Name: _____ SID: _____

Signature: _____

PRINT YOUR NAME CLEARLY!!

Chem 3BL Su08 **Final Exam** **11AUG08**
Neil O.L. Viernes

This exam has 9 pages; **make sure you have them all.**

Please place answers in designated spaces. **Please write clearly.** Messy or ambiguous answers will not be graded.

This exam is 60 minutes long. No clarifying questions will be answered by the GSI's after the exam begins.

Mark one of the following. If you are enrolled in Chem 3BL, mark off your laboratory section.

___ Completing I Grade

___ 101 – Michael Chiang

___ 102 – Daniel Cordaro

___ 103 – Michael Gribble

___ 104 – Elton Chan

___ 105 – Ying Zhang

___ 106 – Greg Dallinger

___ 201 – Joshua Wong

___ 202 – Margaret Wei

___ 203 – Steven Vu

___ 204 – Aaron Low

___ 205 – Brian Ikkanda

___ 206 – Silvio Levy

Do not write in this box
1) _____ (8)
2) _____ (12)
3) _____ (12)
4) _____ (6)
Total: _____ (38)

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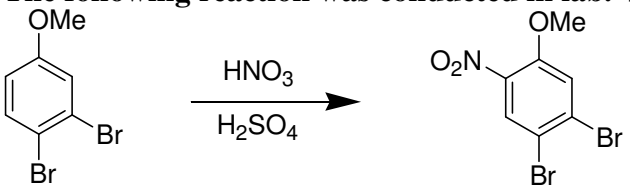
1) (8 pts)

The following reaction was conducted in lab. Show your work for the calculations below.



(1) **(2)**

What is the molecular weight of the starting material (1)?

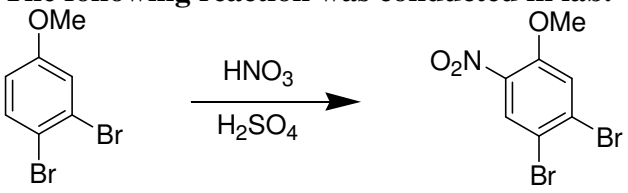
If 0.25g of the starting material was added to the reaction and 1.1 equivalents of HNO_3 is necessary, calculate how many grams of nitric acid would be needed for the reaction.

If 0.25g of the starting material (1) was used in the reaction and it was the limiting reagent, calculate the theoretical yield.

Using the amount of starting material (1) indicated above and assuming that (1) is the limiting reagent, 0.20g of the product (2) was recovered. Calculate the yield of the reaction.

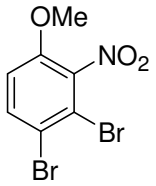
2) (12 pts)

The following reaction was conducted in lab.



(1) **(2)**

Impurity (3) was also recovered from the reaction. ^{1}H NMR spectra for both of the compounds (2) and (3) were obtained but were not labeled. Determine how you would differentiate between the proton spectra for compounds (2) and (3).

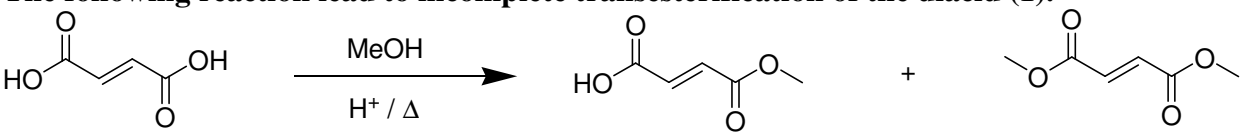


(3)

Draw the splitting tree for a quartet-triplet with a coupling constant of 6 and 2 respectively. Also provide the expected ratios for each peak.

3) (12 pts)

The following reaction lead to incomplete transesterification of the diacid (1).



(1) **(2)** **(3)**

The reaction mixture was neutralized and 2 mL of 1 M NaOH was added. Extraction was conducted with 2 mL of ether.

Identify layers (ether or aqueous) and indicate where you would expect compound (2) and (3).

Indicate if compounds (2) or (3) would have the largest or smallest R_f value if TLC's were taken with the following solid phases.

	SiO_2	C_8
(2)		
(3)		

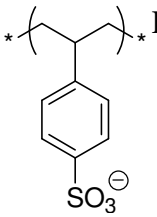
How would you change the solvent system to decrease the R_f of compound (3) with SiO_2 as the solid phase?

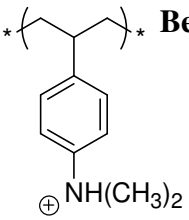
4) (6 pts)

Identify the best technique to purify the product boxed from each mixture.

A = SiO_2 Column Chromatography

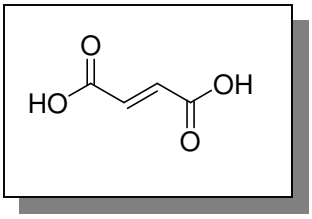
B = C_8 Column Chromatography

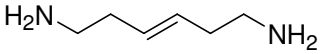
C = Ion Exchange Chromatography with  **Beads**

D = Ion Exchange Chromatography with  **Beads**

E = Size Exclusion Chromatography

F = Affinity Chromatography





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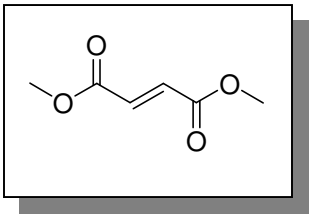

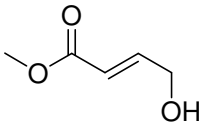

_____

Polystyrene
Mw = 300,000

Polystyrene
Mw = 30,000

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