

Name .....

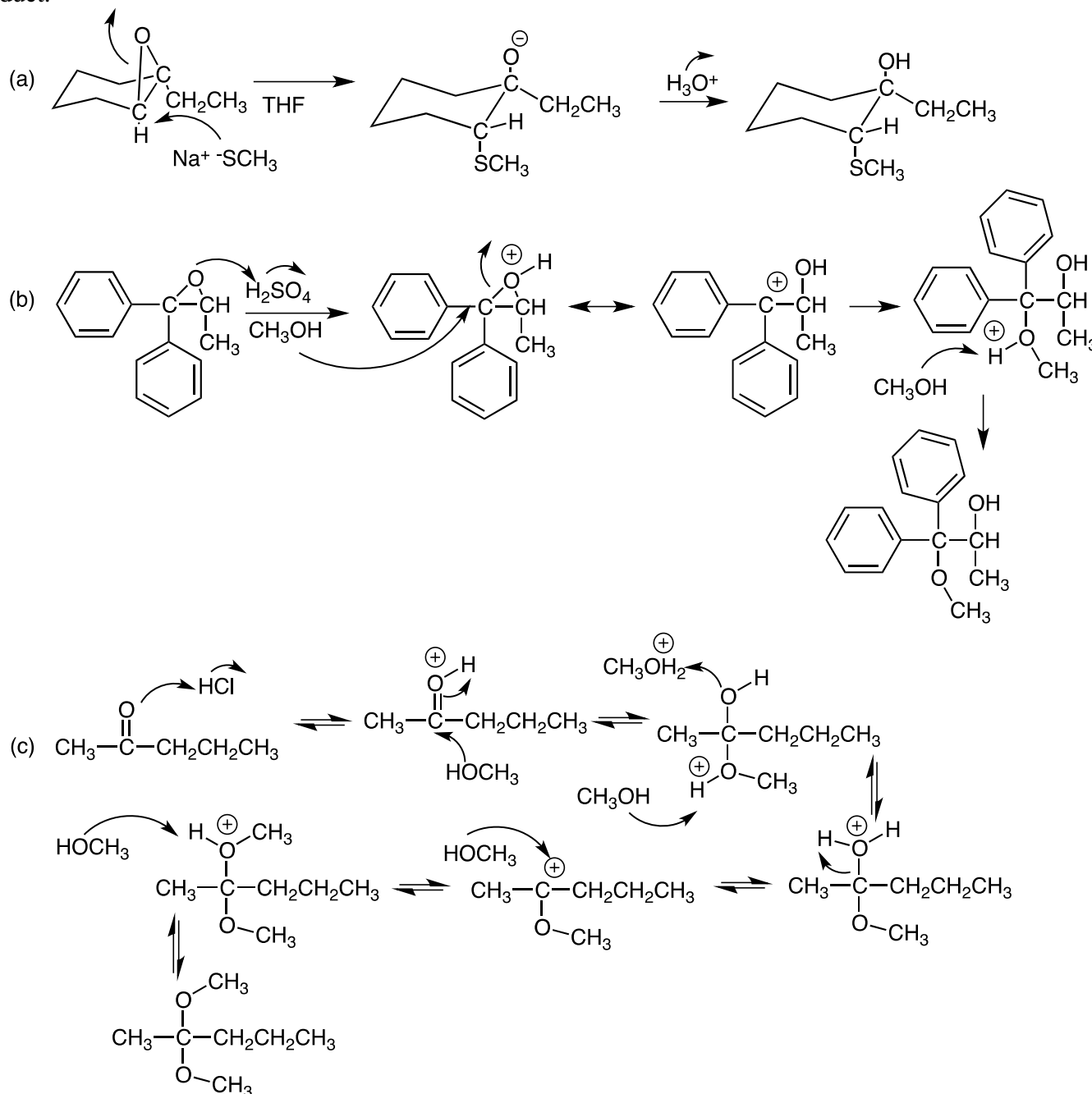
L.I.U.

Chem. 122, Sect 012,

Quiz 2, 50 pts, Spring, 2011

1. Give the product of the following reactions, showing the full reaction mechanism. Pay particular attention to stereochemistry where appropriate. (20 pts)

in (a) in basic conditions, the nucleophile attacks at the less substituted – and less hindered – carbon in (b) in acidic conditions, after protonation of the epoxide oxygen, the nucleophile attacks at the more substituted position because this is where most of the positive charge is located. In both cases we see anti-attack to give the trans product.

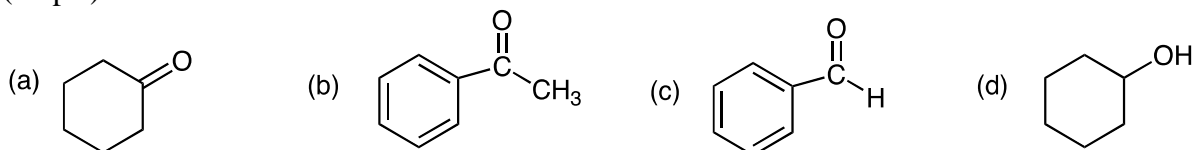


2. One student's unknown carbonyl compound formed a yellow-orange precipitate when shaken with 2,4-dinitrophenylhydrazine. It did not form a silver mirror when shaken with a solution of  $\text{Ag}^+(\text{NH}_3)_2$ . It did not form a yellow precipitate when shaken in a test tube containing a slight excess of  $\text{KI}/\text{I}_2$  in aqueous  $\text{NaOH}$ . Circle the

Name .....

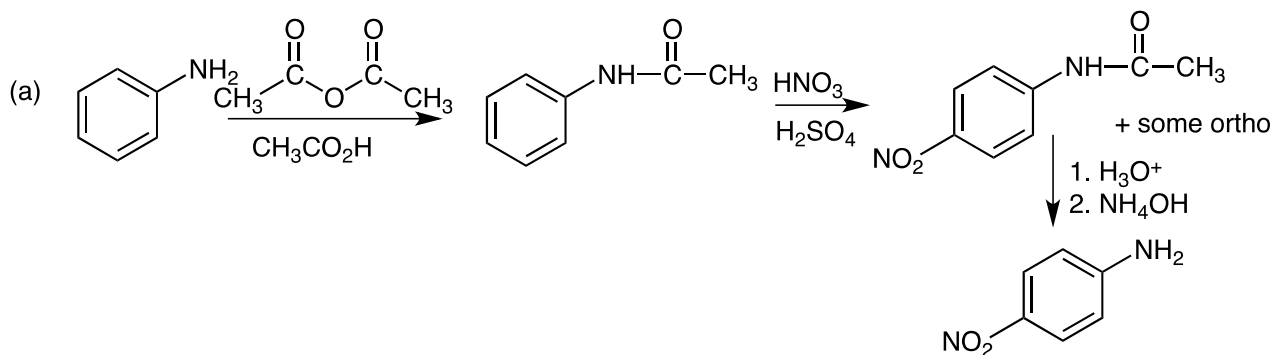
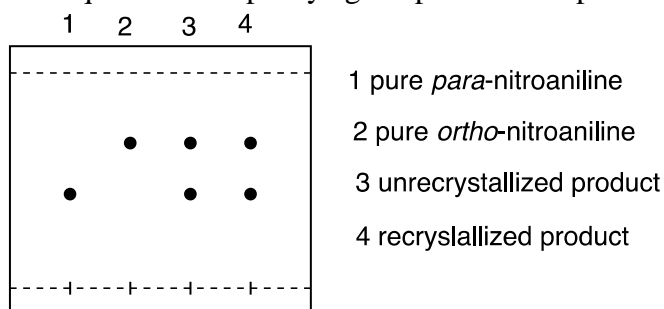
2

compound below which best fits this data. For partial credit briefly interpret the results of each of the three tests. (10 pts)



Ans: Since it formed a yellow precipitate with 2,4-DNP, it must be an aldehyde or ketone. This eliminates (d), which is an alcohol. It did not give a positive Tollen's test (Silver mirror), indication it is not an aldehyde. This eliminates (c). It did not give a positive iodoform test. This eliminates (b), making (a) the correct answer.

3. In the preparation of 2,4-dinitrophenylhydrazine (a) write the overall reaction, showing all three steps. (b) Explain briefly the purpose of putting on the acetyl group before doing the nitration. (c) Based on the tlc plate shown below, (i) did the student obtain a single pure product? Explain briefly. (ii) Was the recrystallization technique useful in purifying the product? Explain briefly.



(b) The acetyl group protects the aniline nitrogen against oxidation and protonation (which would give the *meta* product) and it partially blocks the *ortho* position.

(c) The student did not get one pure product but got some *ortho* product along with the desired *para*-nitroaniline. The recrystallization did not seem to be effective in separating this mixture because in the lane for the recrystallized material there are still two spots, indicating that there are still two products.