MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Chemistry

5.311 DATA SUMMARY SHEET FALL 2005

Student name: _____ TA name: _____

Group: A / B (Please circle) Section: MW / TR (Please circle)

EXPERIMENT 1: KINETICS

molar absorptivity (ε)	
k_{obs}	
k_o	
k_{real}	
Z_1Z_2	
Correlation coefficient (R) Debye-Huckel plot	
temperature (t)	
activation energy (E_a)	
Arrhenius paramenter (A)	
Correlation coefficient (R) Arrhenius plot	

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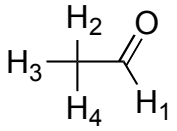
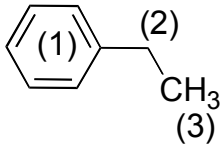
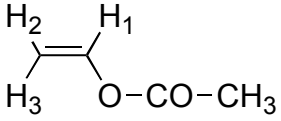
EXPERIMENT 2: Nuclear Magnetic Resonance



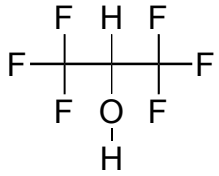
Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings
H_1				
H_2				
H_3				
H_4				



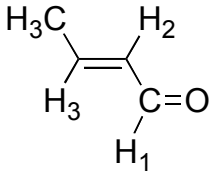
Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings
H_1				
H_2				
H_3				



Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings
H_1				
H_2				
H_3				



Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings
-OH				
-CH				



Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings
H_1				
H_2				
H_3				
CH_3				

Unknown #: Structure:

Identity:

Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings

Unknown #: Structure:

Identity:

Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings

Unknown #: Structure:

Identity:

Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings

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EXPERIMENT 3: Unknown Aromatic Carboxylic Acid

A.

Unknown number	Experimental melting point of the acid	Equivalent weight of the acid	pKa of the acid	Identity of the carboxylic acid
	Crude: Recrystallized:			

Yield of acid	Theoretical yield	Percent yield
Crude:		
Recrystallized:	*	*

*base on the mass of crude used in the recrystallization. Mass of crude used_____

B.

	Titration 1	Titration 2	Titration 3
Calculated molarity of the sodium hydroxide solution for each titration with error propagation			

Report any additional titrations on an additional page.

	reading the buret	mass	endpoint location
Estimated uncertainty in measurement			

95% Confidence limits: _____

Average propagated error: _____

Concentration of NaOH: _____

C.

	Titration 1	Titration 2	Titration 3
Calculated equivalent weight from each titration with error propagation			

Report any additional titrations on an additional page.

95% Confidence limits of mean equivalent weight: _____

Average propagated error in equivalent weight: _____

D.

	Titration 1	Titration 2	Titration 3
Calculated V_e from each titration with error propagation			

	Titration 1	Titration 2	Titration 3
Calculated pKa from each titration			

Report any additional titrations on an additional page.

pKa: _____

95% Confidence limits of pKa: _____

Unknown #: Structure:

Identity of Carboxylic Acid:

Proton	Chemical Shift (ppm)	Multiplicity	Integration	J-Couplings

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EXPERIMENT 4: Ferrocene and Acetylferrocenes

Yield of ferrocene from synthesis (crude)	Limiting reagent	Theoretical yield	Percent yield

	Mass of pure ferrocene	Theoretical yield (based on the mass used in technique)	Percent yield (based on the mass used in technique)
Sublimation			
Recrystallization			

mass [emim]I	mass $AlCl_3$	mass ferrocene	volume acetic anhydride	time stirring	crude yield

Observations TLC (including R_f values, solvent systems): Please provide in a table on the reverse.

GCMS results	Ferrocene (FW=186)	Acetylferrocene (FW=228)	Diacetyl ferrocene (FW=270)

Solvent system used for column chromatography: _____

	Ferrocene (unreacted)	Acetylferrocene	Diacetyl ferrocene	Diacetyl ferrocene
Yield				
Percent Yield				
Melting Point Range				