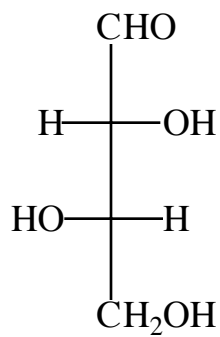
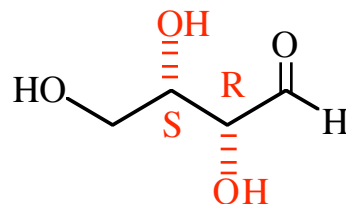


Name: _____

1) (24 pts) a) A Fischer projection of a sugar with four carbons (**1a**) is given below. Complete the wedges and dashes structure (**1b**) for the same compound.



1a




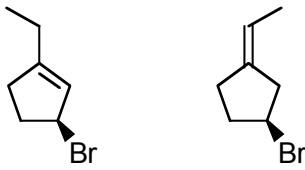
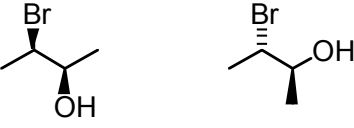
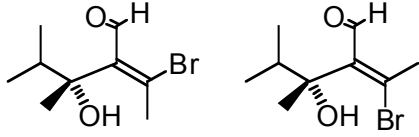
1b

b) Indicate the configuration (R or S) of each chirality center for your structure **1b**.

Name: _____

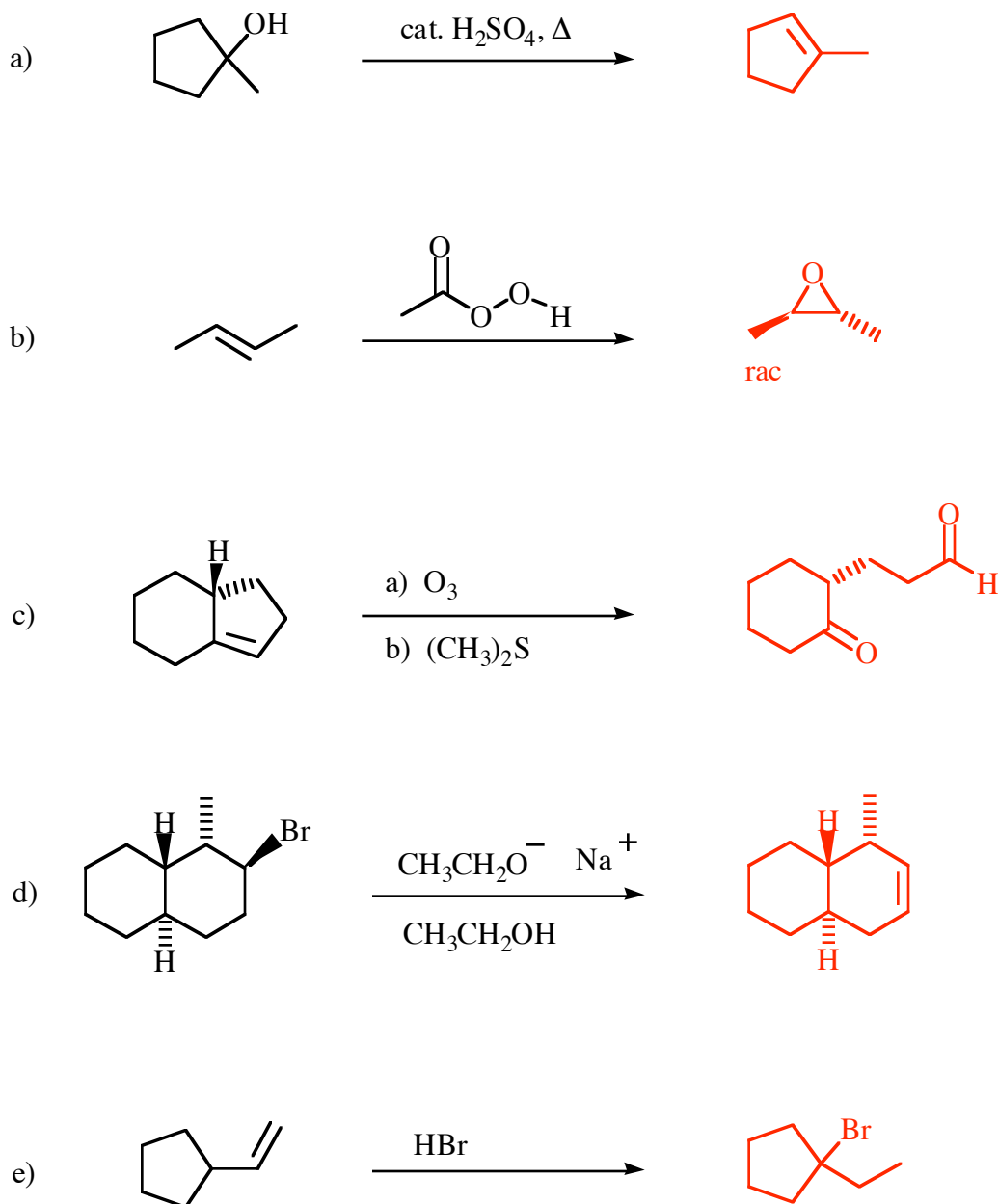
1) – continued-

c) Indicate the relationship between each of the following pairs of structures (homomers, conformers, constitutional isomers, enantiomers, or diastereomers). Using the check boxes, indicate for each structure whether the compound represented by each structure is chiral or achiral (a check means chiral, no check means achiral).

| | |
|--|---|
|  <p style="text-align: center; color: red;">homomers</p> <p>chiral <input type="checkbox"/> chiral <input type="checkbox"/></p> |  <p style="text-align: center; color: red;">constitutional isomers</p> <p>chiral <input checked="" type="checkbox"/> chiral <input checked="" type="checkbox"/></p> |
|  <p style="text-align: center; color: red;">enantiomers</p> <p>chiral <input checked="" type="checkbox"/> chiral <input checked="" type="checkbox"/></p> |  <p style="text-align: center; color: red;">diastereomers</p> <p>chiral <input checked="" type="checkbox"/> chiral <input checked="" type="checkbox"/></p> |

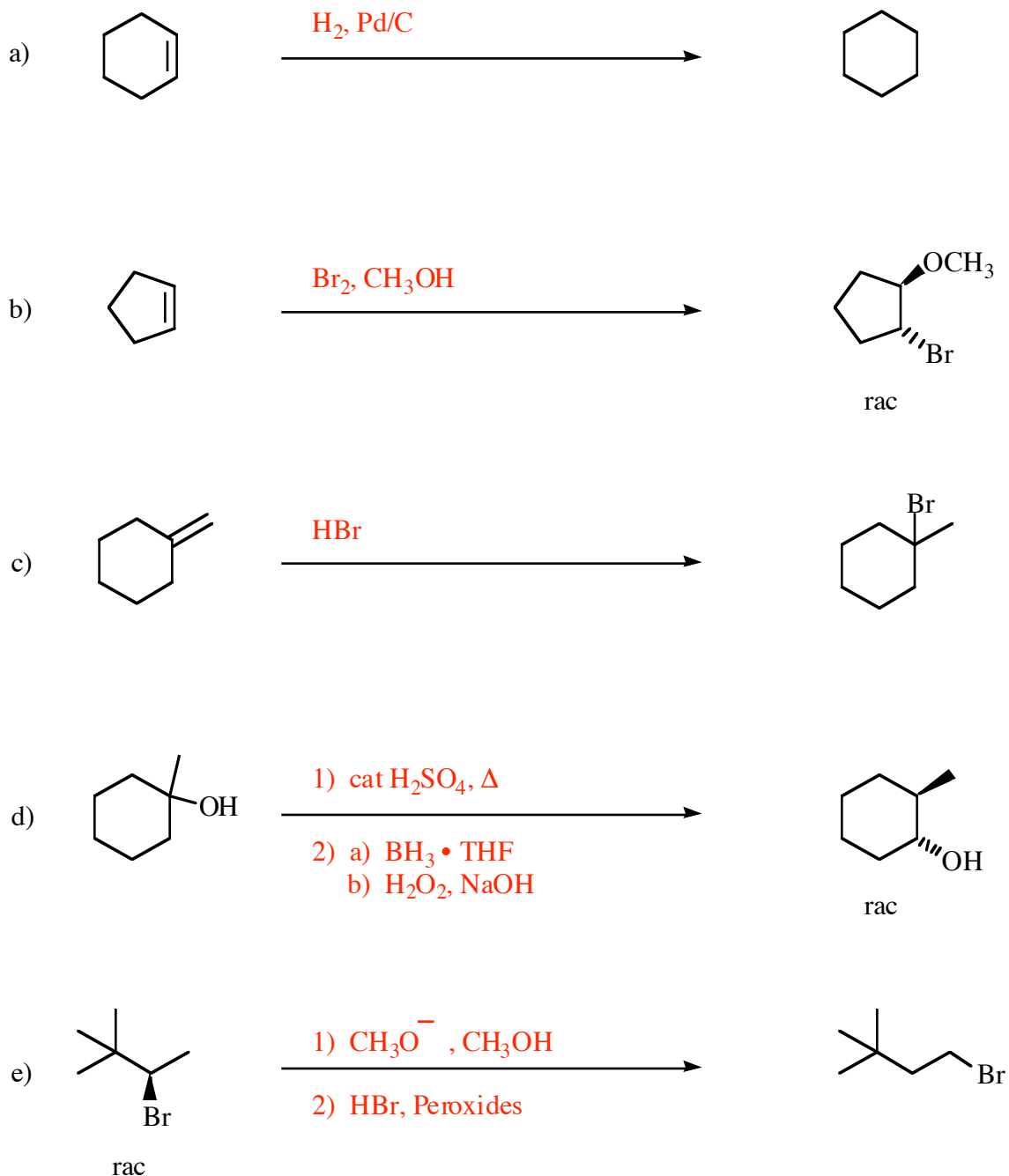
Name: _____

2) (25 pts) Give the single major organic product of each of the following reactions. Carefully indicate the stereochemistry of the product(s) if appropriate, using wedges and dashes for chirality centers. If a racemate is formed, show only one enantiomer, and label it "rac."



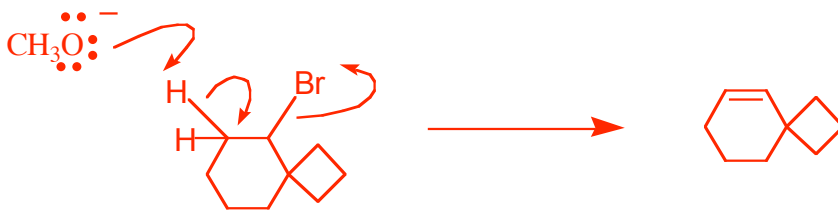
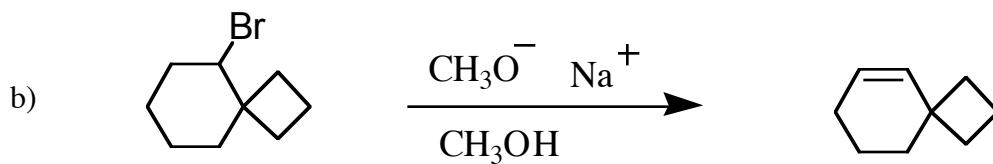
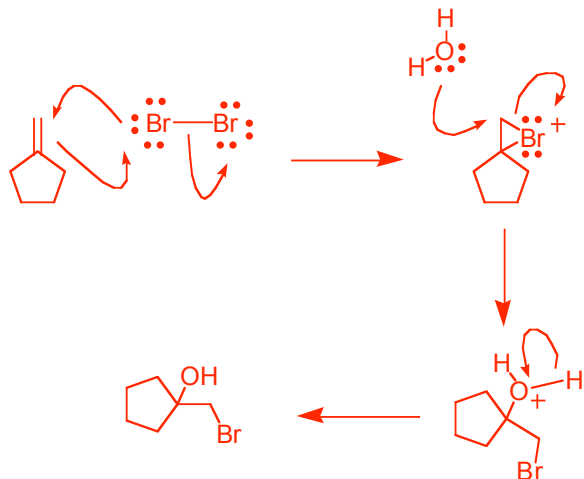
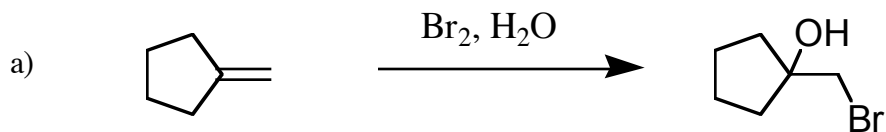
Name: _____

3) (25 pts) Propose reagents for accomplishing the following transformations. NOTE: more than one step may be required! Try to make your synthesis efficient (i.e. the desired product should be the major product). You must use the starting material given; you may use any other reagents you need.



Name: _____

4) (26 pts) Propose an arrow-pushing mechanism for each of the following transformations. Carefully show the structure of all of the intermediates in your mechanism.

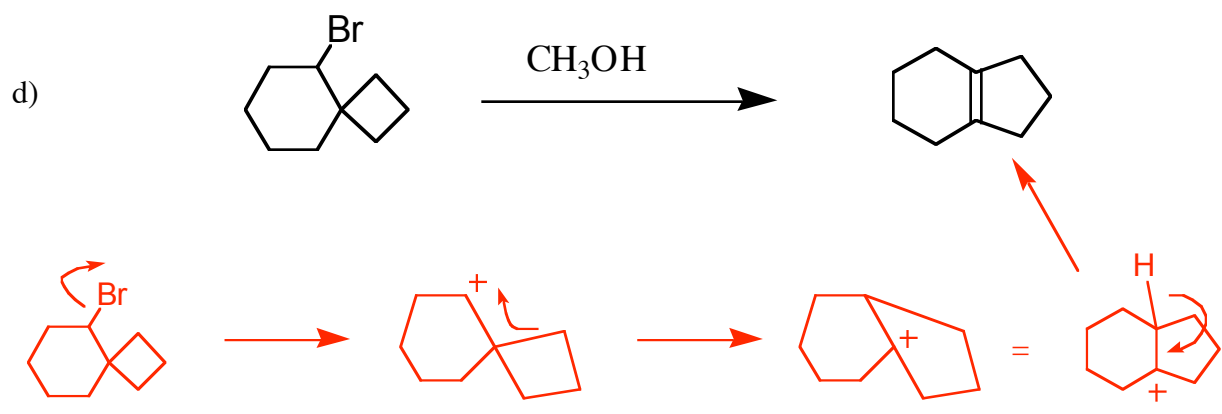


c) Give the NAME of the mechanism from part 4b:

E2

Name: _____

4) -continued-



e) Give the NAME of the mechanism from part 4d:

E1