

Student ID \_\_\_\_\_

Name \_\_\_\_\_

TA Name \_\_\_\_\_

page

points:

2 \_\_\_\_\_ (24)

3 \_\_\_\_\_ (18)

4 \_\_\_\_\_ (18)

5 \_\_\_\_\_ (18)

6 \_\_\_\_\_ (18)

7 \_\_\_\_\_ (4)

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															

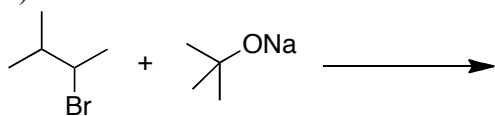
**Please sit with an empty seat between you and your neighbors.**

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

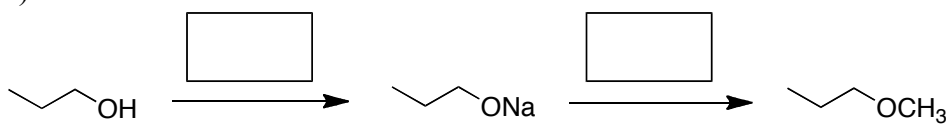
**Feel free to ask questions about the questions, but please don't ask questions about your answers, it distracts your neighbors.**

1. Provide the missing products or reagents for the following reactions. If a reaction would produce stereoisomers, draw the isomers and indicate if they will be produced in equal or unequal amounts (3 pts each).

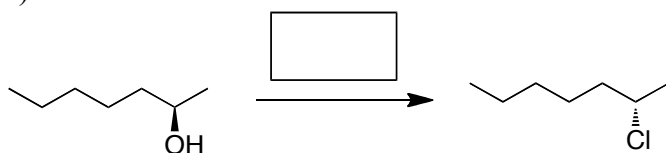
1)



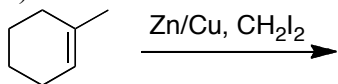
2)



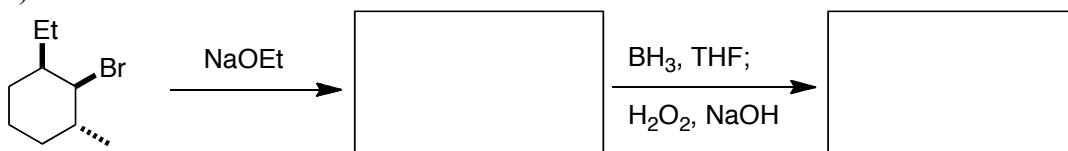
3)



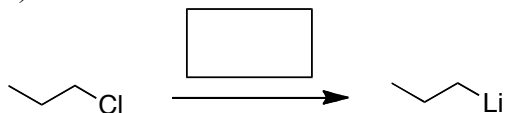
4)



5)



6)

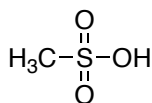
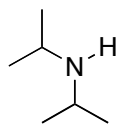
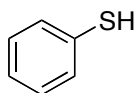


2. Provide the corresponding pKa values for the following species. (2 pts)

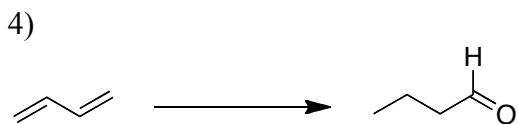
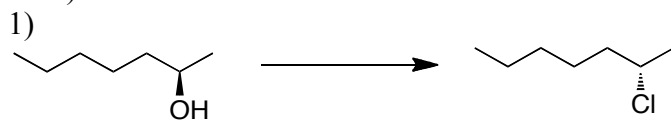
**pKa**

EtOH

Bu-H

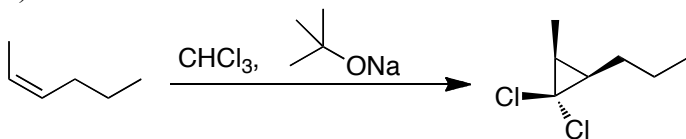


3. Are the following transformations oxidations [O], reductions [H], or neither [N]? (2 pts each)

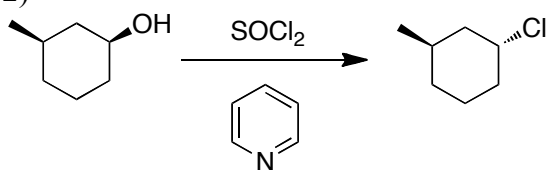


4. Write a mechanism for the following reaction. (6 pts each)

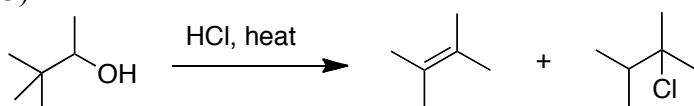
1)



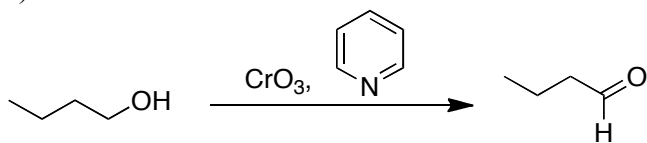
2)



3)

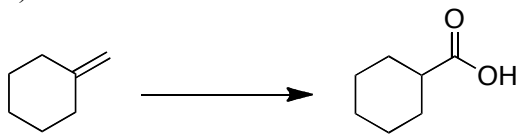


4)

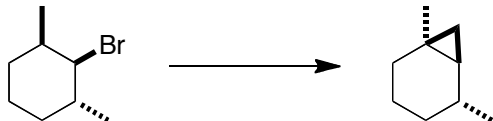


5. Complete the synthesis shown below. Draw reagents and products for each step (6 pts each).

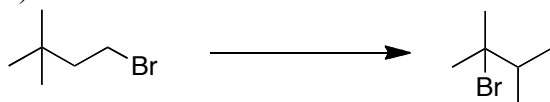
1)



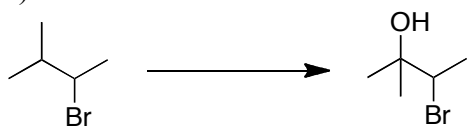
2)



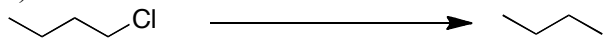
3)



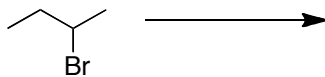
4)



5)



6. In the following conditions, indicate which mechanism/reaction is favored (1 pt each).



1. EtSNa
2. <sup>t</sup>BuONa
3. MeOH, heat
4. <sup>t</sup>BuOH, heat