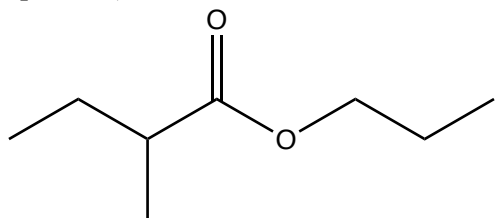


1. (6 pts. ea.) Provide IUPAC names for the following

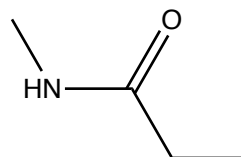
structures

1. \_\_\_\_\_

a.



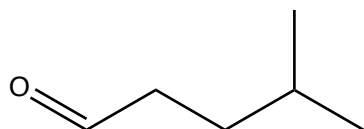
b.



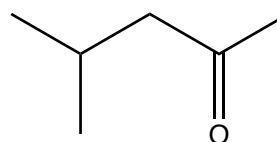
2. \_\_\_\_\_

3. \_\_\_\_\_

c.



d.



4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

2. In general, esters are more easily hydrolyzed than amides.

(a. 10 pts.) Draw a generic reaction (just a balanced chemical equation, a mechanism is not needed) that shows the acid promoted hydrolysis of an amide.

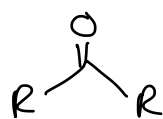
7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

(b. 6 pts) Briefly, explain why esters are more easily hydrolyzed as compared to amides.

3. (a. 10 pts.) Draw a generic aldehyde and a generic ketone. (b. 6 pts.) Explain why aldehydes and ketones don't do acyl substitution reactions.



$R \neq H$

aldehyde

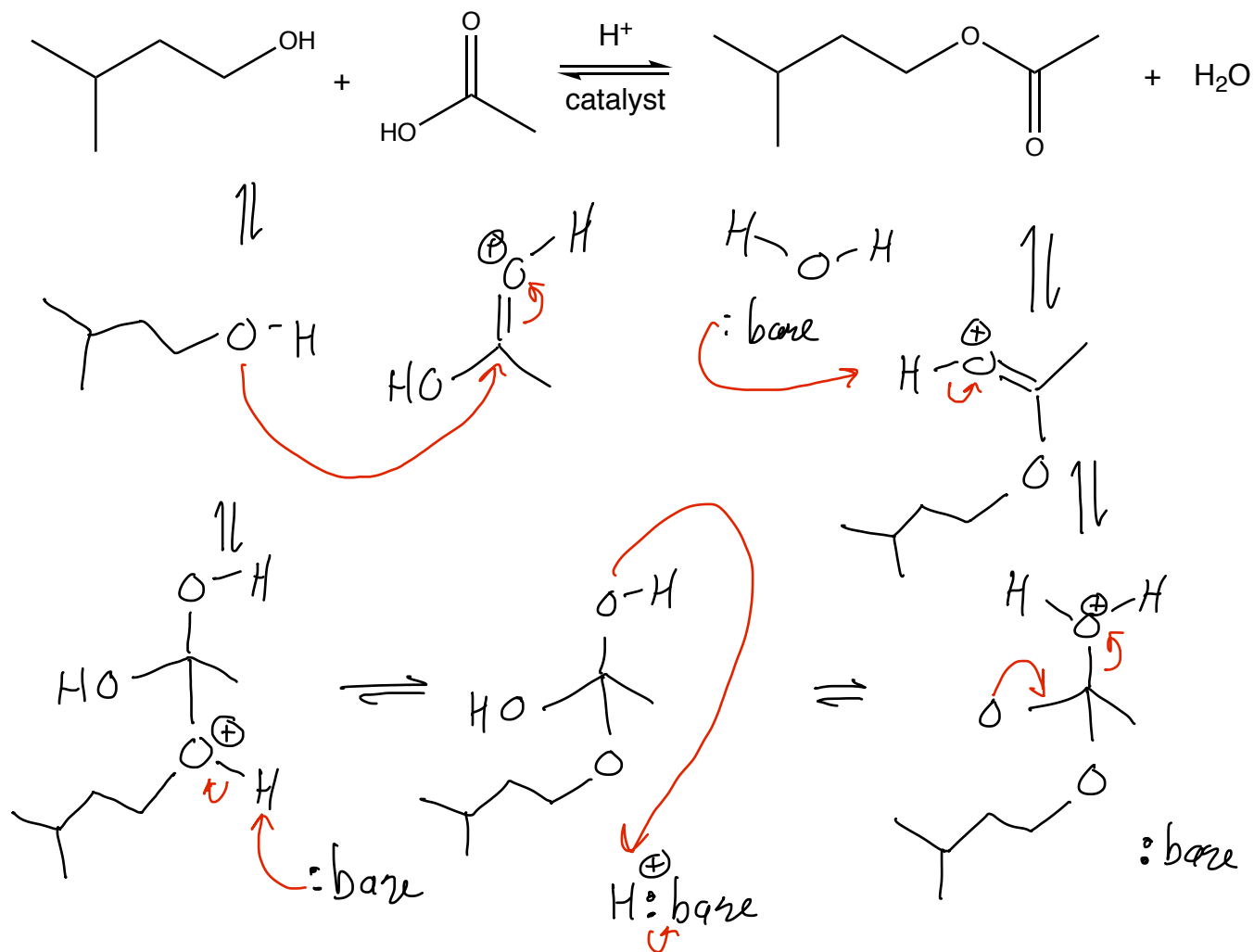
ketone

to do acyl substitution reactions  
there must be a leaving group bonded  
to the  $C=O$  C atom....

on aldehydes and ketones a  $H^{\ominus}$   
or carbanion act as the leaving group

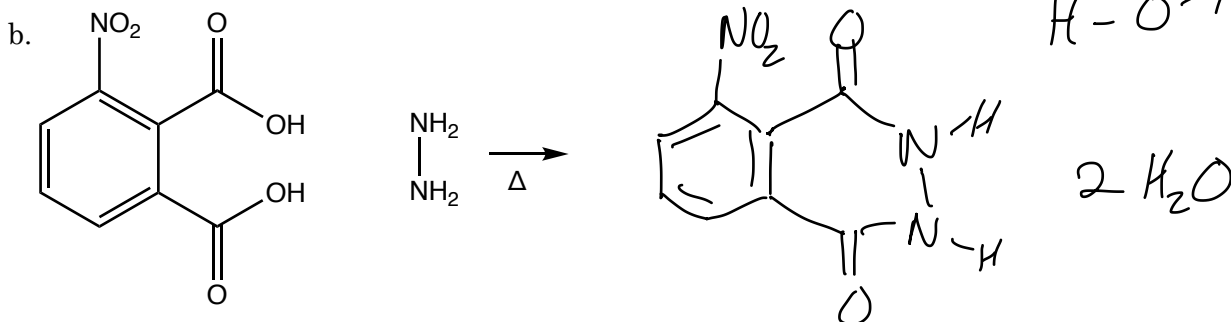
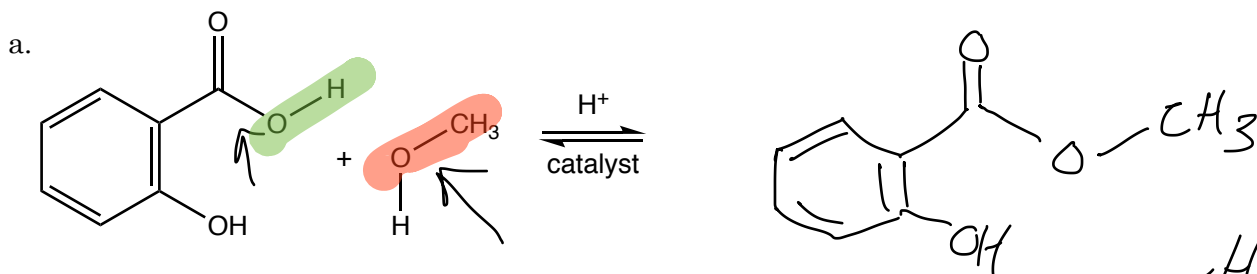
but  $H^{\ominus}$  and carbanions are too basic to act as LG's

4. (14 pts.) Draw a mechanism for the acid catalyzed esterification of acetic acid and isoamyl alcohol to form isoamyl acetate. Remember to include electron movement arrows.

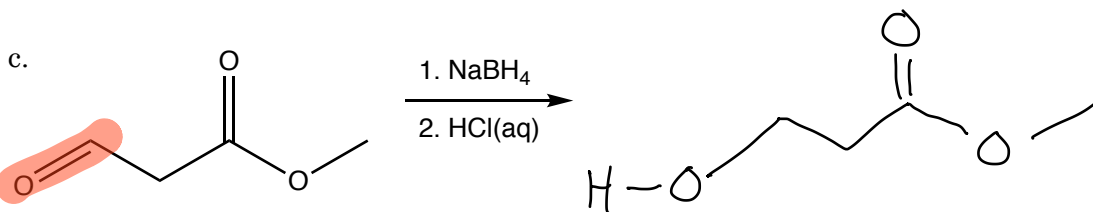
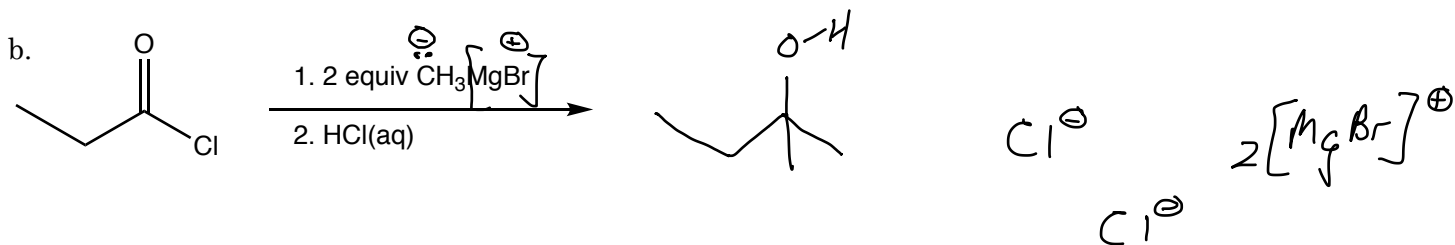
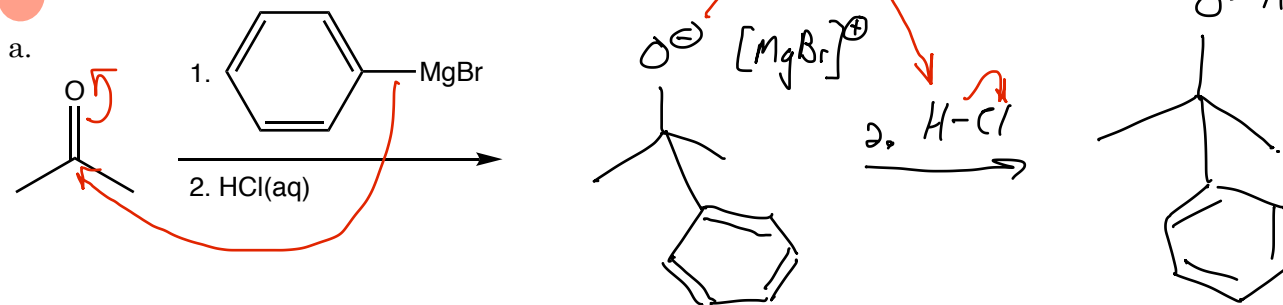


5. Esters can be hydrolyzed to a carboxylic acid and an alcohol using water and an acid catalyst (the reverse of the reaction shown in 4) or by promoting the reaction using hydroxide. The base promoted hydrolysis of an ester is not an equilibrium reaction. **(a. 6 pts.)** Draw the products of the base promoted hydrolysis of isoamyl acetate (pictured in 3) and **(b. 6 pts)** explain why the products do not reform the ester.

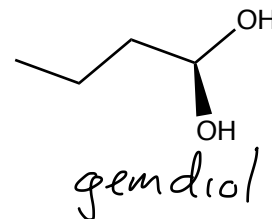
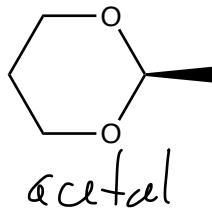
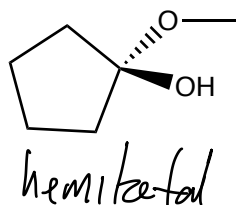
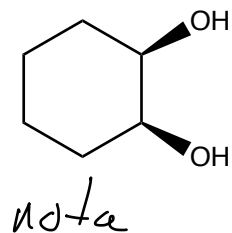
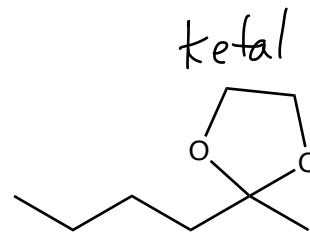
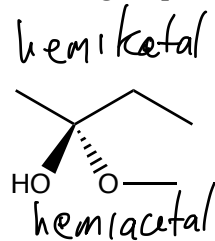
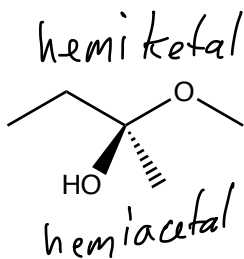
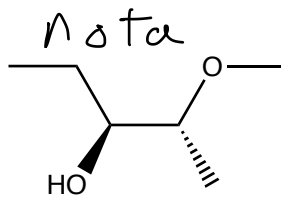
6. (18 pts.) Predict the products for the following acyl substitution reactions.



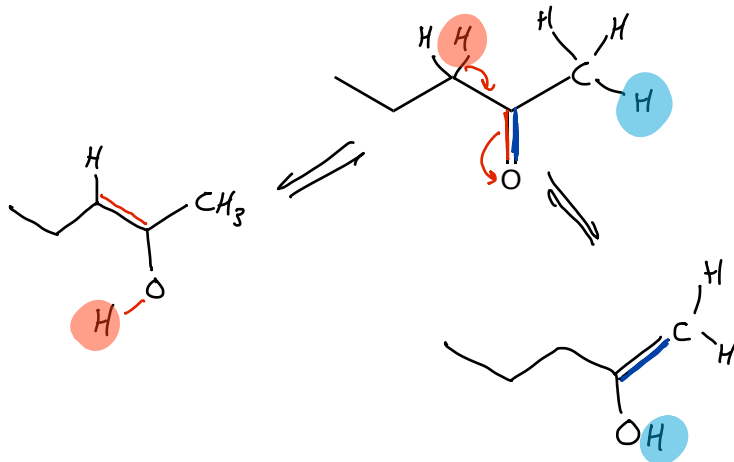
7. (18 pts.) Predict the products of the following reactions.



8. (16 pts.) Determine whether the following molecules are gem-diols, acetals, ketals, hemiacetals, hemiketals, or not one of the aforementioned functional groups.



9. (10 pts.) Draw the enol forms for the following ketone.



1	<b>H</b> 1.0079																	2	<b>He</b> 4.0026																
3	<b>Li</b> 6.941	4	<b>Be</b> 9.012																	10	<b>Ne</b> 20.1797														
11	<b>Na</b> 22.989	12	<b>Mg</b> 24.305																	18	<b>Ar</b> 39.948														
19	<b>K</b>	20	<b>Ca</b>	21	<b>Sc</b>	22	<b>Ti</b>	23	<b>V</b>	24	<b>Cr</b>	25	<b>Mn</b>	26	<b>Fe</b>	27	<b>Co</b>	28	<b>Ni</b>	29	<b>Cu</b>	30	<b>Zn</b>	31	<b>Ga</b>	32	<b>Ge</b>	33	<b>As</b>	34	<b>Se</b>	35	<b>Br</b> 79.904	36	<b>Kr</b>
37	<b>Cs</b>	38	<b>Sr</b>	39	<b>Y</b>	40	<b>Zr</b>	41	<b>Nb</b>	42	<b>Mo</b>	43	<b>Tc</b>	44	<b>Ru</b>	45	<b>Rh</b>	46	<b>Pd</b>	47	<b>Ag</b>	48	<b>Cd</b>	49	<b>In</b>	50	<b>Sn</b>	51	<b>Sb</b>	52	<b>Te</b>	53	<b>I</b>	54	<b>Xe</b>
55	<b>Rb</b>	56	<b>Ba</b>	57	<b>La</b>	72	<b>Hf</b>	73	<b>Ta</b>	74	<b>W</b>	75	<b>Re</b>	76	<b>Os</b>	77	<b>Ir</b>	78	<b>Pt</b>	79	<b>Au</b>	80	<b>Hg</b>	81	<b>Tl</b>	82	<b>Pb</b>	83	<b>Bi</b>	84	<b>Po</b>	85	<b>At</b>	86	<b>Rn</b>
87	<b>Fr</b>	88	<b>Ra</b>	89	<b>Ac</b>	104	<b>Rf</b>	105	<b>Db</b>	106	<b>Sg</b>	107	<b>Bh</b>	108	<b>Hs</b>	109	<b>Mt</b>	110		111		112		114										118	

58	<b>Ce</b>	59	<b>Pr</b>	60	<b>Nd</b>	61	<b>Pm</b>	62	<b>Sm</b>	63	<b>Eu</b>	64	<b>Gd</b>	65	<b>Tb</b>	66	<b>Dy</b>	67	<b>Ho</b>	68	<b>Er</b>	69	<b>Tm</b>	70	<b>Yb</b>	71	<b>Lu</b>
90	<b>Th</b>	91	<b>Pa</b>	92	<b>U</b>	93	<b>Np</b>	94	<b>Pu</b>	95	<b>Am</b>	96	<b>Cm</b>	97	<b>Bk</b>	98	<b>Cf</b>	99	<b>Es</b>	100	<b>Fm</b>	101	<b>Md</b>	102	<b>No</b>	103	<b>Lr</b>