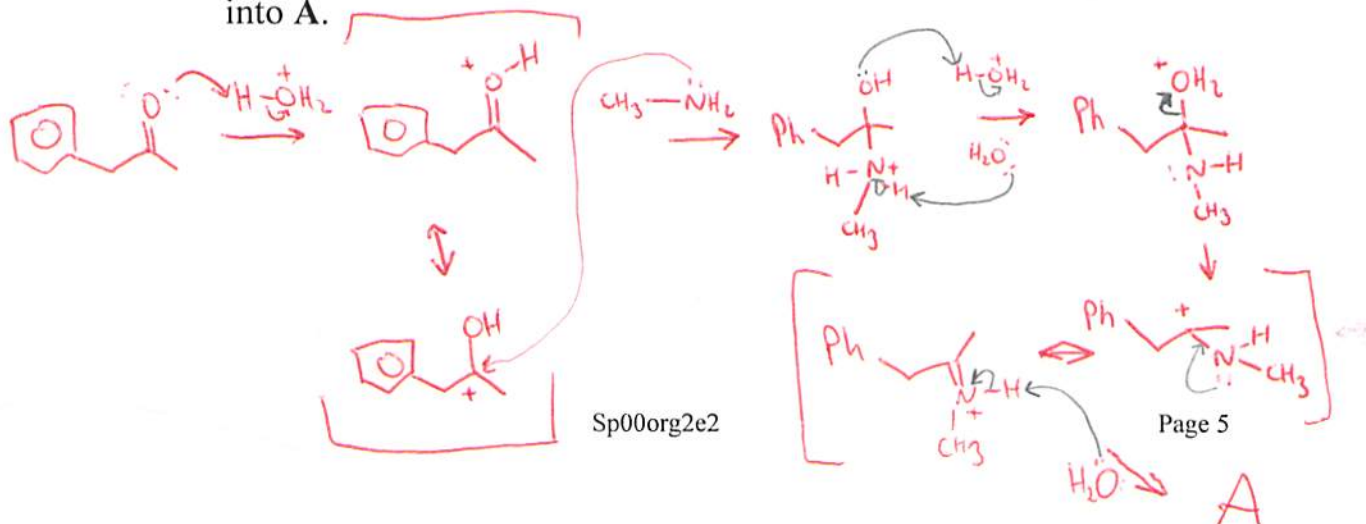
- (iii) draw the structure of compound **B**.



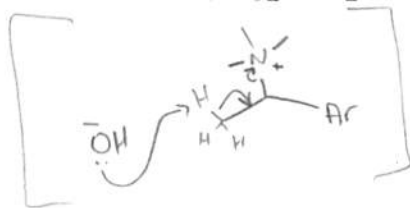
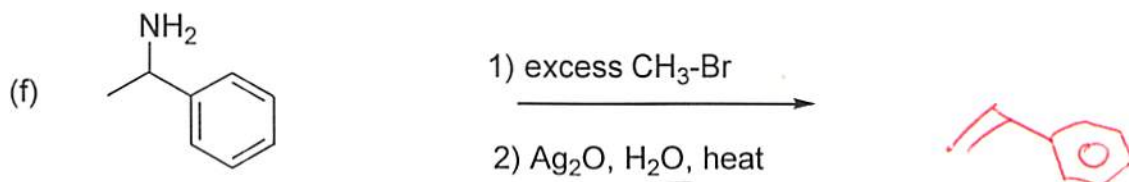
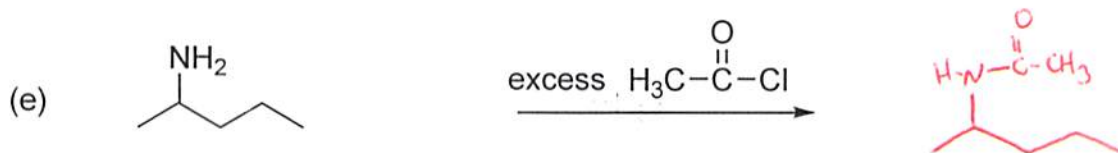
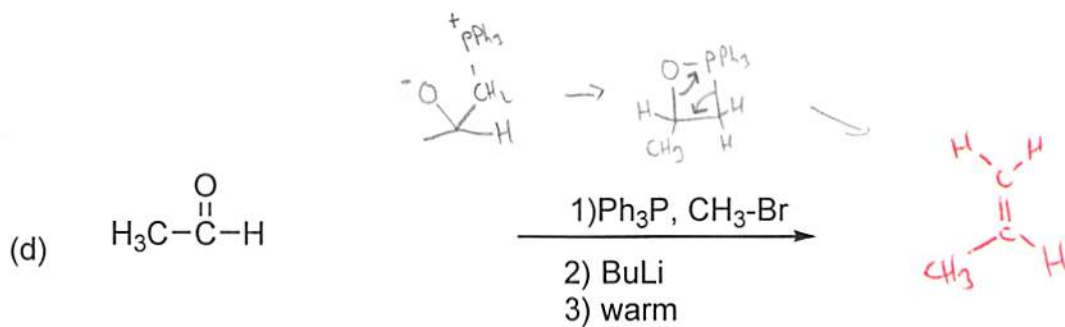
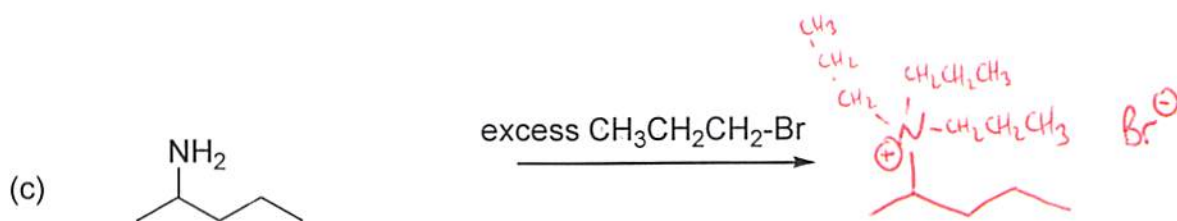
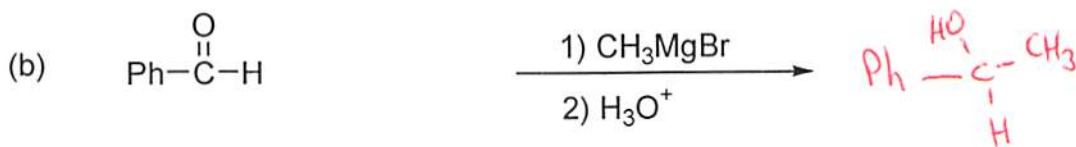
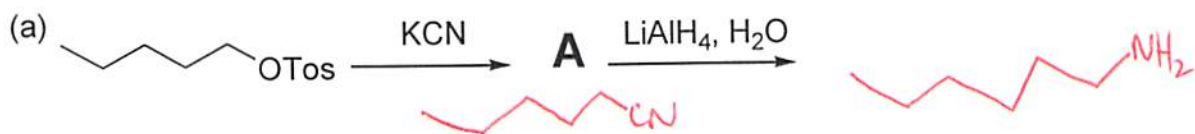
- (iv) what other reagent(s) could accomplish the transformation **A** to **B**?



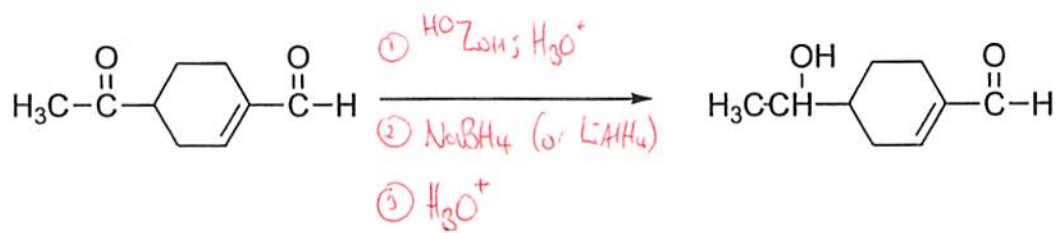
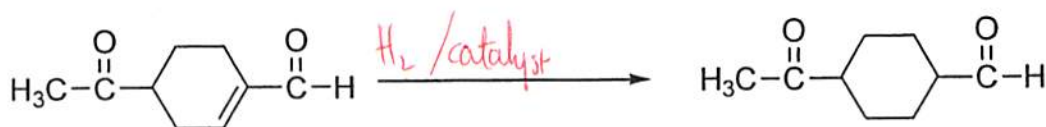
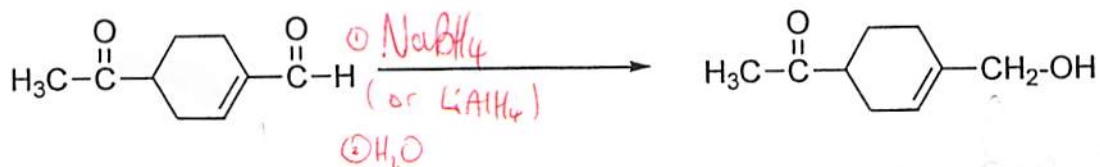
- (v) Draw the mechanism for the transformation of the starting material into **A**.



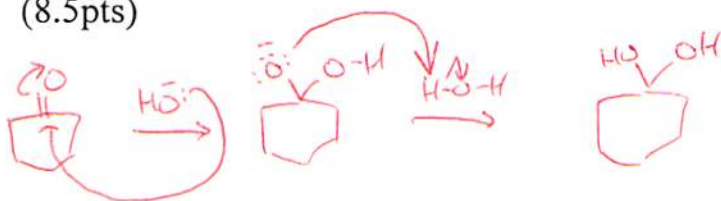
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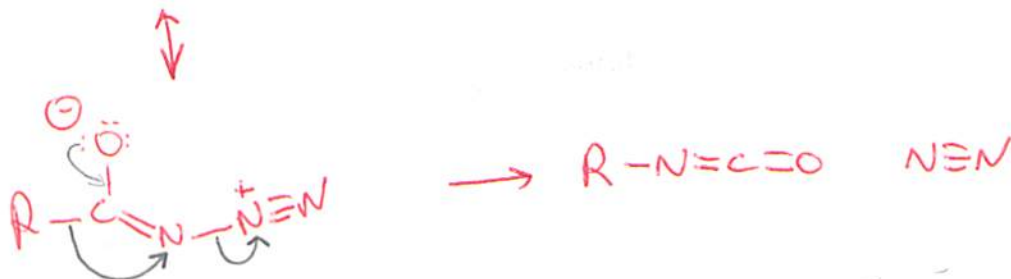


9) Write the mechanism for the **base** catalyzed hydration of cyclohexanone (8.5pts)



**\*Bonus question\* (up to 3pts)**

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Just like  
Hoffman

