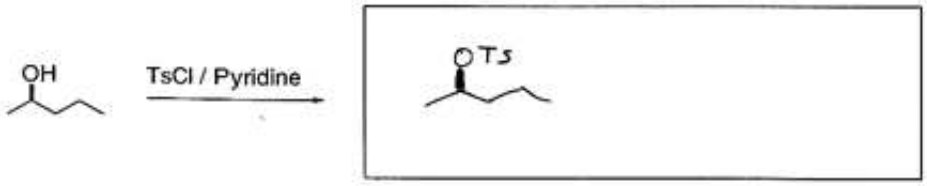
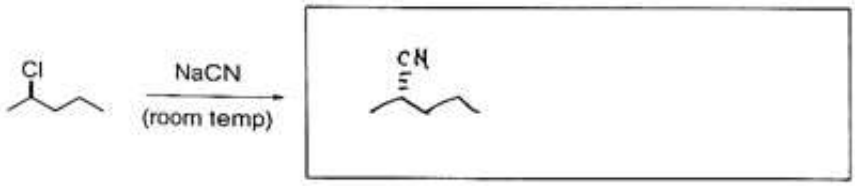
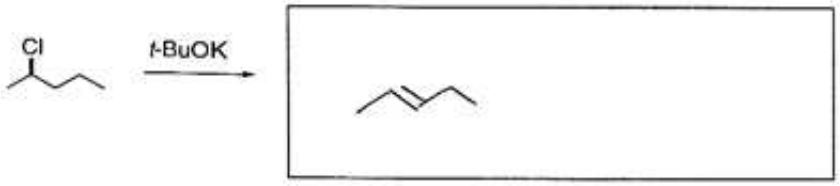
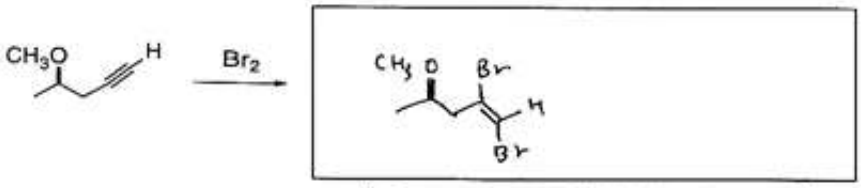
Name _____

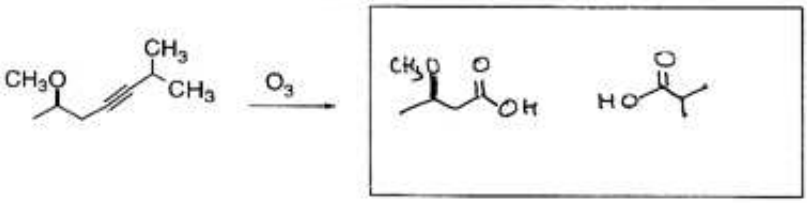
1) Provide the products of the following reactions (each reaction has an appropriate aqueous work-up). If no reaction would occur, then write NR. For reactions that provide stereoisomers, draw all possible stereoisomers and indicate if they would be produced in equal or unequal amounts (27 points total).





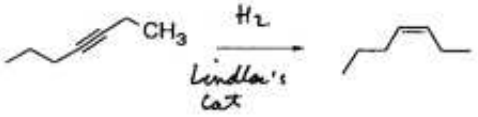


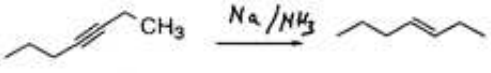


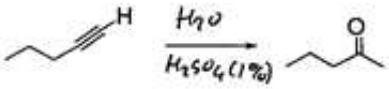


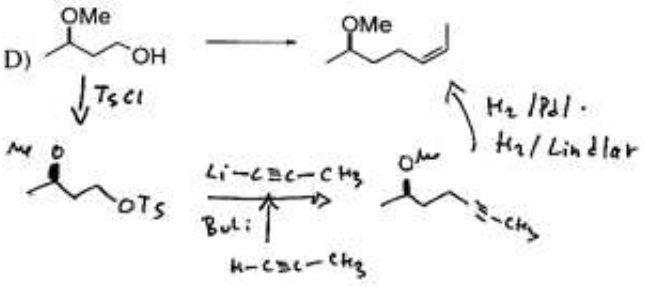
Name _____

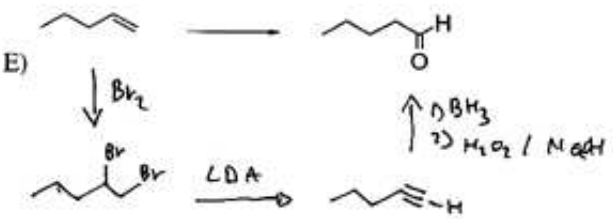
2) Complete the syntheses shown below using organic reagents of 5 carbons or less and any inorganic reagents you wish. **If your synthesis requires more than one step, you must write the product of each step.** (4 or 9 points each, 30 points total)

A) 

B) 

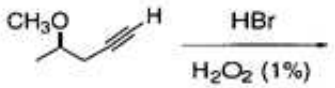
C) 

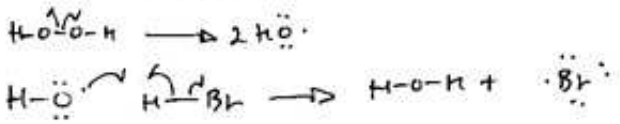
D) 

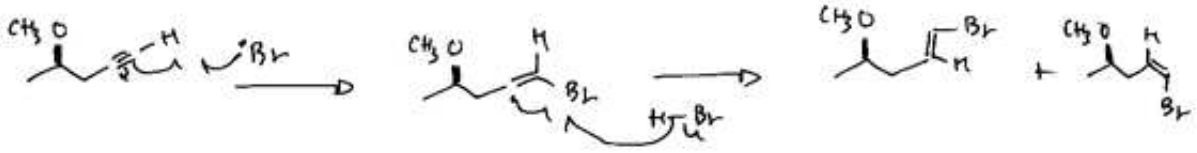
E) 

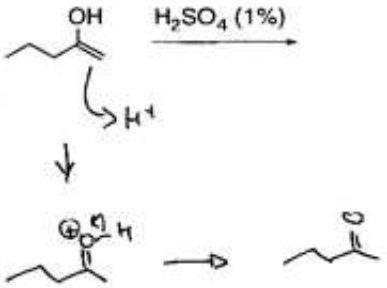
 Name _____

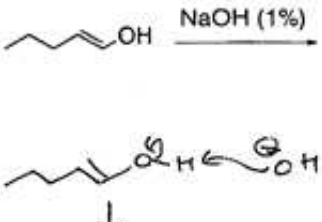
3) Provide the products and mechanisms for the following reactions. Please show every intermediate and all the arrows required for each step of the reaction (4 or 8 points each, 16 points total).





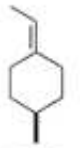




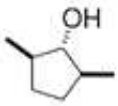


Name _____

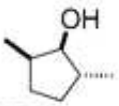
4) Circle the words that accurately describe the following molecules. You may circle more than one word for each molecule if more than one applies. (1 point each)



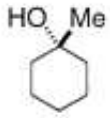
Chiral
Achiral
Meso
None of above



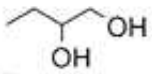
Chiral
Achiral
Meso
None of above



Chiral
Achiral
Meso
None of above



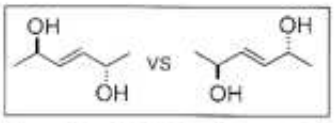
Chiral
Achiral
Meso
None of above



Chiral
Achiral
Meso
None of above

Chiral
Achiral
Meso
None of above

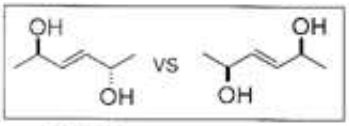
You are hired by Bill Romanowski (former Broncos linebacker) to clean out his attic, and you run across jars labeled with the following pairs of compounds. Are the compounds in the jars **enantiomers, diastereomers, identical** or **none of the above** (circle the correct answer, 1 point each)?



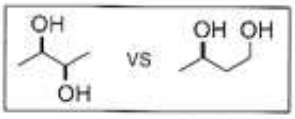
Ent diast ident None of above

Ent diast ident None of above

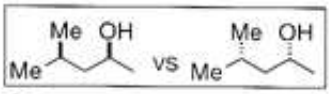
Ent diast ident None of above



Ent diast ident None of above

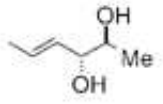


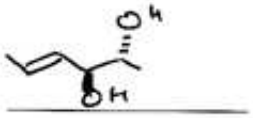
Ent diast ident None of above

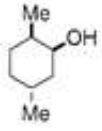


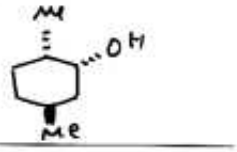
Ent diast ident None of above

Draw the enantiomers of the molecules shown below (3 points each):

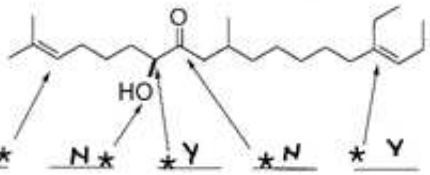








Indicate if the starred atoms are stereocenters (Yes or No), chirality centers (Yes or No). For the ones that are stereocenters, label them as either R vs S, or E vs Z as appropriate (9 points, -1 each wrong answer).



Stereocenter (Yes, No)?	N	N	Y	N	Y
R/S E/Z?	—	—	S	—	E
Chirality center (Yes, No)?	N	N	Y	N	N