

Name: _____

Locker Number: _____

CHEMISTRY 354-355

Experiment 30

RESOLUTION OF (\pm)-**a**-PHENYLETHYLAMINE AND
DETERMINATION OF OPTICAL PURITY

RESOLVED a-PHENYLETHYLAMINE

1. Report the following for your sample (as an individual -- not as a group) of resolved **a**-phenylethylamine.
 - a) the **mass** (grams) of a-phenylethylamine obtained _____
 - b) the **color** of your product _____

2. Report the following for the *combined product* for your laboratory group.
 - a) the **observed rotation** for your group's sample of a-phenylethylamine

 - b) the **specific rotation** of your group's product. Use the space below to show your calculation. Note that the specific gravity of a-phenylethylamine is 0.9395 g/mL.

 - c) the **optical purity** (enantiomeric excess) of your group's combined sample. Use the space below to show your calculation.

3. What are percentages of the (S)-(-) and the (R)-(+) enantiomers in the sample? Show your calculation.
4. Using your NMR spectrum, determine the percentages of (S)-(-) and (R)-(+) stereoisomers present in your sample. Be sure to show your method of calculation.
5. Be sure to submit your resolved α -phenylethylamine sample with your report. Use a properly labeled sample vial. Alternatively, ask your instructor how he or she wants you to submit the sample.
6. Write the names of your laboratory partners:

7. Be sure to attach a photocopy of your *personal* NMR spectral results to this report sheet. **Be sure to interpret the NMR spectrum completely**, except for the phenyl region.
8. Attach copies of your chiral gas chromatograms to this report. Make sure that they are clearly labeled. Use the data from the chiral GC or from your NMR spectrum to answer the following:

retention time of (S)-(-)- α -phenylethylamine: _____ minutes

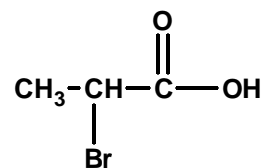
retention time of (R)-(+)- α -phenylethylamine: _____ minutes

percentage of (S)-(-)- α -phenylethylamine in your sample: _____ %

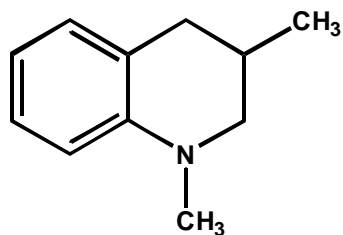
percentage of (R)-(+)- α -phenylethylamine in your sample: _____ %
9. How do the percentages of the enantiomers that you recorded in Part 8 compare with your results from Part 3 of this laboratory report? Explain.

ANSWER THE FOLLOWING QUESTIONS

1. Explain how you could isolate (**R**)-(+)-**a**-phenylethylamine from the mother liquor that remained after your crystallized (**S**)-(-)-**a**-phenylethylamine. **NOTE:** Confine your answer to *three* sentences!
2. Draw the three-dimensional structure of (**S**)-(-)-**a**-phenylethylamine (Use wedge/dashed/solid line notation).
3. Draw the three-dimensional structure of (**S**)-(+)-O-acetylmandelic acid.
4. Propose methods of resolving each of the following racemic compounds:
 - a)



b)



5. Calculate the specific rotation of a substance that is dissolved in a solvent (0.4 g/mL) and that has an observed rotation of -10° as determined with a 0.5-dm cell. Show your work!

6. What is the optical purity of a partially racemized product if the calculated specific rotation is -8° and the pure enantiomer has a specific rotation of -10° ? Show your work!

7. Calculate the percentage of each enantiomer in the partially racemized product described in question 6. Show your work!