Name _____ Partner Name _____

TA Name _____ Section Letter _____ Day _____ Time _____

Experiment 2 Worksheet – Perkin Condensation: Synthesis of *trans*-Cinnamic Acid

Use as reference for notebook preparation – submit on Canvas this individually after lab

Pre-Lab Requirements

1. **Dress for lab** – see safety rules – arrive a few minutes early
2. Copy these templates into your lab notebook – contact instructors for alternate accommodations
   - Fill in the **purpose with structures** and **reagent table**
   - **Procedure Diagrams** – must be complete before you can start the lab

A. Experimental Purpose and Perkin Condensation Reaction Scheme

B. Reagent Table

Refer to the procedure for amounts and safety table for hazards; find the chemical properties on Wikipedia!

Name	Volume	Density	Mass	MW	mmol	Equiv*	Boiling or melting point	Hazards
Benzaldehyde (PhCHO)								
Acetic anhydride (Ac_2O)								
Potassium acetate	-	-						
trans-cinnamic acid (product)	-							

*** Equiv** = molar equivalents of reaction components with respect to the limiting reagent (benzaldehyde)

- Acetic Anhydride (reagent): divide the mmol of reagent by the mmol of salicylic acid

C. Procedure Diagrams - on as many pages as needed.

- All **labeled equipment, chemical names** with **amounts**, **transfers**, **cleanup & safety** notes
    - Help w diagrams: Slugs@home Exp 2 website & class notes

Experiment segments

1. **Reaction setup** – all equipment and chemicals (name, structure, and amount)
2. **Reaction workup** – flow chart / diagrams of separatory funnel contents and all solution transfers
3. **Analysis** – NMR and IR sample preparation; sketches of spectra, identifying key signals

E. Data & Observations

Volume of benzaldehyde _____ mL Theoretical yield of t-cinnamic acid _____ mg

Theoretical Yield Calculation:

Product Loss– list the amount and specific reason for the loss

Crude yield of product, *trans*-cinnamic acid = _____ mg

III. Spectroscopic Analysis – Analyze the IR obtained in lab and NMR spectrum on the Slugs@home website. Identify any signals within the expected range. It is acceptable for a signal to be "not observed."

Benzaldehyde IR

Functional Group	Bond	Expected Wavenumber Range (cm^{-1})	Observed Wavenumber (cm^{-1})

^{1}H NMR of benzaldehyde
(draw structure with labels)

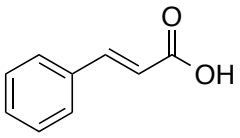
^{13}C NMR of benzaldehyde

Signal	Integration (#H's)	Splitting	Chemical Shift Expected (ppm)	Chemical Shift Observed (ppm)	Signal	Chem Shift Expected (ppm)	Chem Shift Observed (ppm)
A					A'		
B					B'		
C					C'		
D					D'		
					E'		

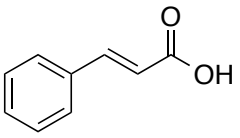
III. Spectroscopic Analysis - Analyze the IR obtained in lab and preview the NMR spectra on the Slugs@home website. Your NMR spectra will be shared on Canvas a few days after lab. Identify any signals within the expected range. It is acceptable for a signal to be "not observed."

***trans*-cinnamic acid IR**

Functional Group	Bond	Expected Wavenumber Range (cm^{-1})	Observed Wavenumber (cm^{-1})



^{1}H NMR of *trans*-Cinnamic Acid



^{13}C NMR

Signal	Integration (#H's)	Splitting	Chemical Shift Expected (ppm)	Chemical Shift Observed (ppm)	Signal	Chem Shift Expected (ppm)	Chem Shift Observed (ppm)
A					**A'**		
B					**B'**		
C					**C'**		
D					**D'**		
E					**E'**		
F					**F'**		
					G'		