



# CHE 322 Organic Chemistry II

Exam 2 Form 1

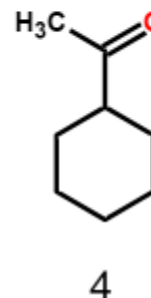
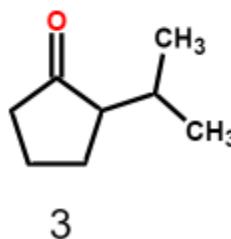
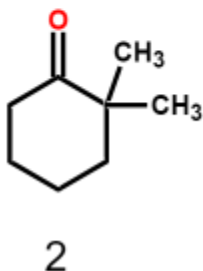
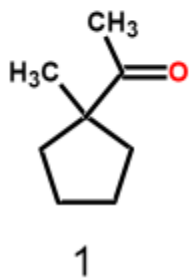
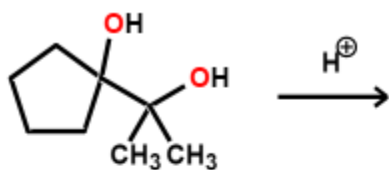
Thursday March 24, 2022

8:15 PM – 9:35 PM

1. Write your nine digit University ID number in the nine boxes provided and then bubble in each of the nine digits.
2. Print your name and sign your answer form using the spaces provided.
3. Questions 1 to 10 are multiple choice questions worth 5 points. Bubble your answers on the answer form. Questions 11-17 are short answer questions with points as indicated. Write out your answers in the indicated place on the answer form.

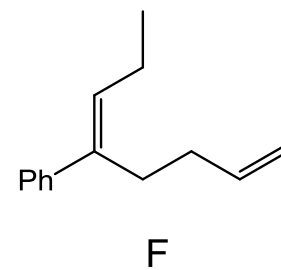
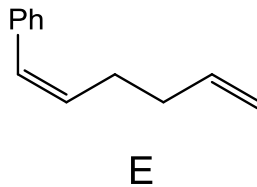
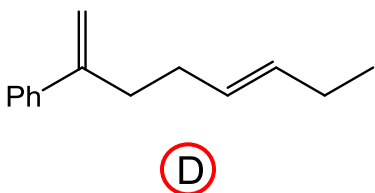
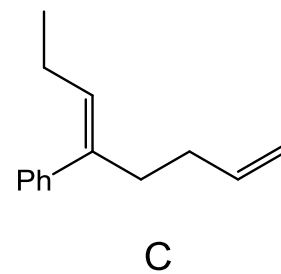
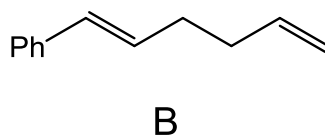
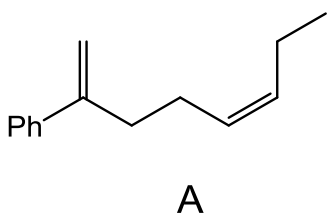
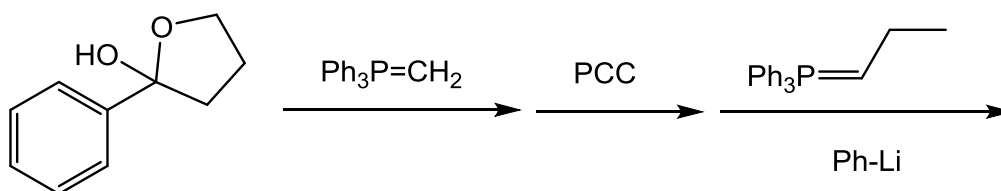
		Group																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period	1	H																	He
	2	Li	Be											B	C	N	O	F	Ne
	3	Na	Mg											Al	Si	P	S	Cl	Ar
	4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
	6	Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	7	Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og

1. The pinacol rearrangement shown below gives two products. Choose the two products.

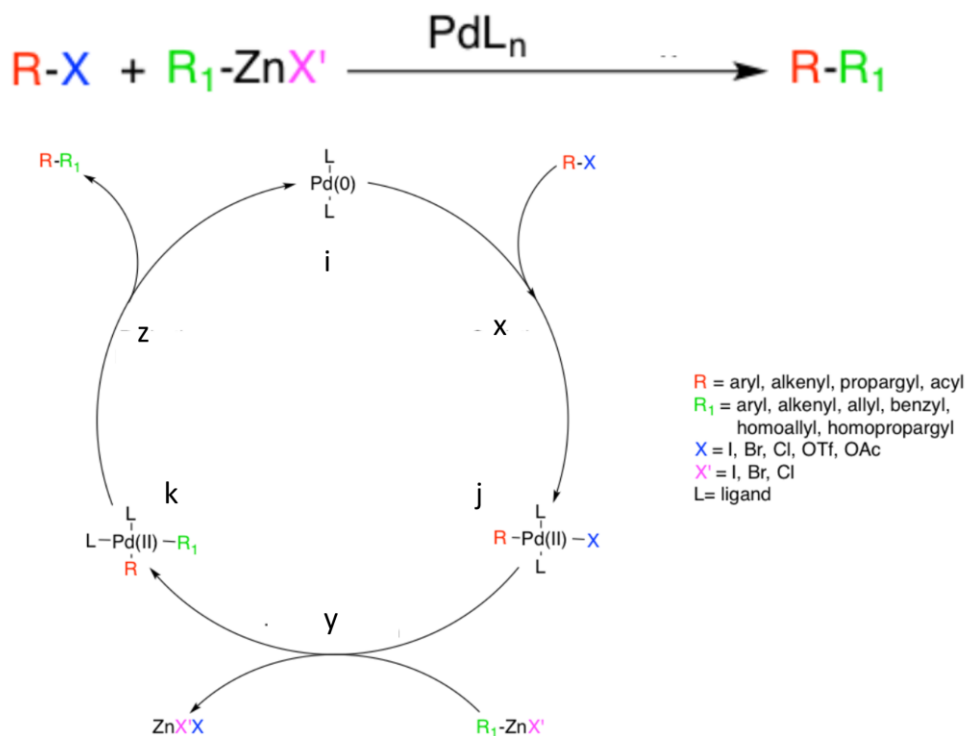


- A. 1 and 2    B. 1 and 3    C. 1 and 4    D. 2 and 3    E. 2 and 4    F. 3 and 4

2. Choose the expected major product of the following reaction sequence.



The Negishi coupling is a widely employed transition metal catalyzed cross-coupling reaction. The reaction couples organic halides or triflates with organozinc compounds, forming carbon-carbon bonds (C-C) in the process. A palladium (0) species is generally utilized as the metal catalyst. Use the catalytic cycle shown below to answer the next two questions.



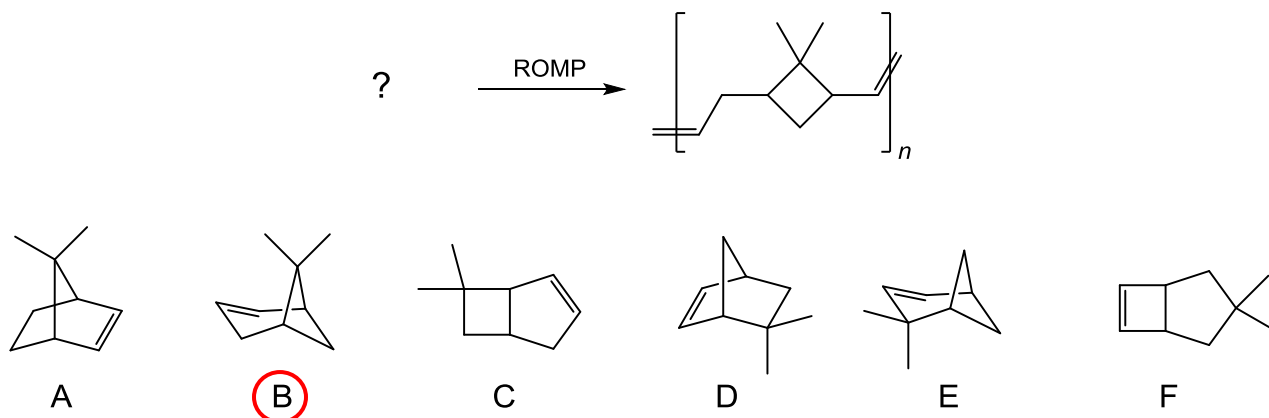
3. Which of the following choices has Pd electron counts correct?

Choice	i	j	k
A	16	18	16
B	14	18	16
<b>C</b>	14	16	16
D	16	18	18
E	12	14	14
F	16	14	14

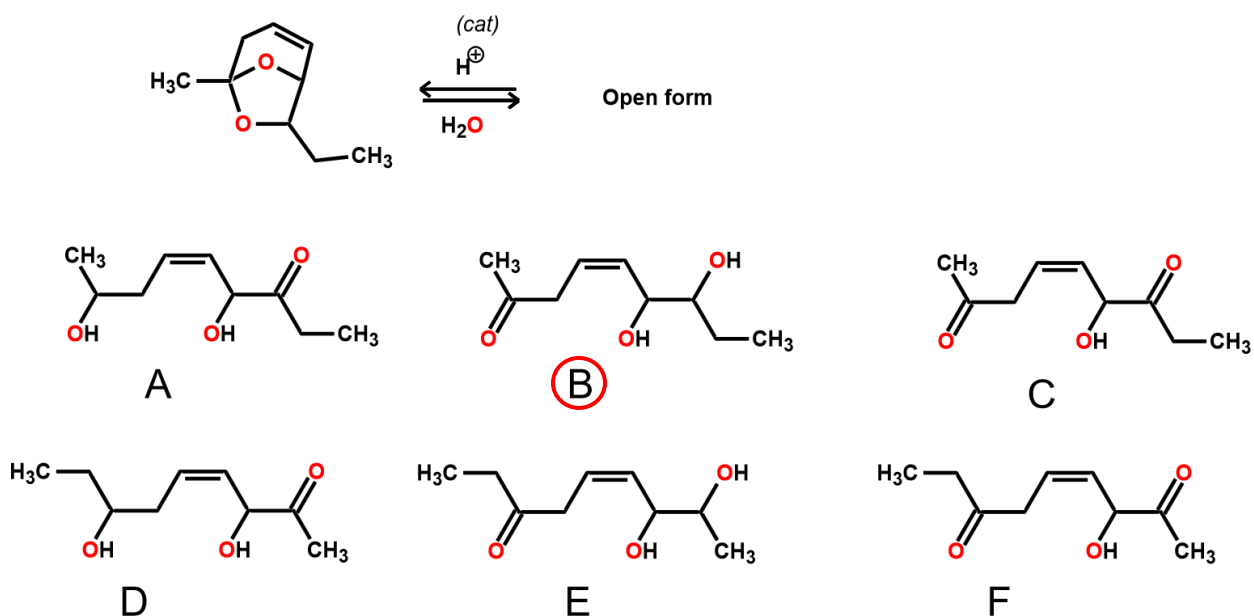
4. Which of the following choices has the reaction types labeled correctly?

Choice	x	y	z
A	Ligand association	Trans-metallation	Ligand diassociation
B	Oxidative addition	Trans-metallation	Ligand deinsertion
C	Oxidative addition	Ligand insertion	Reductive elimination
D	Ligand association	Ligand insertion	Reductive elimination
E	Ligand association	Trans-metallation	Ligand deinsertion
<b>F</b>	Oxidative addition	Trans-metallation	Reductive elimination

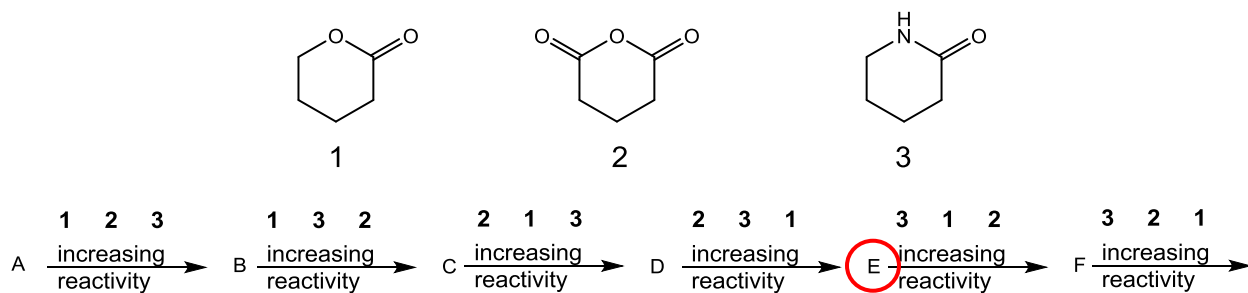
5. Which alkene would give the following polymer from a ring opening metathesis polymerization?



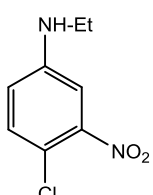
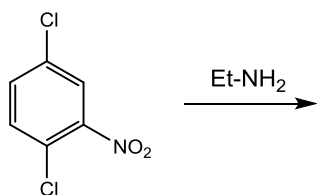
6. The acetal shown below is a mouse pheromone. Choose the structure of its open form.



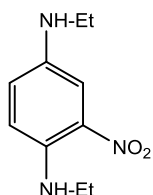
7. Choose the order that has the following carboxylic acid derivatives correctly arranged with respect to increasing reactivity with a nucleophile.



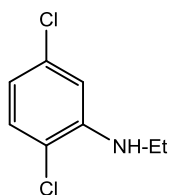
8. Select the expected major product of the following reaction.



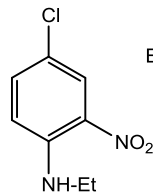
A



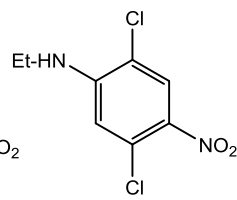
B



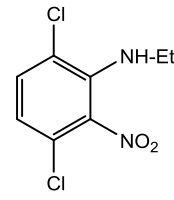
C



D

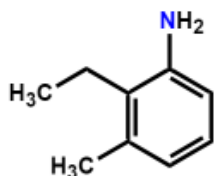
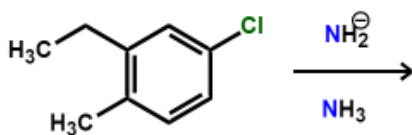


E

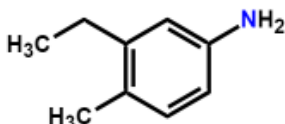


F

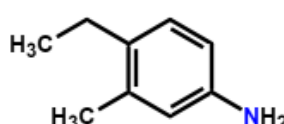
9. Predict the products of the following reaction.



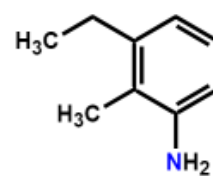
1



2



3



4

A. 1 + 2

B. 1 + 3

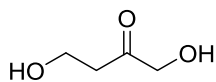
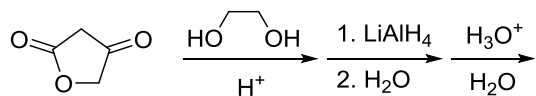
C. 1 + 2 + 3

D. 2 + 3

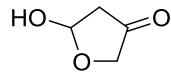
E. 2 + 3 + 4

F. 3 + 4

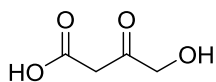
10. Select the major product of the following reaction sequence.



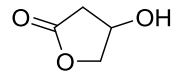
A



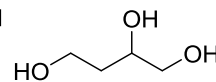
B



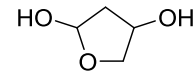
C



D

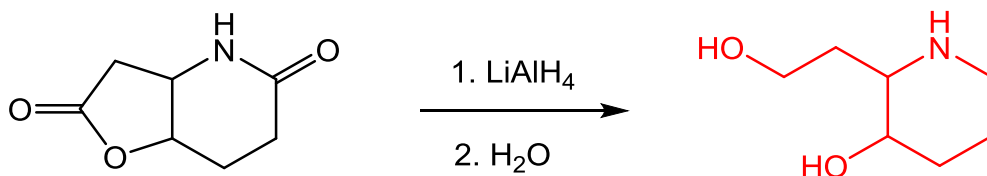


E

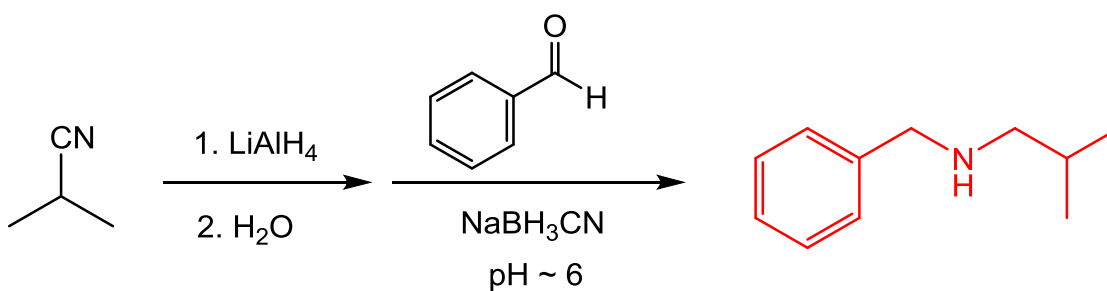


F

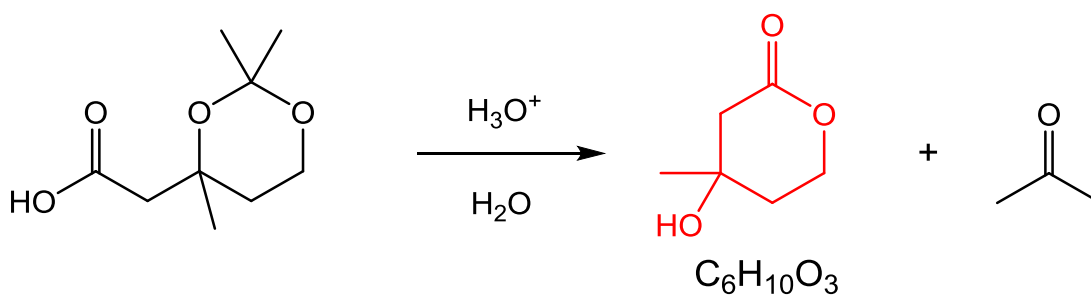
11. Draw the major product of the following reaction. (5 points)



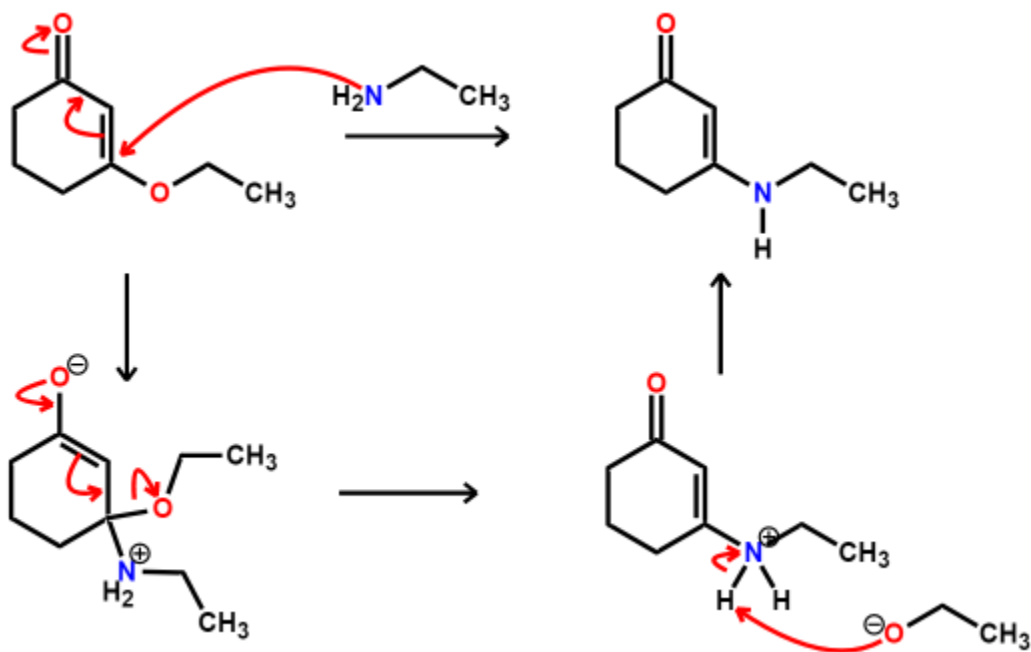
12. Draw the major product of the following reaction sequence. (5 points)



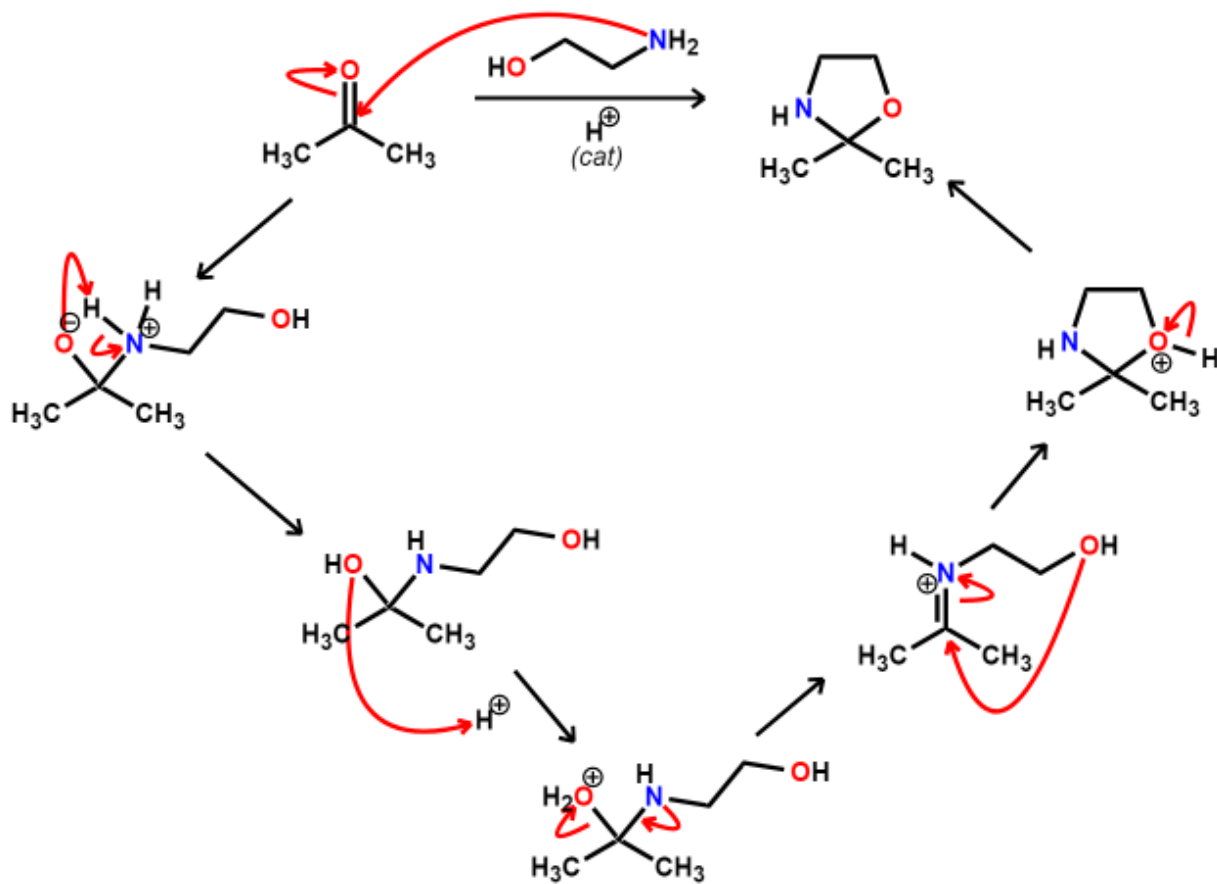
13. The following reaction involves hydrolysis of an acetal, followed by an intramolecular Fischer esterification to produce a six-membered lactone. The byproduct of this reaction is acetone, as shown below. Draw the structure of the product. (5 points)



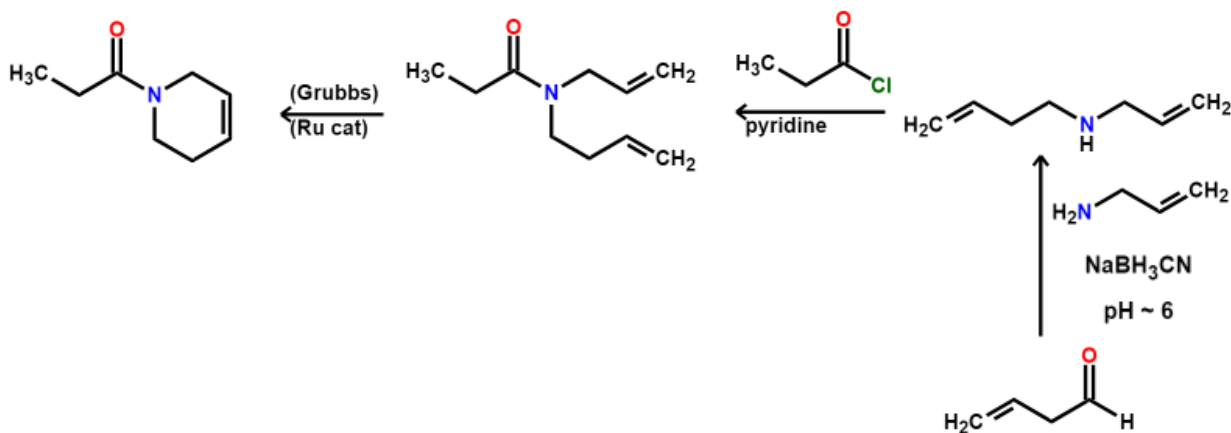
14. Draw a curved arrow mechanism for the following substitution reaction. Be sure to include all important intermediates. (5 points)



15. Draw a curved arrow mechanism for the reaction shown below. The reaction takes place in weakly acidic solution. Hint: identify the stronger nucleophile first! (10 points)



16. Propose a synthesis of the following amide using compounds containing 4 carbon atoms or less. (10 points)



17. Show how you could synthesize the compound shown below starting with two moles of phenyl acetylene as your only starting material. (10 points)

