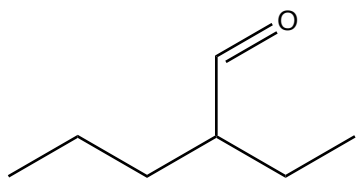


1. a. (2 pts. ea.) Identify the following compounds as aldehydes or ketones.
b. (4 pts. ea.) Provide IUPAC names for the following compounds.

1. _____

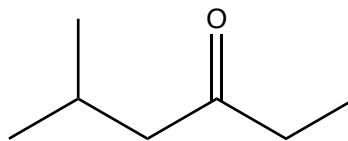
i.



a. _____

b. _____

ii.



a. _____

b. _____

2. _____

3. _____

4. _____

5. _____

2. (12 pts.) Aldehydes and ketones undergo nucleophilic addition reactions instead of nucleophilic acyl substitution reactions. Compare the potential leaving groups on aldehydes and ketones with the potential leaving group on an ester, and explain why aldehydes and ketones do not undergo nucleophilic acyl substitution.

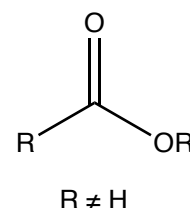
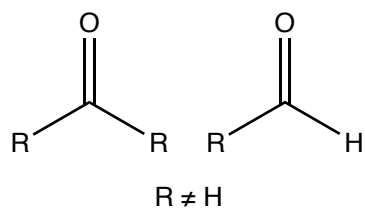
6. _____

7. _____

8. _____

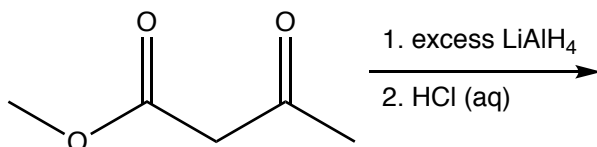
9. _____

10. _____

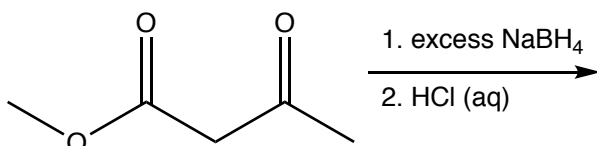


3. (6 pts. ea.) Predict the organic products for the following reaction sequences.

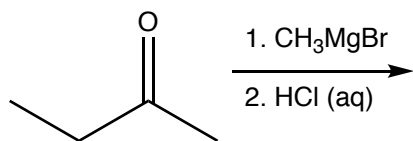
a.



b.



4. (6 pts.) Predict the organic product for the following reaction sequence.

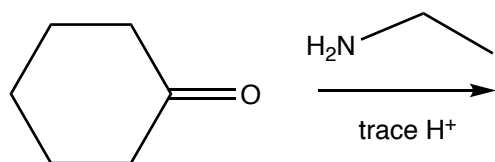


5. The reactions of 1° and 2° amines with ketones or aldehydes produce different products.

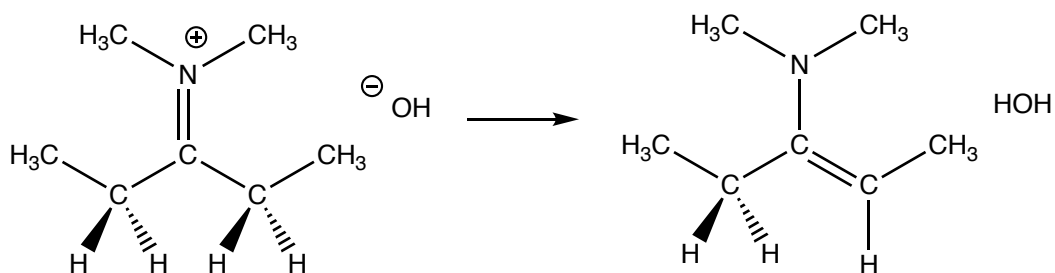
a. (6 pts.) Draw an example of a 1° amine and an example of a 2° amine.

b. (4 pts.) Briefly explain why 1° and 2° amines produce different products.

6. (6 pts.) Predict the organic product and the non-organic byproduct for the following reaction.

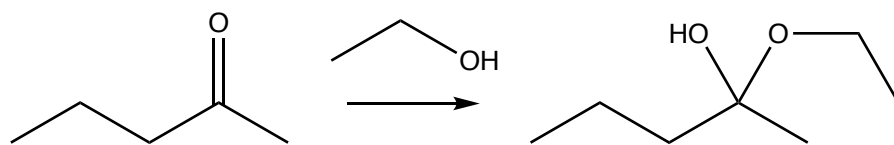


7. (6 pts.) Draw electron movement arrows that show how the enamine below can be produced from the iminium ion.

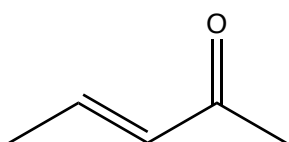


8. (8 pts.) When a reaction is said to be under “thermodynamic control” and two products are possible what factor determines what the major product will be?

9. (14 pts.) Alcohols react with ketones to form hemiacetals. An example of the reaction appears below. Draw a mechanism, including electron movement arrows, that shows the formation of the hemiacetal from the ketone and alcohol. Remember to show all proton transfer steps.



10. An α,β -unsaturated is drawn below.



- a. (6 pts.) Identify the two electrophilic carbon atoms.
- b. (8 pts.) Draw a resonance contributor, and briefly explain why each carbon is electrophilic.

1	H 1.0079																	2	He 4.0026		
3	4	Li 6.941	Be 9.012																	10	Ne 20.1797
11	12	Na 22.989	Mg 24.305																	18	Ar 39.948
19	20	K 39	Ca 40	Sc 21	Ti 22	V 23	Cr 24	Mn 25	Fe 26	Co 27	Ni 28	Cu 29	Zn 30	Ga 31	Ge 32	As 33	Se 34	Br 35	Kr 36		
37	38	Cs 56	Sr 57	Y 39	Zr 40	Nb 41	Mo 42	Tc 43	Ru 44	Rh 45	Pd 46	Ag 47	Cd 48	In 49	Sn 50	Sb 51	Te 52	I 53	Xe 54		
55	56	Rb 85	Ba 86	La 57	Hf 72	Ta 73	W 74	Re 75	Os 76	Ir 77	Pt 78	Au 79	Hg 80	Tl 81	Pb 82	Bi 83	Po 84	At 85	Rn 86		
87	88	Fr 87	Ra 88	Ac 89	Rf 104	Db 105	Sg 106	Bh 107	Hs 108	Mt 109	110	111	112	114	116					118	

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