## Optical Rotation / Polarimetry Report Form
### Refer to Lehman Operation #31

Work in pairs. There will be no need for formal recording in your lab notebook for this experiment. Complete this form and answer the Web questions from the assignmment page, attach and turn-in form. Keep a copy for your records. *http://chemconnections.llnl.gov/organic/Chem226/226assign-05.html*

### Part I: Optical rotation, optical purity, enantiomeric excess

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 2 samples of carvone and relate your experimental results to the enantiomer's smell, physical properties and absolute configuration. Each partner should independently determine $\alpha$ for both of the unknown carvone solutions A & B that have been prepared for you. Take the average of the two and then calculate $[\alpha]$ for each of the carvone unknowns. Show your calculations below the Table.

*Experimental Data:*

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

|  | Mass (mg) | Volume (mL) | $\alpha_1$ | $\alpha_2$ | $\alpha_{avg}$ | $[\alpha]$ (calc.) | Smell: (mint , caraway or cannot tell) |
|---|---|---|---|---|---|---|---|
| Unknown A | 4,002 | 25.00 |  |  |  |  |  |
| Unknown B | 3,945 | 25.00 | +1.8° | +1.7° | +1.75° |  |  |

*Calculations:*

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

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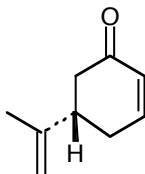


|  | boiling point | density | $[\alpha]$ | Abs. Config. |
|---|---|---|---|---|
| d-carvone |  |  |  |  |
| l-carvone |  |  |  |  |

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.