Chem 3331 Wang Spring 2011 Midterm 2

Student ID _____ Name _____

page	points:		
2	(15)	**>73**	**A**
3	(21)	**55-73**	**B**
4	(27)	**33-54.5**	**C**
5	(25)	**<33**	**D**
6	(12)		
Total	(100)		

Periodic Table

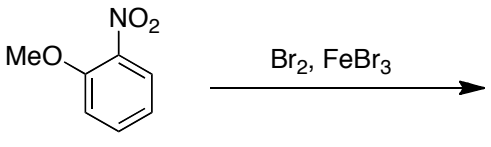
H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Ha	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

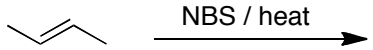
Please sit with an empty seat between you and your neighbors.

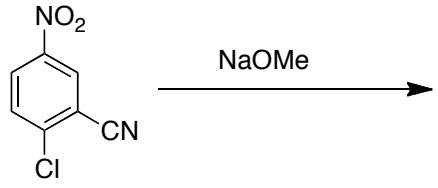
Unless specifically asked, you do not have to draw mechanisms for reactions.

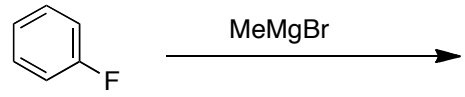
Feel free to ask questions about the questions, but please don't ask questions about your answers, it distracts your neighbors.

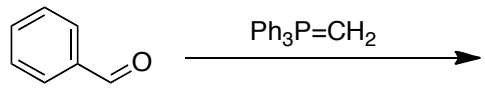
1 Provide the products of the following reactions (all reactions have an appropriate aqueous work up). If no reaction would occur, write NR. If a reaction would produce stereoisomers, draw the isomers and indicate if they will be produced in equal or unequal amounts (3 pts each).

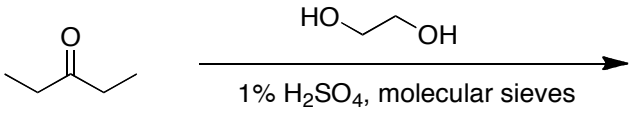
a) 

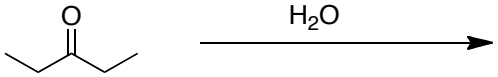
b) 

c) 

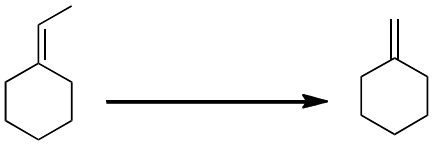
d) 

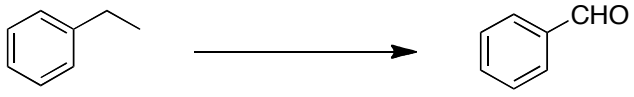
e) 

f) 

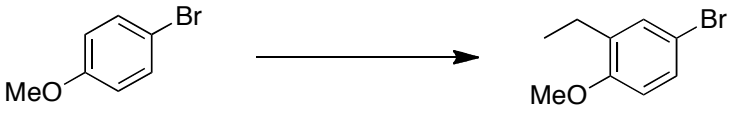
g) 

2) Complete the following syntheses using any reagents you need. You do not have to show the synthesis of the reagents you use, but **you must use the starting material indicated**. If your synthesis requires more than one step, **provide the product after each step**. All chiral products are racemic mixtures.

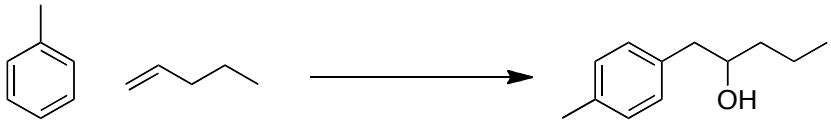
a)  (6 pts)

b) 

(9 pts)

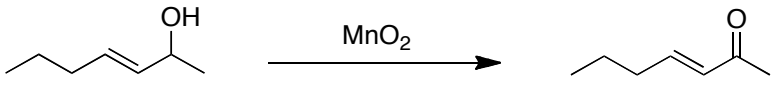
c) 

(6 pts)

d) 

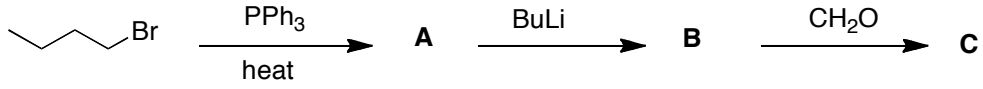
(9 pts)

3) Provide the mechanism for the following reaction. Show every intermediate with the proper charges and all the arrows required for each step of the reaction.

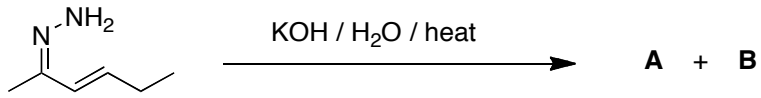
a) 

(12 pts)

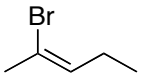
b) Provide the intermediates and product of the following reaction (3 pts each).

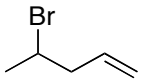


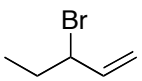
4) Provide the two products and mechanism for the reaction shown below. Show every intermediate with the proper charges and all the arrows required for each step of the reaction (3 pts for each product 10 pts for mechanism, 16 pts total)



5) Rank the reaction rates for the following substrate in the indicated reactions, respectively (2 pts each).



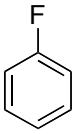


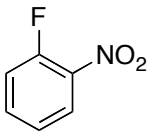


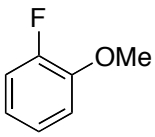
E1

E2

S_N2





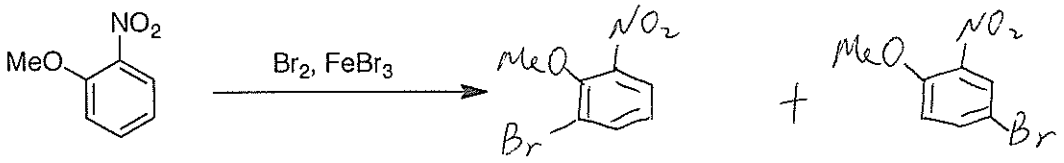


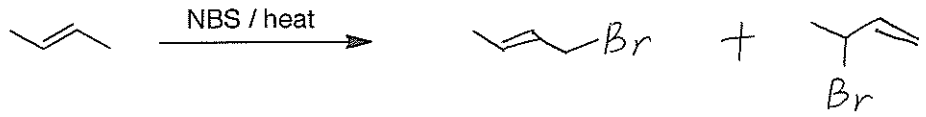
$Br_2/FeBr_3$

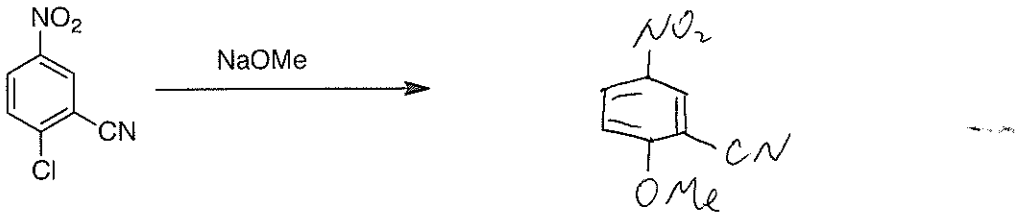
NaOEt

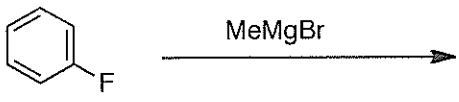
$CH_3COCl/AlCl_3$

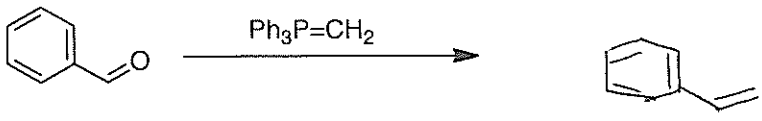
1 Provide the products of the following reactions (all reactions have an appropriate aqueous work up). If no reaction would occur, write NR. If a reaction would produce stereoisomers, draw the isomers and indicate if they will be produced in equal or unequal amounts (3 pts each).

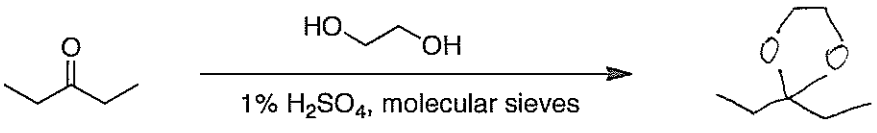
a) 

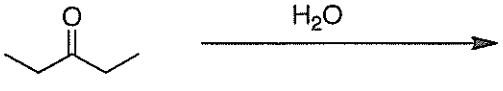
b) 

c) 

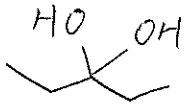
d) 

e) 

f) 

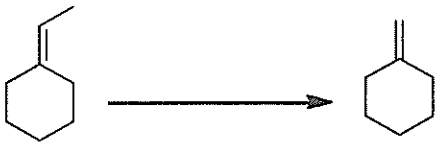
g) 

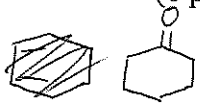
N. R. (3 pts)

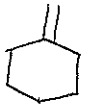


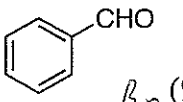
(1 pt)

2) Complete the following syntheses using any reagents you need. You do not have to show the synthesis of the reagents you use, but **you must use the starting material indicated.** If your synthesis requires more than one step, **provide the product after each step.** All chiral products are racemic mixtures.

a)  (6 pts)

1. O_3 → 

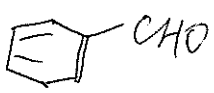
2. $Ph_3PCH_3 \cdot Br$, $BuLi$ → 

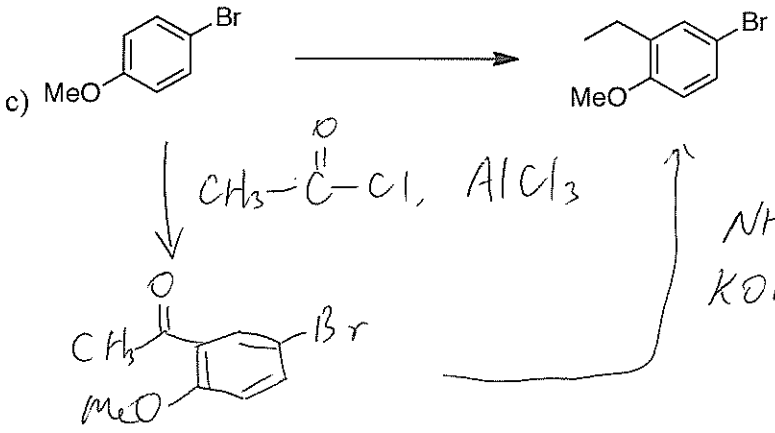
b) 


(9 pts)

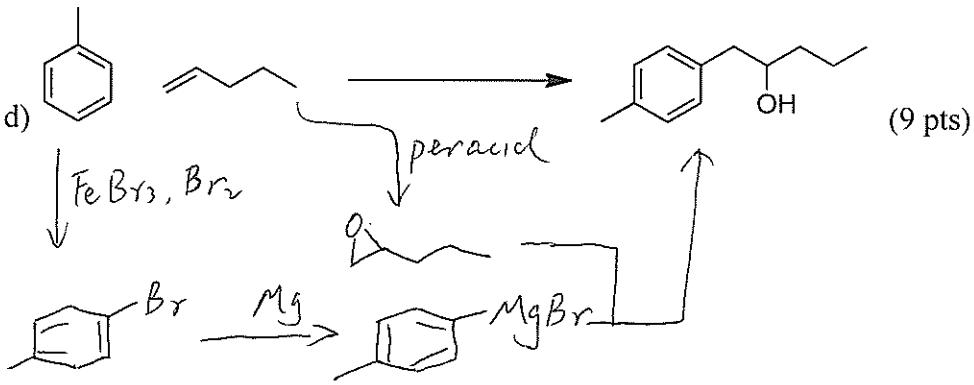
1. NBS, Δ → 

2. KO^tBu (or other strong base) → 

3. $Ph_3P \cdot CH_3Br$, $BuLi$ → 

c) 

(6 pts)

d) 

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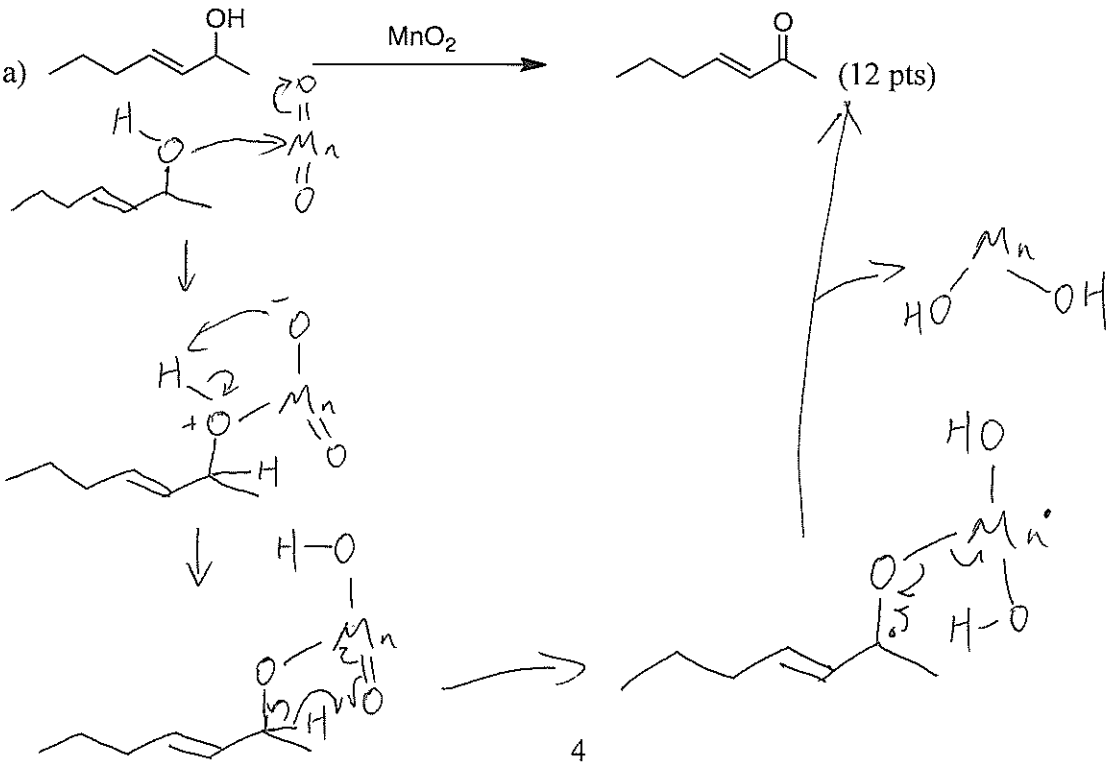
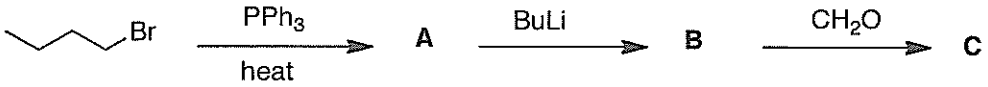
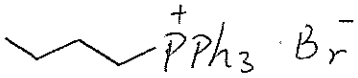
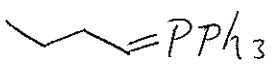
a) 

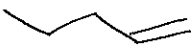
(12 pts)

b) Provide the intermediates and product of the following reaction (3 pts each).



A : 

B : 

C : 

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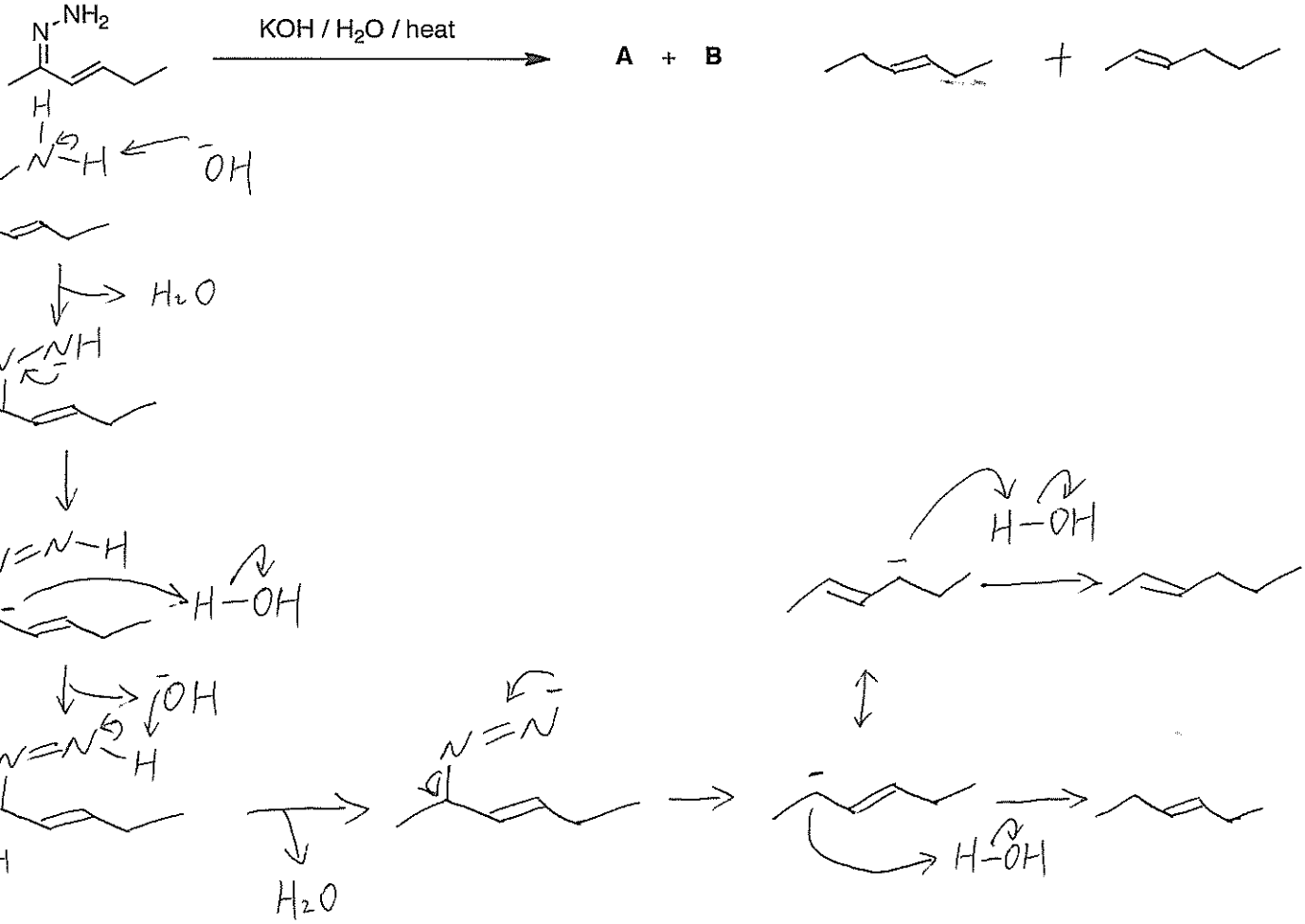
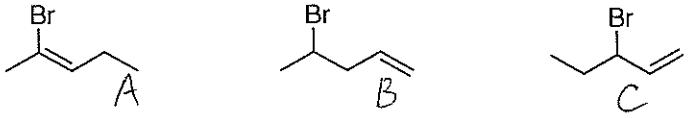


5) Rank the reaction rates for the following substrate in the indicated reactions, respectively (2 pts each).



E1

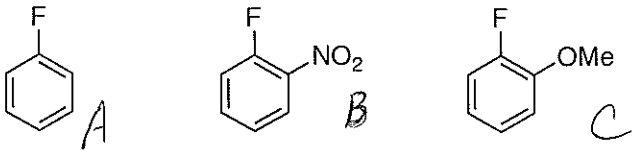
C > B > A

E2

B > C > A

S_N2

C > B > A



$Br_2/FeBr_3$

C > A > B

NaOEt

B > A > C

$CH_3COCl/AlCl_3$ C > A > B