

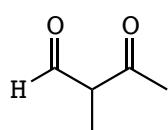
CHM 234, Spring 2018
QUIZ #11 ANSWER KEY

(hit the RETURN Button to return to the Main Quiz Page)

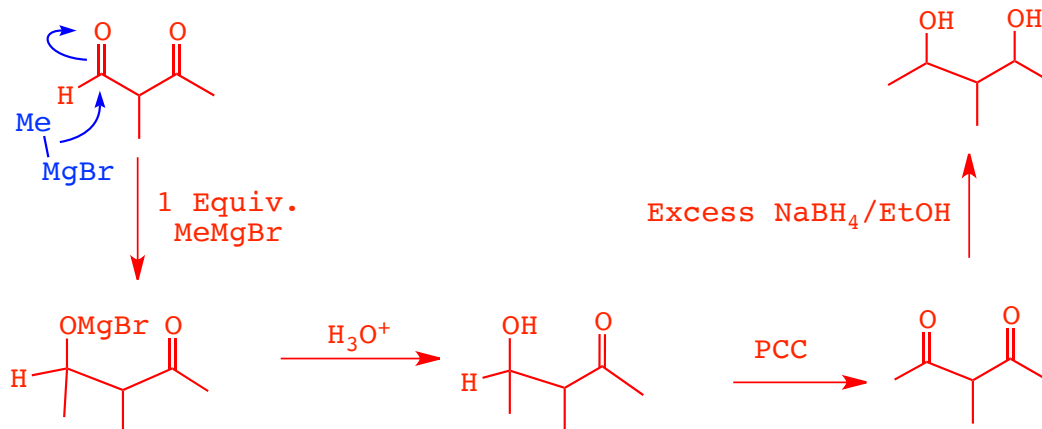
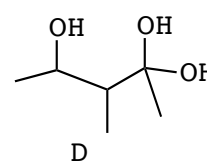
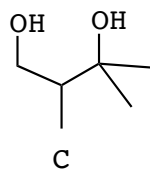
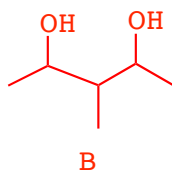
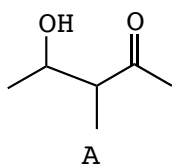
QUESTION 1

MC33g

Which best describes the product of the following reaction sequence?



1. 1 Equiv. MeMgBr
2. H₃O⁺
3. PCC
4. Excess NaBH₄/EtOH

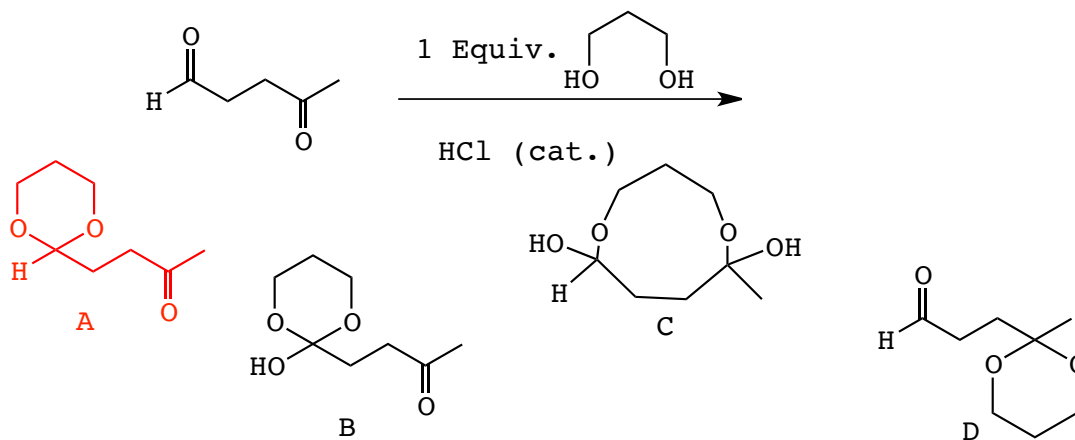


remember, all Grignard reactions have to be performed in the absence of any water or other source of protons

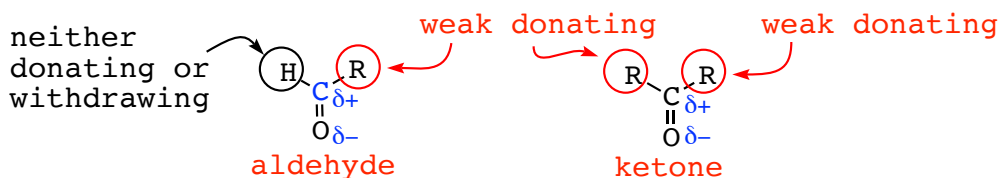
QUESTION 2

MC331

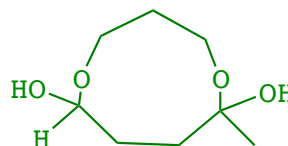
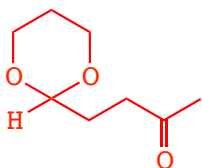
Give the best product for the following reaction



the 1 equivalent of the diol must "choose" between the aldehyde and the ketone. aldehydes are more reactive than ketones, ketones have two weak donating alkyl groups to stabilize the partial positive charge on the carbon of the C=O bond, aldehydes only have one

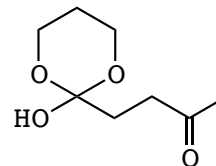


addition of the diol to the aldehyde yields the cyclic acetal



this is a "cute" idea, adding the -OH at one end of the diol to the aldehyde and the other -OH to the ketone, but with two hemiacetals, it can hardly be described as the "best" product

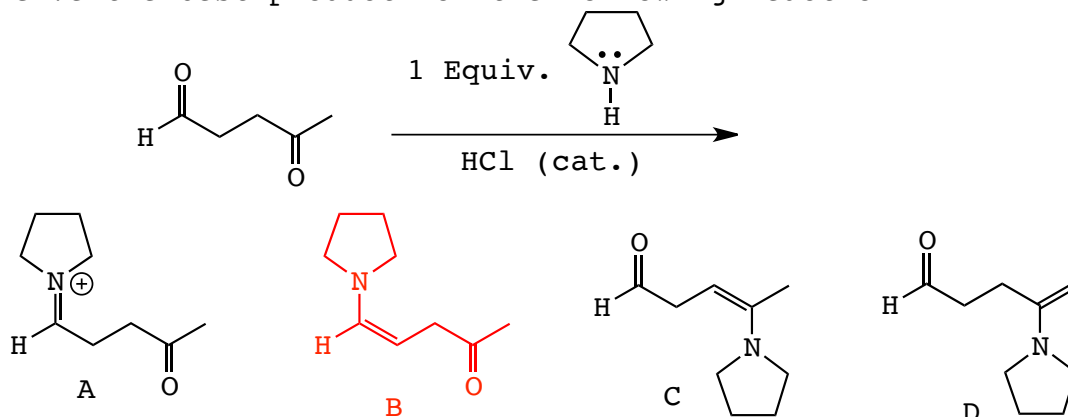
if both oxygens of the diol add to the carbonyl carbon, then the original oxygen must be lost, this is impossible



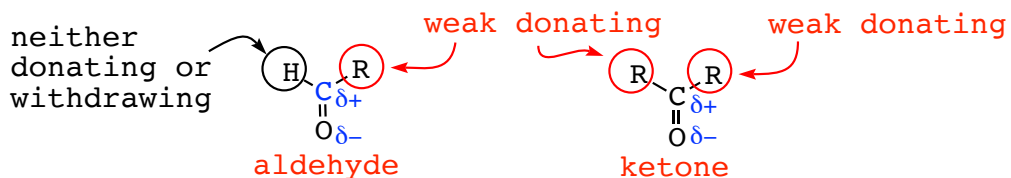
QUESTION 3

MC33m

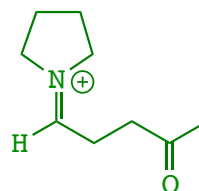
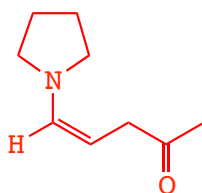
Give the best product for the following reaction



the 1 equivalent of the 2° amine must "choose" between the aldehyde and the ketone. aldehydes are more reactive than ketones, ketones have two weak donating alkyl groups to stabilize the partial positive charge on the carbon of the C=O bond, aldehydes only have one

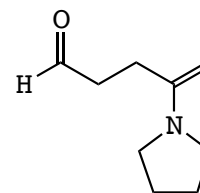
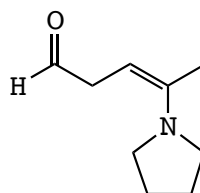


addition of a 2° amine to a C=O bond forms an ENAMINE



this is the initial nucleophilic addition product, which normally deprotonates to form the enamine, although formed, it can't be described as the "best" product

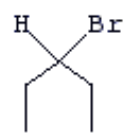
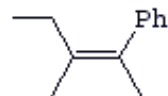
neither of the 2 possible enamines for the ketone will be formed, since the aldehyde is more reactive



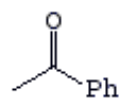
QUESTION 4

MC33o

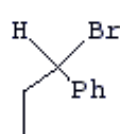
The Wittig reaction starts with an alkyl halide and a carbonyl compound and ends with an alkene. Which are the BEST alkyl halide and carbonyl compounds to use in a Wittig synthesis of the alkene below



+



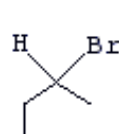
A



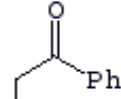
+



B



+



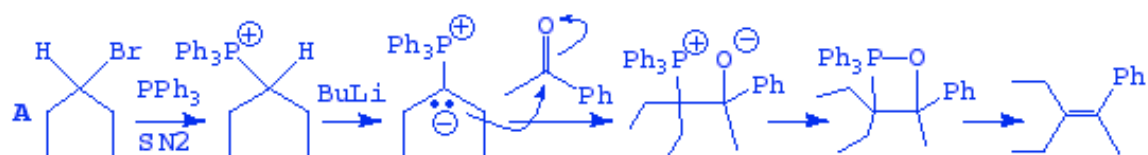
C



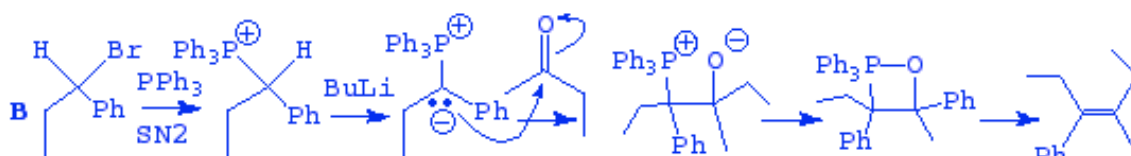
+



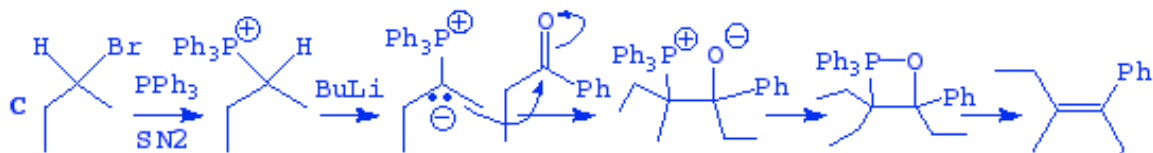
D



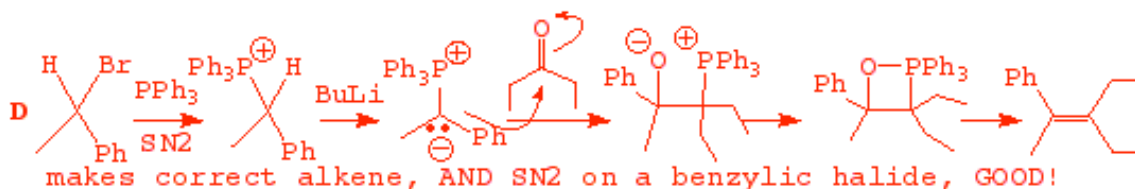
makes correct alkene, but needs SN2 on a 2° halide at the start



makes incorrect alkene



makes incorrect alkene AND Sn2 on 2° halide (poor reaction)



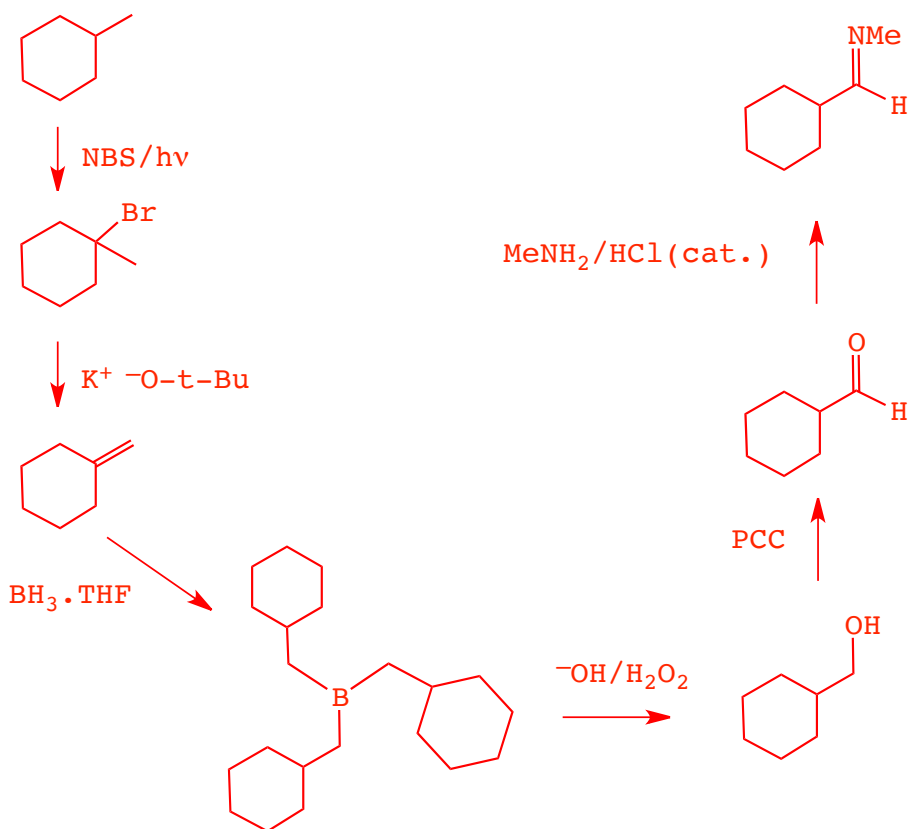
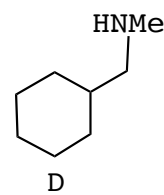
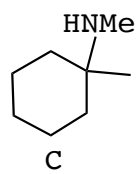
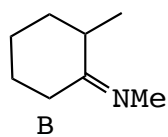
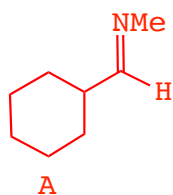
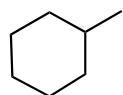
makes correct alkene, AND SN2 on a benzylic halide, GOOD!

QUESTION 5

MC33s

Give the product of the following reaction sequence

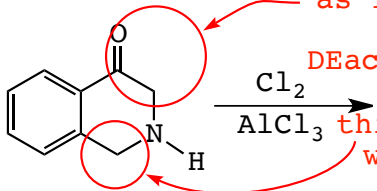
1. NBS/hv
2. $K^+ -O-t-Bu$
3. $BH_3 \cdot THF$
4. $-OH/H_2O_2$
5. PCC
6. $MeNH_2/HCl(cat.)$

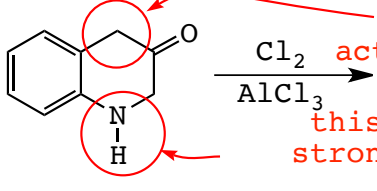


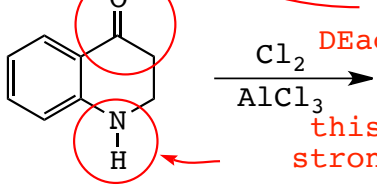
QUESTION 6

MC32k

For the following reactions indicated as 1, 2 and 3, which is the correct order of INCREASING rate of electrophilic aromatic substitution?

1 

2 

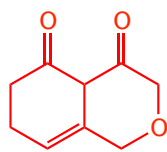
3 

A 1 (slowest) < 2 < 3 (fastest)
B 2 (slowest) < 3 < 1 (fastest)
C 1 (slowest) < 3 < 2 (fastest)
D 3 (slowest) < 2 < 1 (fastest)

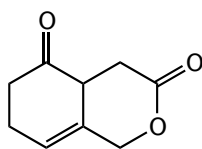
QUESTION 7

MC34f

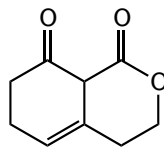
Which is the STRONGEST BRONSTED acid among the following?
This is a long question! FRST, find the most acidic proton in each structure and then compare them. The most acidic proton will always be an enolizable proton



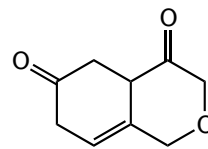
A



B

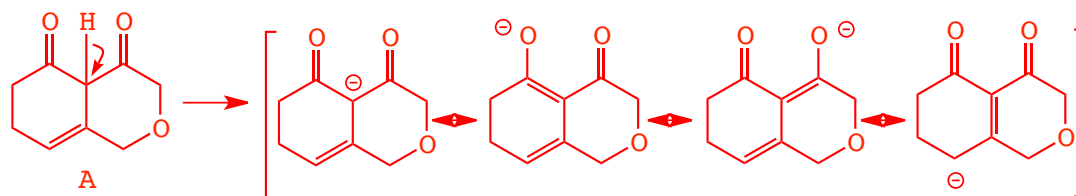


C

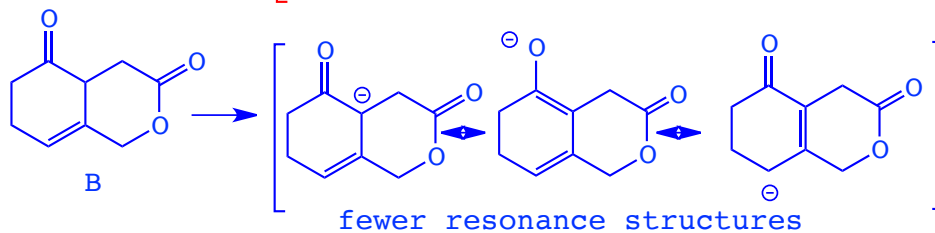


D

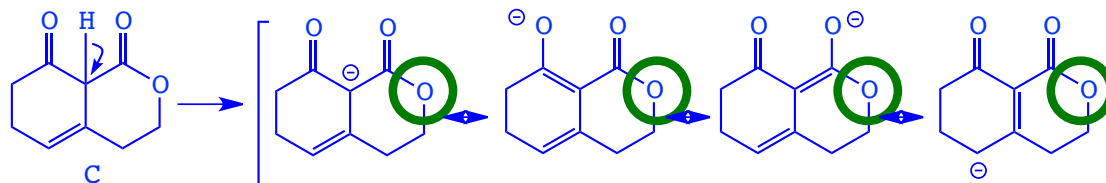
the strongest Bronsted acid has the weakest conjugate Bronsted base, i.e. the most stable anion, in this case the most resonance stabilized anion that is NOT also destabilized by a donating group on the conjugated anion π -system



A

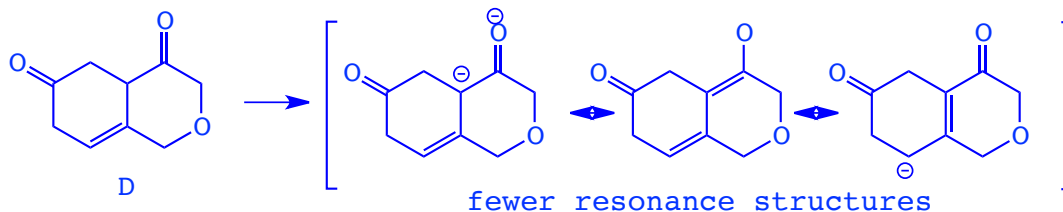


B



C

same # and kind of resonance contributors as A, BUT, the -OR donating group destabilizes the negative charge

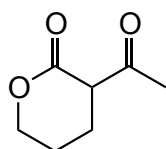


D

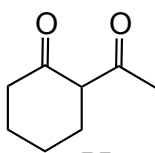
QUESTION 8

MC34u

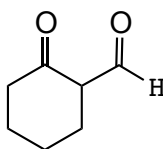
Rank the following in order of INCREASING Bronsted Acidity



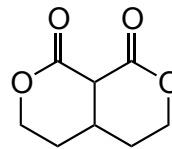
I



II



III



IV

A I < II < IV < III

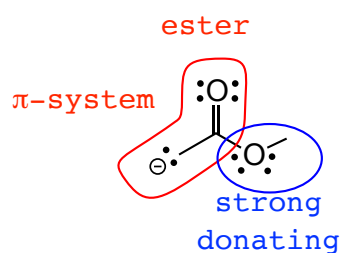
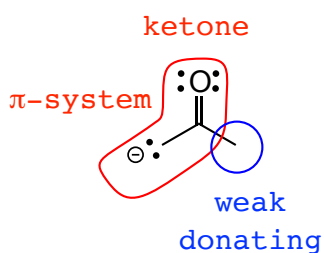
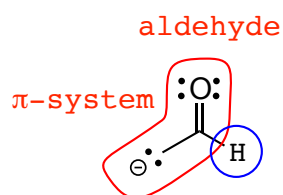
B I < II < III < IV

C III < II < I < IV

D IV < I < II < III

for enolizable hydrogen atoms

aldehydes are more acidic than.... ketones which are more acidic than esters



donating groups destabilize the enolate anion, the stronger the donating group the more the destabilization

