Names: _____ *Section_____*

Chem 226/ Fall 2008 *Dr. Rusay*

Optical Rotation / Polarimetry (PART 1)

Refer to Class Notes and the Web page listed below

Work in pairs. There will be no need for a formal report and records in your lab notebook for PARTS 1 and 2 of this experiment, only PART 3. Complete this form and the questions in PART 2 for the on-line *jmol* structures, and turn-in before beginning PART 3 (Enantiomeric Resolution of (+/-) Ibuprofen). Keep a copy for your records.

PART I: Optical rotation, optical purity, enantiomeric excess

http://chemconnections.org/organic/chem226/226assign-08.html#polarimetry

Olfactory discrimination of enantiomers is possible as you have seen with carvone. In PART I of this experiment you will determine the optical purity of a sample of carvone using a polarimeter and relate your experimental results to the enantiomer's smell, physical properties and absolute configuration. Each partner should independently determine α for the unknown carvone solution A that has been prepared for you. Unknown Bhas it's data provided. Take the average of the two and then calculate [α] for each of the carvone unknowns. Show your calculations below the Table.

Experimental Data:

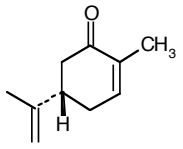
Cell path length = 100. mm	*Temperature =* 25 °C	λ = *589 nm* (sodium D)	*solvent =* ethanol	$\alpha_{solvent}$ = 0°

	Mass (mg)	Volume (mL)	α_1	α_2	α_{avg}	[α] (calc.)	Smell: (mint , caraway or cannot tell)
Unknown A	4,002	25.00					
Unknown B	3,945	25.00	+7.0°	+7.1°	+7.05°		

Calculations:

$[\alpha]_A$ = $[\alpha]_B$ =

Consult the chemical literature and complete the following table of physical / optical data for the respective carvone enantiomers. (To detemine the absolute configurations (R- or S-) refer to the structure below of d-carvone.)



	boiling point	density	[α]	Abs. Config.
d-carvone				
l-carvone				

Using the literature and experimental data complete the following questions for the unknowns A and B. Show your calculations for optical purity and enamtiomeric excess.

	optical purity	% R-	% S-	Enantiomeric Excess: (%) *indicate* *d-* or *l-*	Smell
Unknown A					
Unknown B					

Calculations:
Optical Purity (Enantiomeric Excess) A

Optical Purity B (Enantiomeric Excess B)

A) Are the observed smells consistent with your results? Briefly discuss.

B) The LD_{50} for racemic carvone is reported as 1640 mg/kg . 1) Is carvone considered toxic? 2) Would you expect this value to be the same for each enantiomer? Briefly explain your answer.