Chem 3331 WANG Spring 2010 Midterm 1

Student ID _____

page	points:
2	(20)
3	(30)
4	(15)
5	(22)
6	(13)

Total _____(100)

> 82 A
71 – 82 B
52 – 70 C
< 52 D

Periodic Table

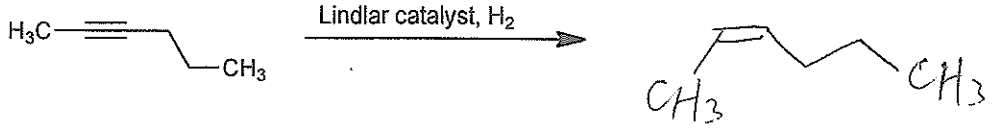
H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Ha	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

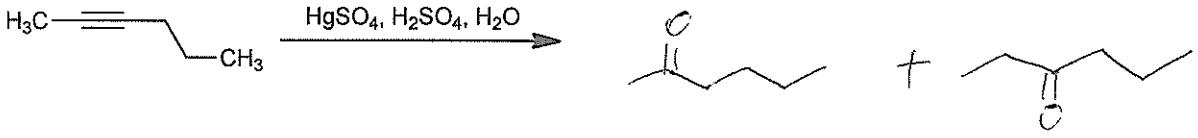
Please sit with an empty seat between you and your neighbors.

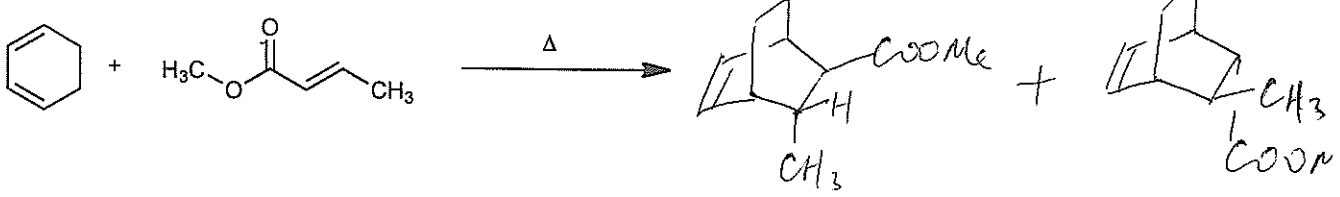
Unless specifically asked, you do not have to draw mechanisms for reactions.

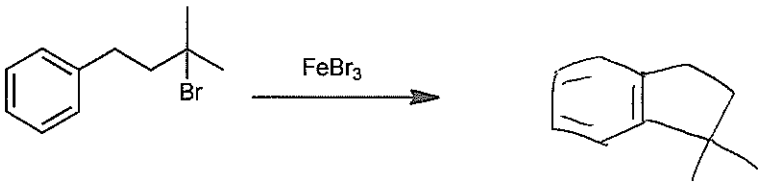
Feel free to ask questions about the questions, but please don't ask questions about your answers, it distracts your neighbors.

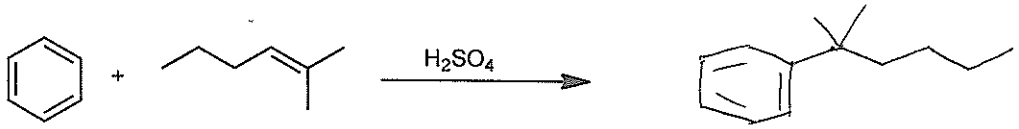
1 Provide the products of the following reactions. If a reaction would produce stereoisomers, draw the isomers and indicate if they will be produced in equal or unequal amounts (4 pts each).

a) 

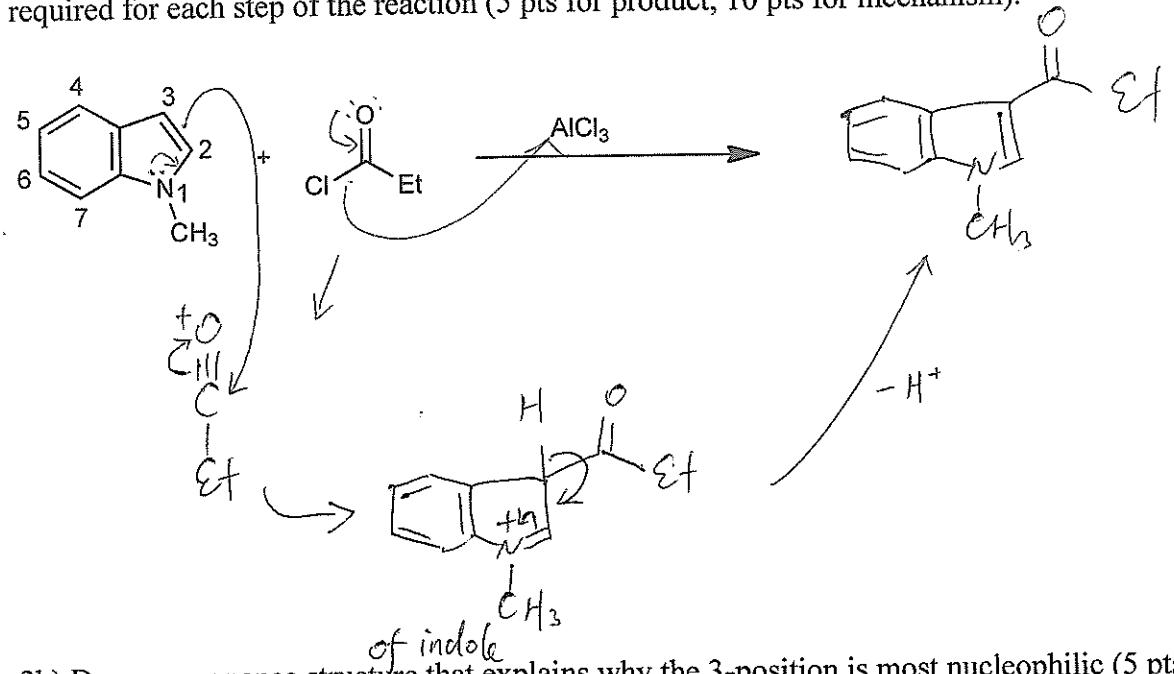
b) 

c) 

d) 

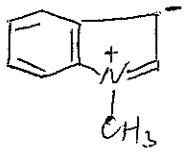
e) 

2a) Compared with benzene, indole is a more reactive aromatic molecule. The 3-position of indole is the most nucleophilic carbon among all carbons. Provide the products and mechanisms for the following reactions. Show every intermediate with the proper charges and all the arrows required for each step of the reaction (5 pts for product, 10 pts for mechanism).

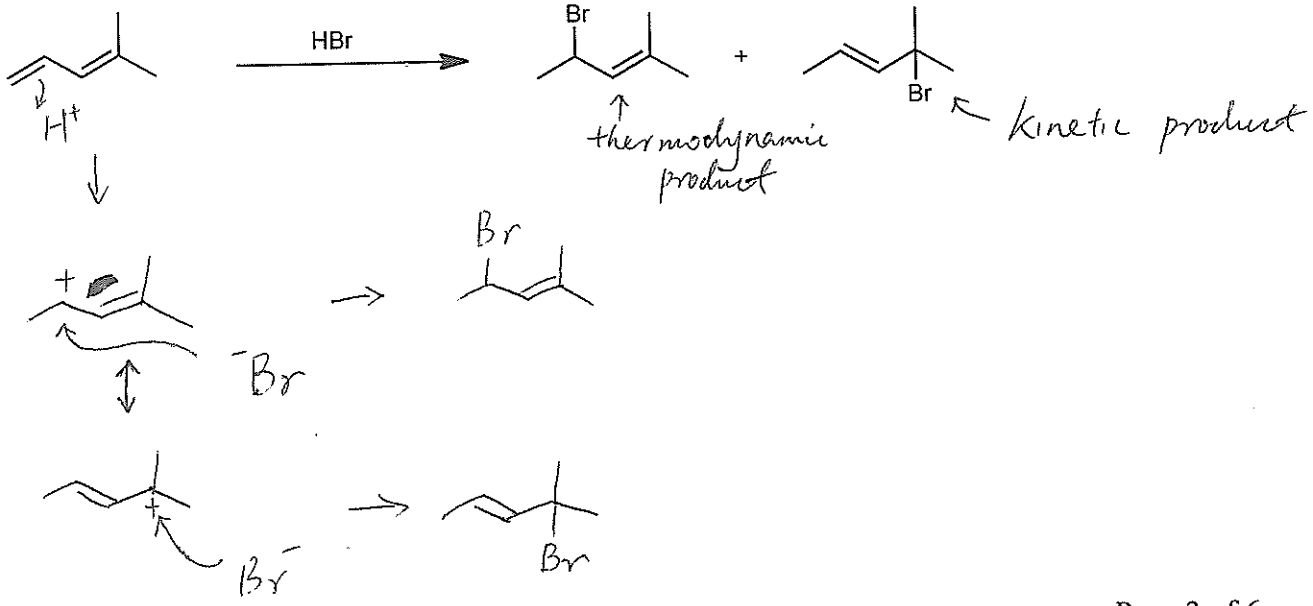


2b) Draw a resonance structure that explains why the 3-position is most nucleophilic (5 pts).

of indole

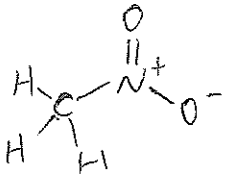


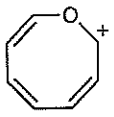
3. Draw the mechanism of the following reaction (6 pts) and label the thermodynamic product (2 pts) and the kinetic product (2 pts).



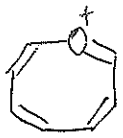
4a) Draw the best resonance structure for the following species.

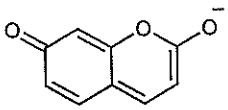
CH_3NO_2 (3 pts)



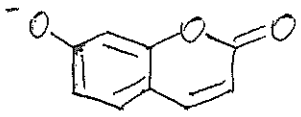


(3 pts)





(3 pts)



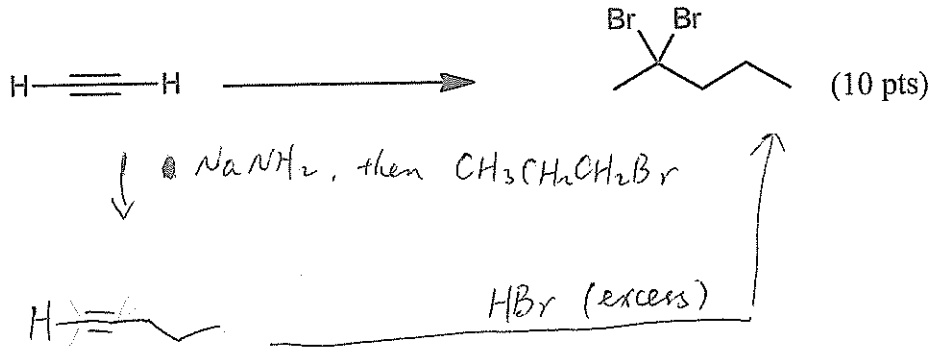
5) Complete the following syntheses using any organic molecule of 4 carbons or less and any reagents you need. You do not have to show the synthesis of the 4-carbon or less molecule you use. If your synthesis requires more than one step, provide the product after each step. All chiral products are racemic mixtures.

a)

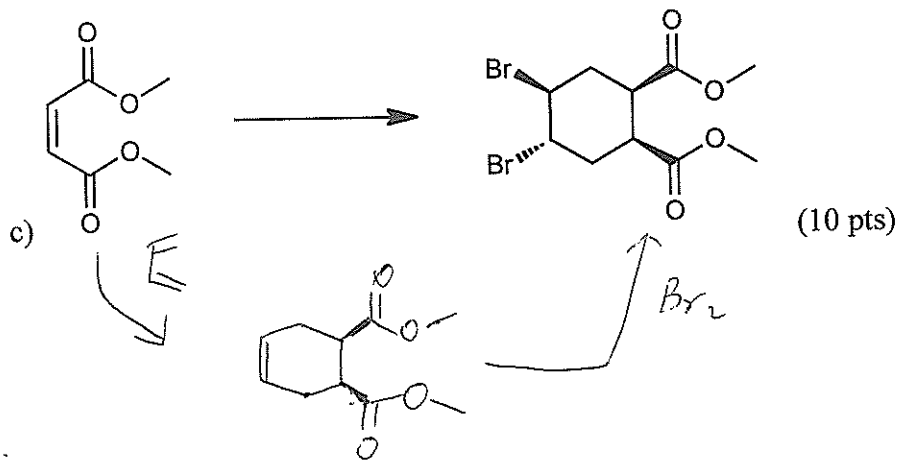
(6 pts)

H_2SO_4

HNO_3.

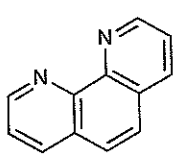
b) 

(10 pts)

c) 

(10 pts)

6a) Provide the hybridization of the **oxygens** and **nitrogens**.



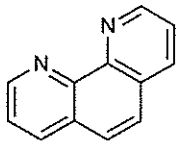
sp^2

(2 pts)

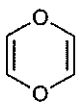
 (4 pts)

both sp^2

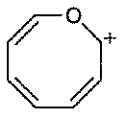
b) Are the following molecules aromatic, anti aromatic, or does this designation not apply? (3 pts each)



aromatic



doesn't apply



anti-aromatic