

Name: \_\_\_\_\_

SID: \_\_\_\_\_

Signature: \_\_\_\_\_

**PRINT YOUR  
NAME CLEARLY!!**

**Chem 3BL Sp09  
Neil O.L. Viernes**

**Final Exam**

**07MAY09**

This exam has 10 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.**

\_\_\_ Completing I Grade

\_\_\_ 101 JASON HUDAK

\_\_\_ 501 PETER HILLMAN

\_\_\_ 102 THOMAS HOLCOMBE

\_\_\_ 502 SEAN ANDREWS

\_\_\_ 111 PARAM DHILLON (MON)

\_\_\_ 511 TIM DAVENPORT

\_\_\_ 112 MASSIMO PACILLI

\_\_\_ 512 CYRUS MAHER (FRI)

\_\_\_ 113 JAMES NELSON

\_\_\_ 211 ANDREW CHUNG

\_\_\_ 212 SIRILATA YOTPHAN

\_\_\_ 301 CYRUS MAHER (WED)

\_\_\_ 302 AMY WEEKS

\_\_\_ 311 MIKA SHIRAMIZU

\_\_\_ 312 PARAM DHILLON (WED)

\_\_\_ 411 DIANA UMENE

**Do not write in this box**

1) \_\_\_\_\_ (6)

2) \_\_\_\_\_ (8)

3) \_\_\_\_\_ (10)

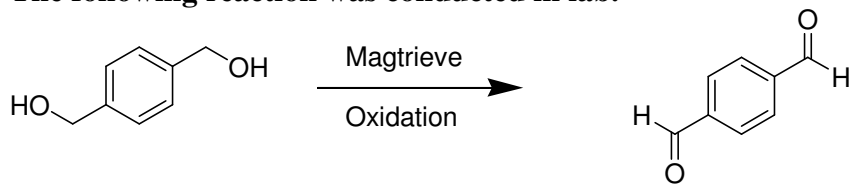
4) \_\_\_\_\_ (7)

5) \_\_\_\_\_ (7)

**Total:** \_\_\_\_\_ (38)

1) (6 pts)

The following reaction was conducted in lab.



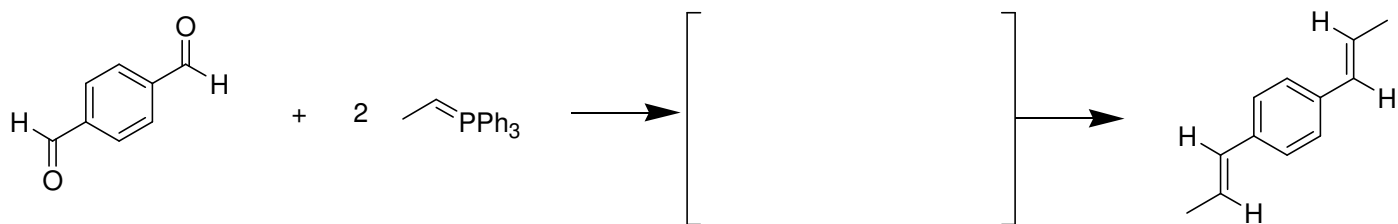
What is the molecular weight of the product?

If 250 mg of the starting material was used, what is the theoretical yield of the reaction?

The % yield of the transformation is 95%. How many mmols of aldehyde is recovered?

2) (8 pts)

The following reaction was conducted in lab.

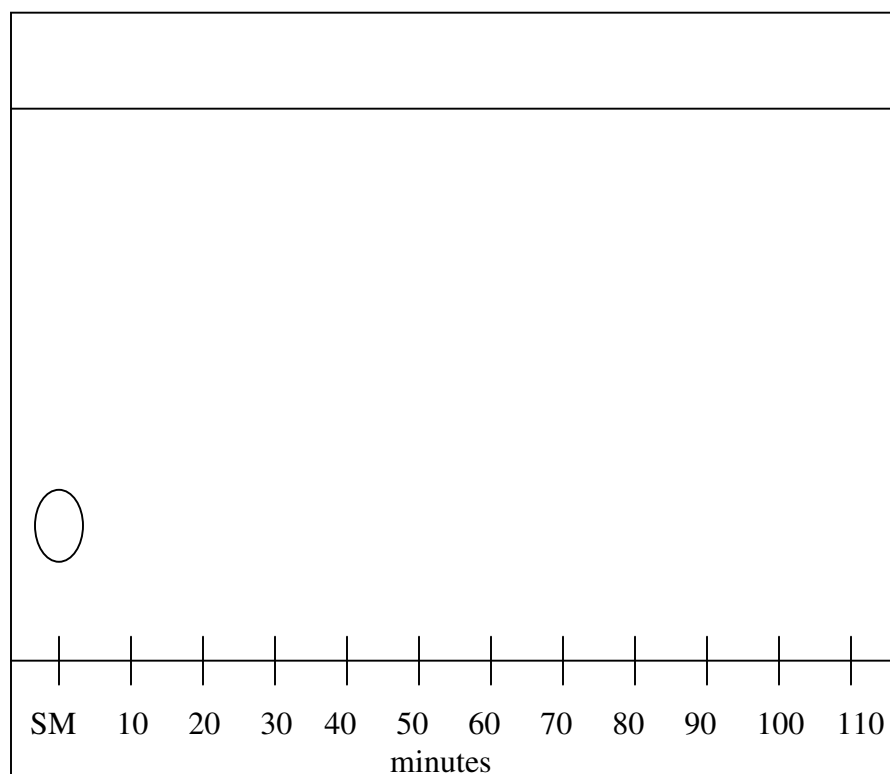


Draw the structure of the intermediate formed in the reaction between the brackets of the reaction above.

Complete the following TLC plate for the reaction with the following additional information:

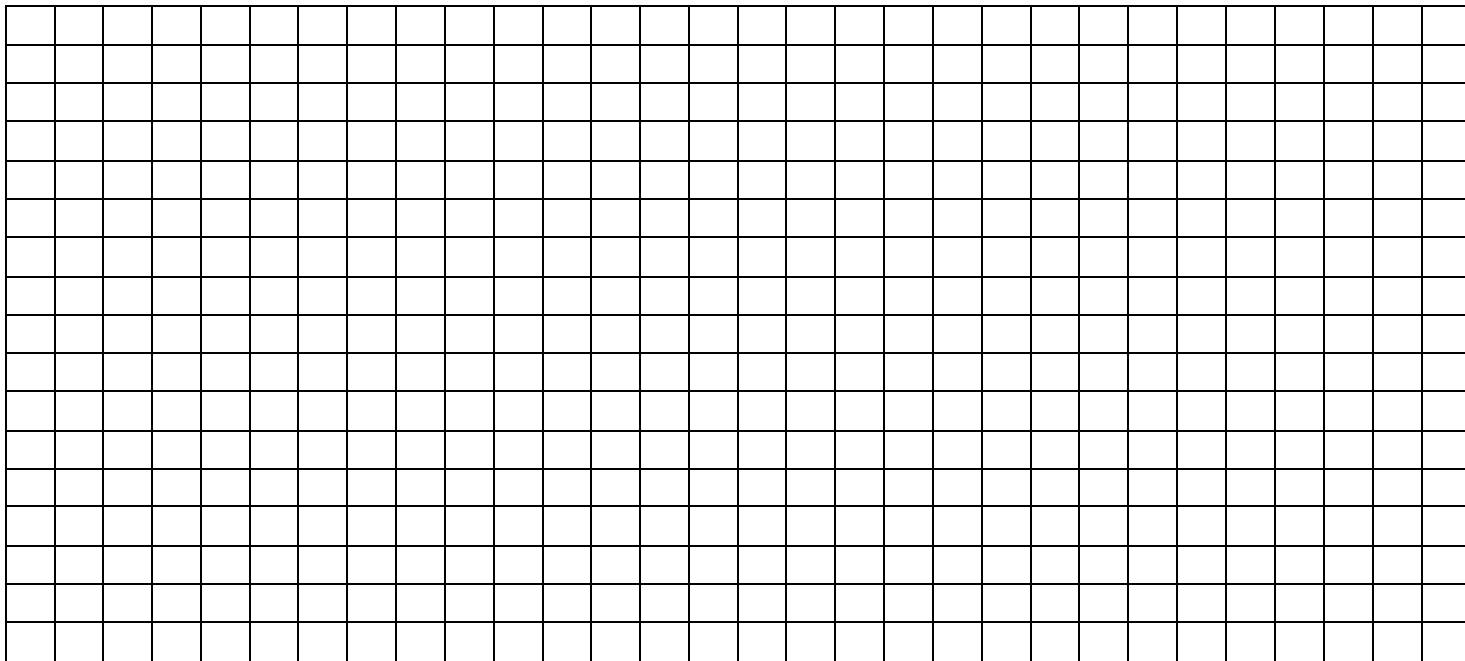
- 1) The starting material aldehyde is not observed after 65 minutes
- 2) The intermediate is observed after 15 minutes
- 3) The product is observed after 35 minutes
- 4) The reaction is complete after 95 minutes

The starting material aldehyde is identified on the TLC plate as SM. Samples of the reaction were spotted every 10 minutes.

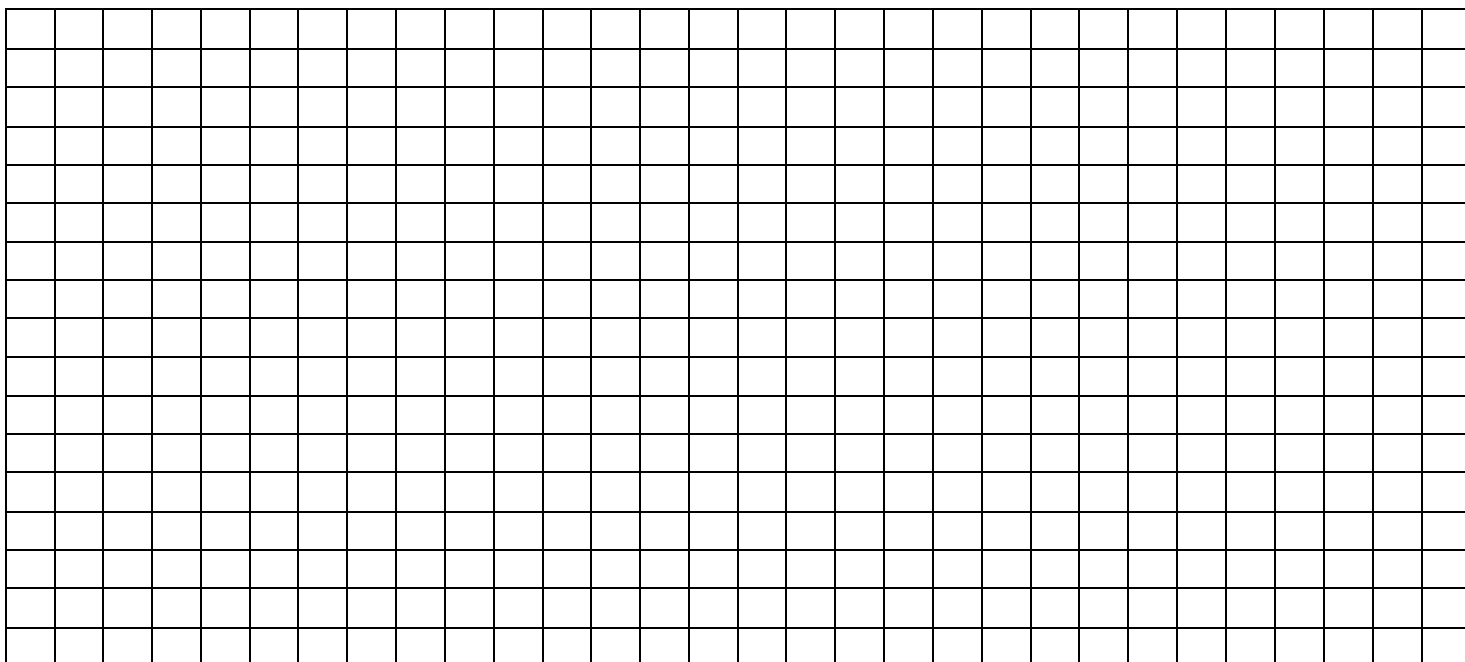


3) (10 pts)

Describe the splitting observed below. Include the coupling constants in your answer.

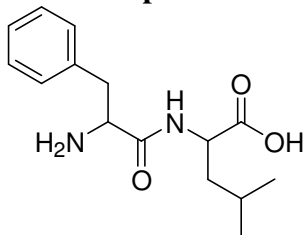


Draw the splitting tree for a doublet-triplet with a coupling constant of 4 and 2 respectively. Also provide the expected ratios for each peak.

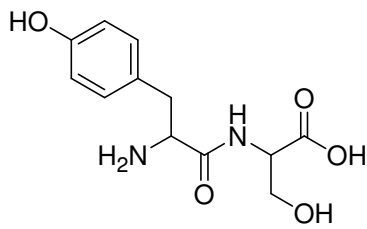


4) (7 pts)

Reversed-phase column chromatography was used to separate the following dipeptides.



(1)



(2)

Which of the two dipeptides would elute off of the column first?

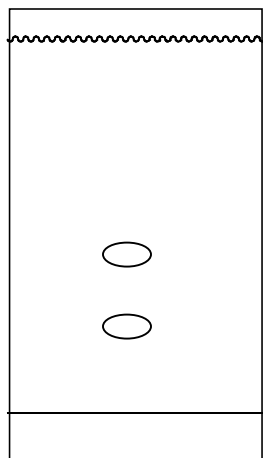
Jane separated and isolated both dipeptides using a 3:7 Acetonitrile:H<sub>2</sub>O solvent system.

Michael separated and isolated both dipeptides using a 1:1 Acetonitrile:H<sub>2</sub>O solvent system.

Acetonitrile (H<sub>3</sub>CCN) is less polar than water.

Assuming that identical column conditions were used except for the solvent system, identify the student who will complete the separation first?

Jane's reversed-phase TLC is shown on the left. Predict the TLC Michael may observe using his solvent system. Be sure to label the spots in both TLC plates.



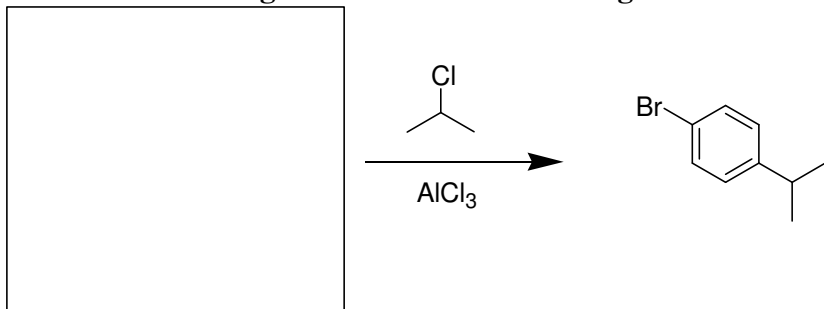
Jane



Michael

5) (7 pts)

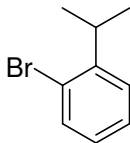
Provide the starting material for the following reaction.



How many non-equivalent hydrogens are found in the product?

How many non-equivalent carbons are found in the product?

Another possible product of the reaction is



How would you differentiate the two possible products using NMR (TWO SENTANCES OR LESS)?