

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

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

page \_\_\_\_\_ points:

2 \_\_\_\_\_ (14)

3 \_\_\_\_\_ (20)

4 \_\_\_\_\_ (20)

5 \_\_\_\_\_ (12)

6 \_\_\_\_\_ (20)

7 \_\_\_\_\_ (14)

Total \_\_\_\_\_ (100)

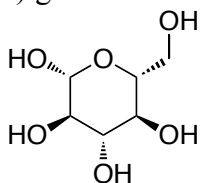
## Periodic Table

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															

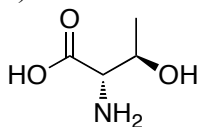
**Please sit with an empty seat between you and your neighbors.****Unless specifically asked, you do not have to draw mechanisms for reactions.****Feel free to ask questions about the questions, but please don't ask questions about your answers, it distracts your neighbors.**

1. Give the configuration (R or S) of each asymmetric center in the following molecule. (14 pts).

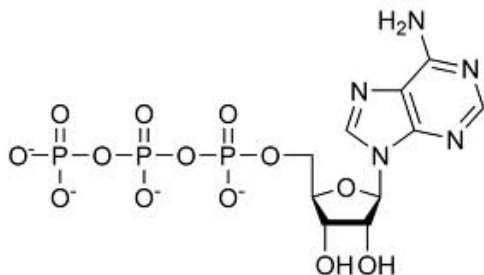
a) glucose



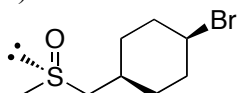
b) threonine



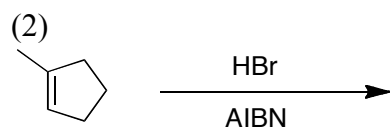
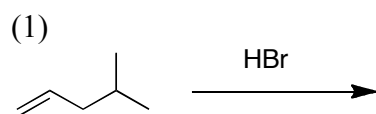
c) ATP

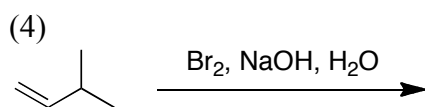
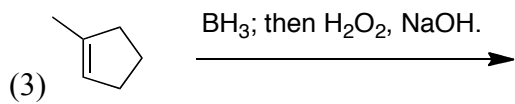


d)



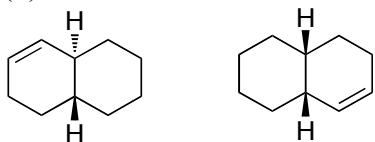
2. Provide all product(s) and the corresponding mechanism of the following reactions. If there are enantiomers or diastereomers, draw all of them and assign R or S for each chiral center (10 pts each)



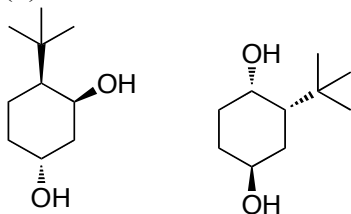


3. Describe the relationship between each of the following pairs of structures (3 pts each).

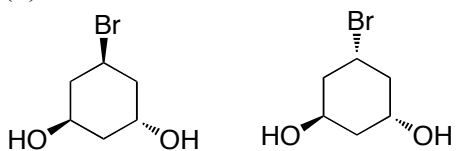
(1)



(2)



(3)

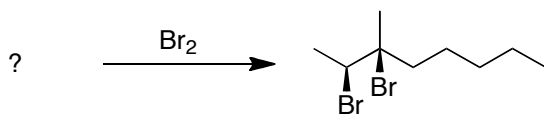


(4)

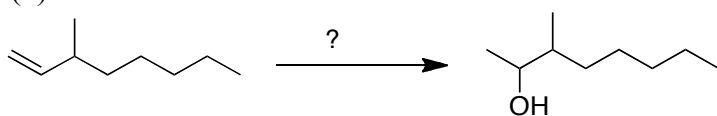


4. Provide the missing starting materials or the reagents for the following reactions. (4 pts)

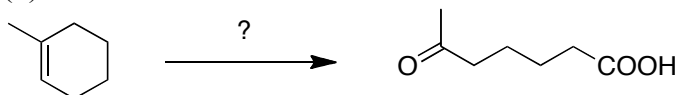
(1)



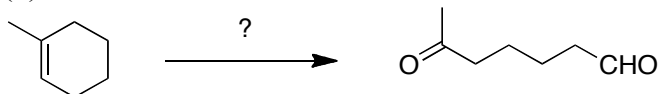
(2)



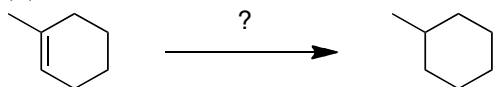
(3)



(4)

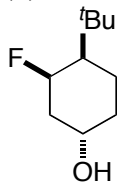


(5)

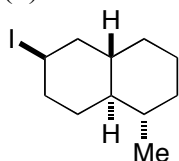


5. Draw the most stable conformation of the following molecules. (3 pts each)

(1)



(2)



6. Compare the strength of the indicated intermolecular interactions of the following molecules (2 pts each). Use stronger, weaker, or similar.

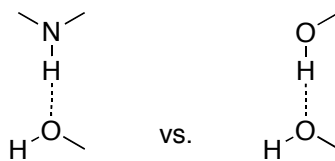
(1)



dipole dipole interaction:

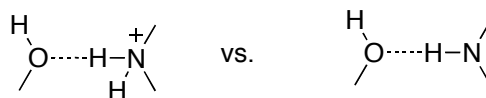
van der Waals force:

(2)



hydrogen bond:

(3)



hydrogen bond: