

REVIEW TEST
 CHM 2120 3X
 Prof: Mark Dornan

Last Name: _____

First name: _____

Student #: _____

Date: May 14th 2015

Notes:

- Approximate total number of points: 51
- There are 6 pages in this exam
- Molecular models are allowed
- Re-grade requests for exams written in pencil will not be considered

	1a	2a	3b	4b	5b	6b	7b		8		1b	2b	3a	4a	5a	6a	7a	0		
1																			2	
H																			He	
3	4												5	6	7	8	9	10		
Li	Be												B	C	N	O	F	Ne		
11	12												13	14	15	16	17	18		
Na	Mg												Al	Si	P	S	Cl	Ar		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36			
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr			
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54			
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe			
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86			
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn			
87	88	89	104	105	106															
Fr	Ra	Ac	Rf	Ha	106															

pK_a table

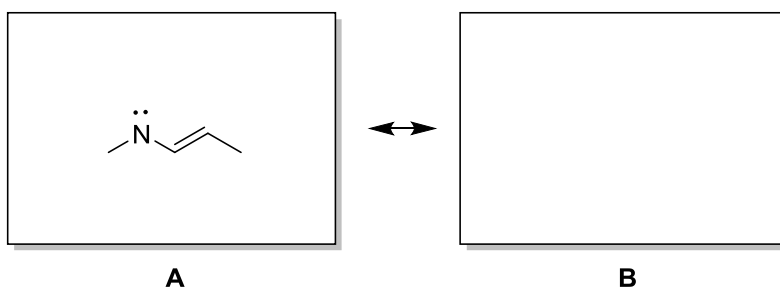
Acid	pK _a
HBr	-9
ROH ₂ ⁺	-2
H ₃ O ⁺	-1.75
RCO ₂ H	5
R ₃ NH ⁺	10-11
H ₂ O	15.75
ROH	16-18
RC(O)CH ₃	20
HC≡CH	25
H ₂	36
R ₂ NH	35-40
CH ₂ =CH ₂	44
RCH ₃	55

1. Draw the structure of the following compounds:
(5 points)

- a. 3,3-dichlorocyclopentene
- b. (Z)-2,4-dimethyloct-4-ene
- c. (R)-3,5-dimethylhex-1-yn-3-ol

2.

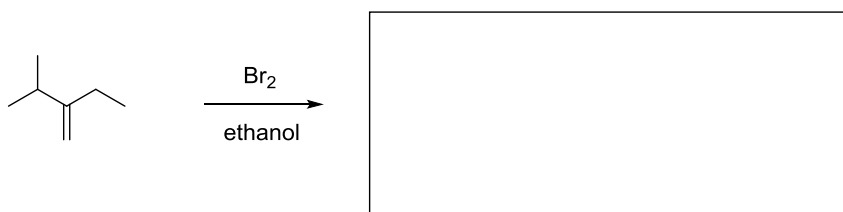
- a. Two major resonance structures are possible for the following compound. One resonance form is given below but it is incomplete. Complete the structure by adding a formal charge. Draw the remaining structure. Include curved arrows on structure A to show how structure B is formed.
(4 points)



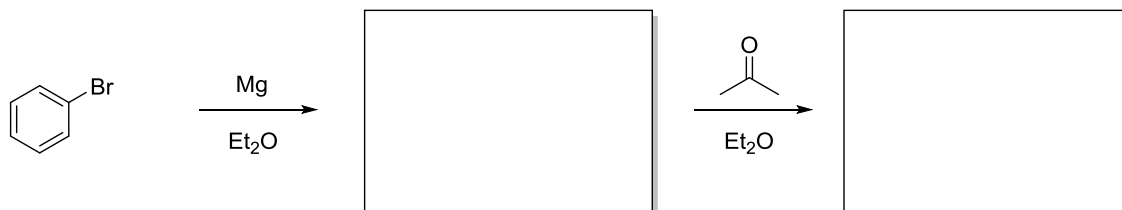
- b. Which structure (**A** or **B**) is more stable and why?
(2 points)

3. Complete the following reaction schemes with starting material(s), product(s) or reagent(s). (14 points)

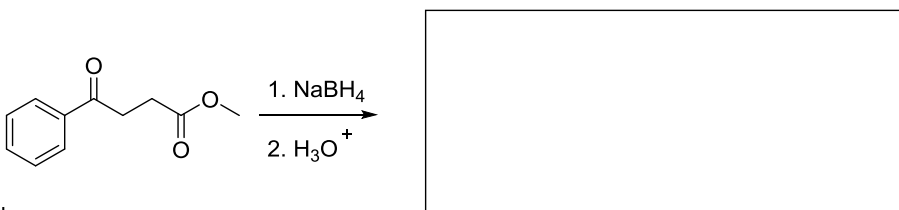
a.



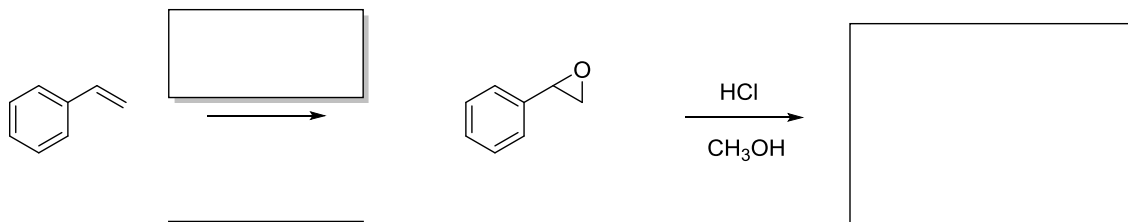
b.



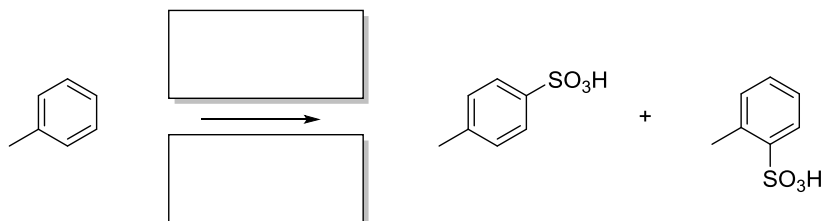
c.



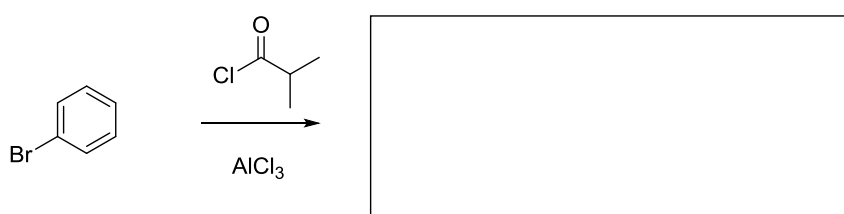
d.



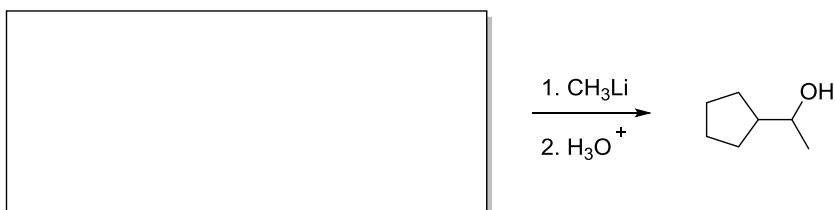
e.



f.

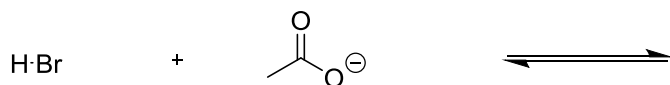


g.

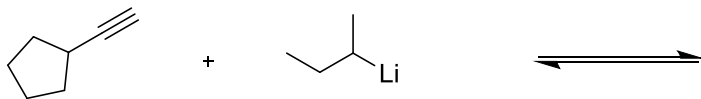


4. Write the equations for the following acid/base reactions including arrow notation. Predict whether the reaction will favour the products or the starting materials. Justify your choice. (6 points)

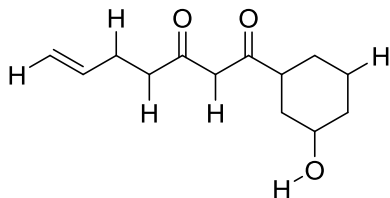
a.



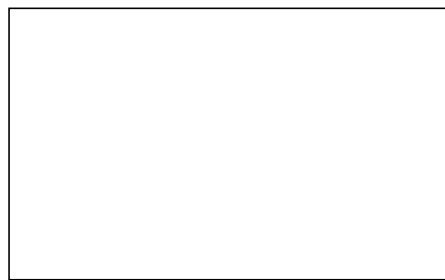
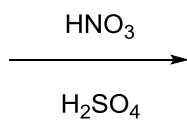
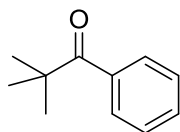
b.



5. Two equivalents of LDA (a strong base) react with the following molecule. Indicate the two protons to be removed, labelling them **A** and **B**. (2 points)



6.
a. What is (are) the major product(s) for this reaction?
(3 points)



major product(s)

- b. Show a detailed mechanism for this reaction.
(7 points)

- c. Use resonance structures for the reaction intermediate of the favoured product(s) and the unfavoured product(s) to explain the regioselectivity of the reaction.
(4 points)

7. Label the following structures as aromatic, anti-aromatic, or not aromatic.
(4 points)

