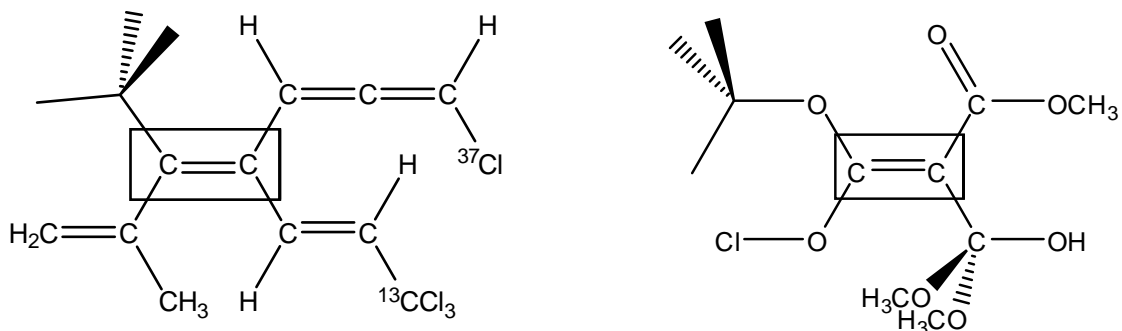
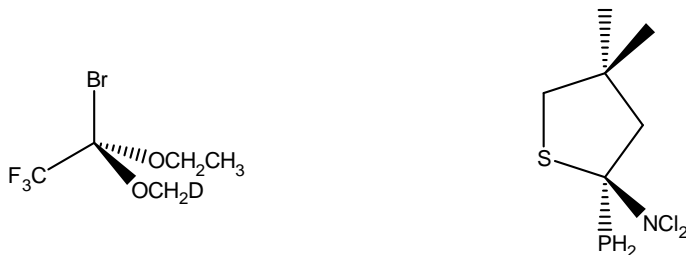


## Chemistry 2500 (Fall 2017): Assignment #9 – Stereochemistry

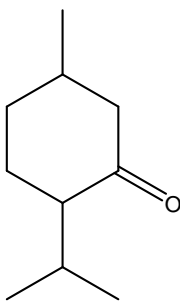
1. Assign Z/E to the two carbon-carbon double bonds in the following molecule.  
a) 7-hydroxy-4-isopropylcyclohepta-2,5-dienone
2. For the following two molecules, assign Z/E to only the 'boxed' carbon-carbon double bonds.



3. Assign the configuration (R/S) to all chiral carbon atoms in the following molecules.

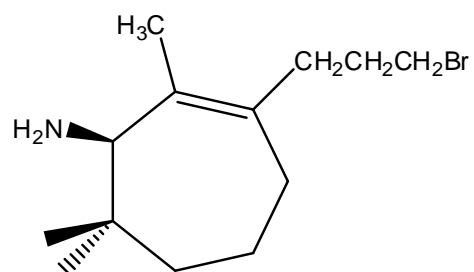


4. For the following molecule, draw all stereoisomers and identify all pairs of enantiomers and diastereomers.

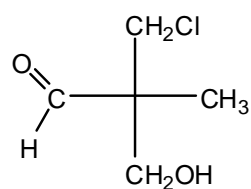


5. Where appropriate, label all stereogenic centers as R or S and all double bonds as E or Z. No explanation is required.

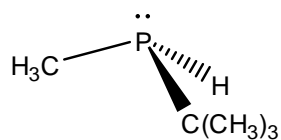
a)



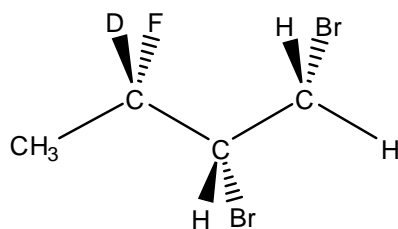
b)



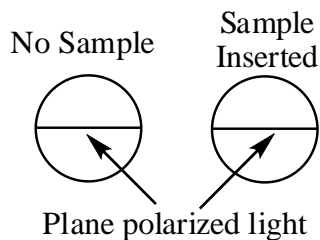
c)



6. Draw all possible stereoisomers of this compound and indicate which are enantiomers and which are diastereomers. Label **all** stereocentres as R or S.

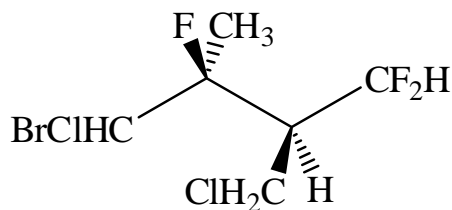


7. You have purchased a small sample of a 100% enantiomerically pure compound from Aldrich Chemicals. Upon measuring the optical rotation, your distracted assistant reports a rotation of  $0^\circ$ ! You double check for yourself and see the following views through the eye-piece.

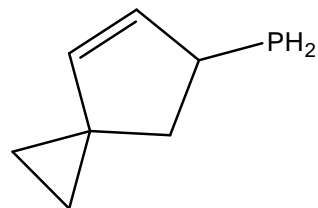
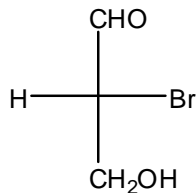
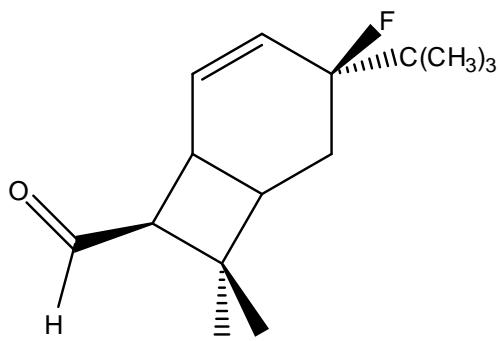


What are two plausible explanations? If you only have 30 minutes, what experiment(s) should you do to determine if Aldrich Chemicals should refund your money?

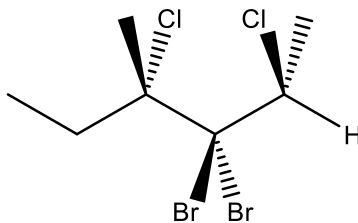
8. Draw all possible stereoisomers (and identify the enantiomers and diastereomers) of the following molecule:



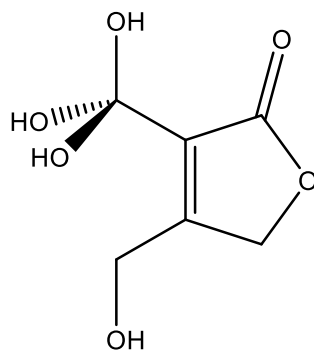
9. Draw the enantiomers for the following molecules and assign all chiral centres as R or S:



10. a) Is this molecule chiral or achiral (no explanation is required)?
- b) Draw all stereoisomers of this compound and indicate which are enantiomers and which are diastereomers.

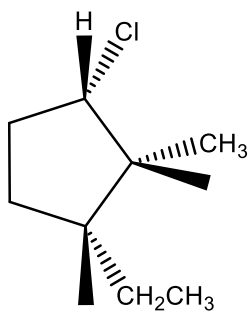


11. Label C=C double bond as E or Z. No explanation is required.

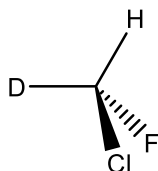


12. Label all stereogenic centres as R or S. No explanation is required. (10 points)

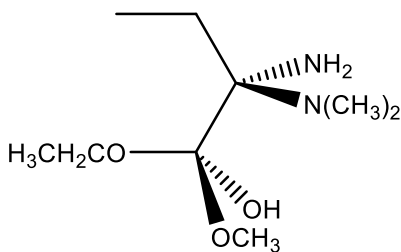
a)



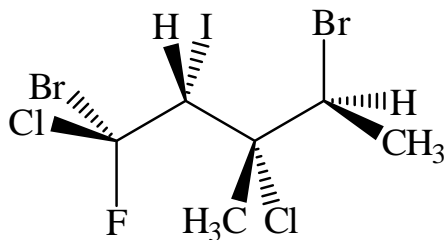
b)



c)

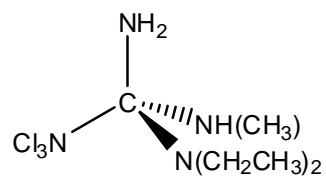


13. Draw all possible stereoisomers for the following compound and indicate which are enantiomers and which are diastereomers: (20 points)

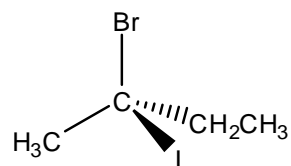


14. Assign the stereogenic center in each of the following compounds as R or S. (16 points)

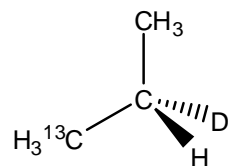
a)



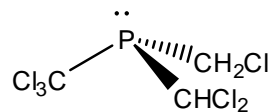
b)



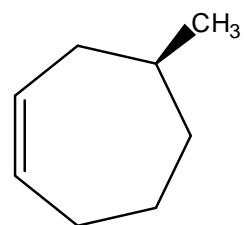
c)



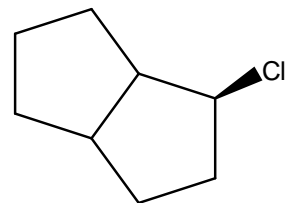
d)



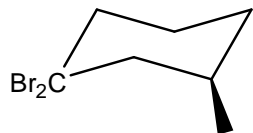
e)



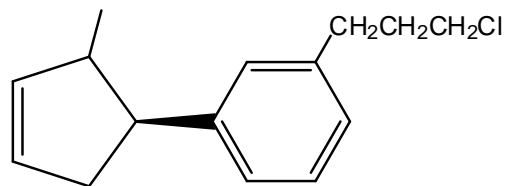
f)



g)

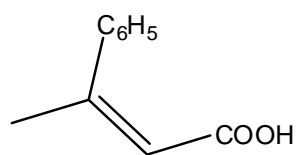


h)

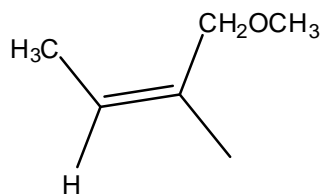


15. Assign the following compounds as E, Z or neither. (16 points)

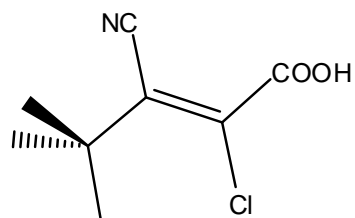
a)



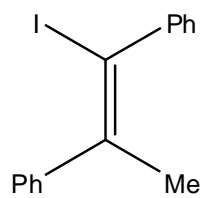
b)



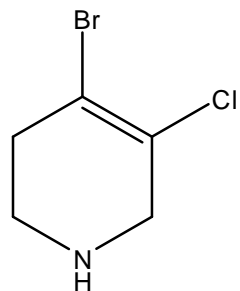
c)



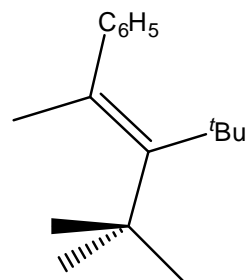
d)



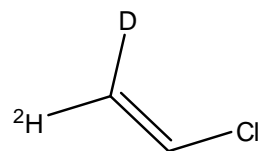
e)



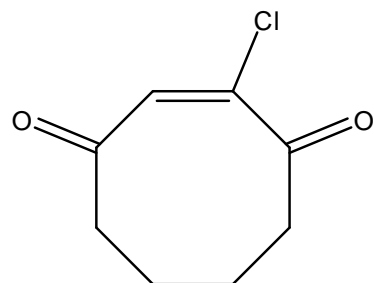
f)



g)



h)



16. Estrone, a naturally occurring chiral steroid has a specific rotation of  $+161^\circ$  at a concentration of 1 g/L (the standard units for concentration in this measurement). A sample of synthetic estrone is contaminated by 15% of its (-)-enantiomer. What would be the measured specific rotation of this sample? (10 points)