

290

Chemistry 172Q
April 14, 2005

Exam 4

1 _____/35

2 _____/15

3 _____/25

4 _____/30

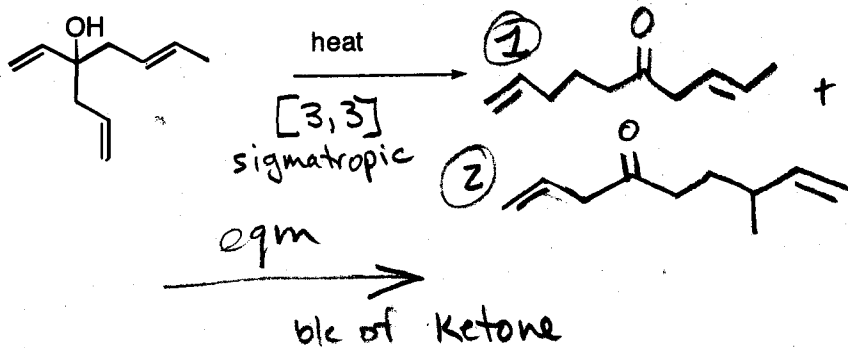
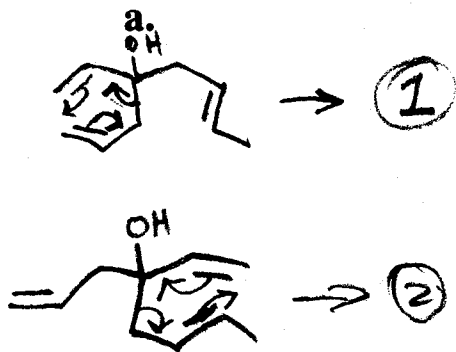
5 _____/20

Total _____/125

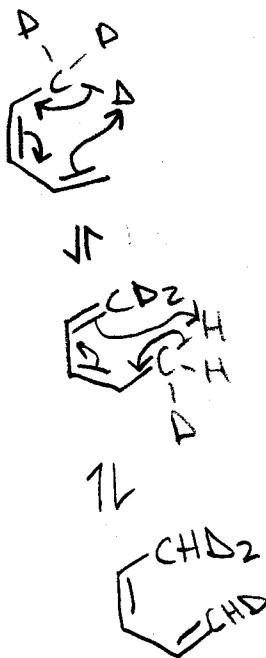
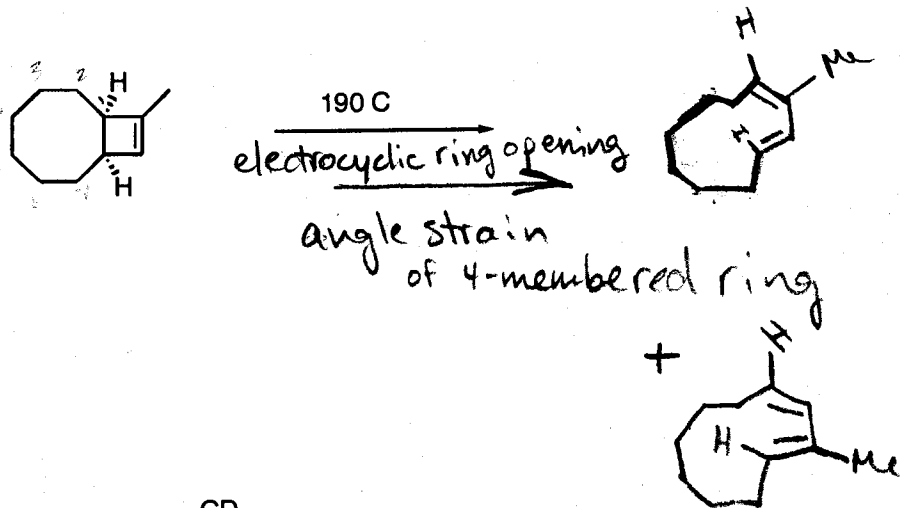
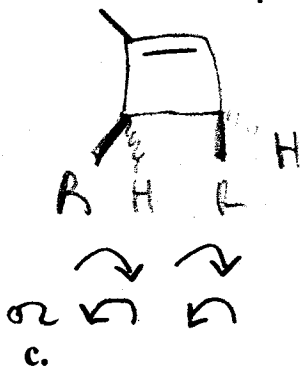
NAME

Answer Key

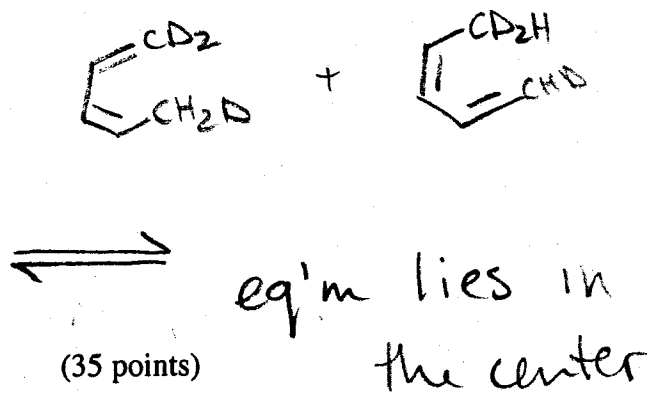
1. $\frac{1}{2}$ Give a mechanism, characterize the reaction type, and predict the products you would expect to observe in each reaction.



b. 4π , con.

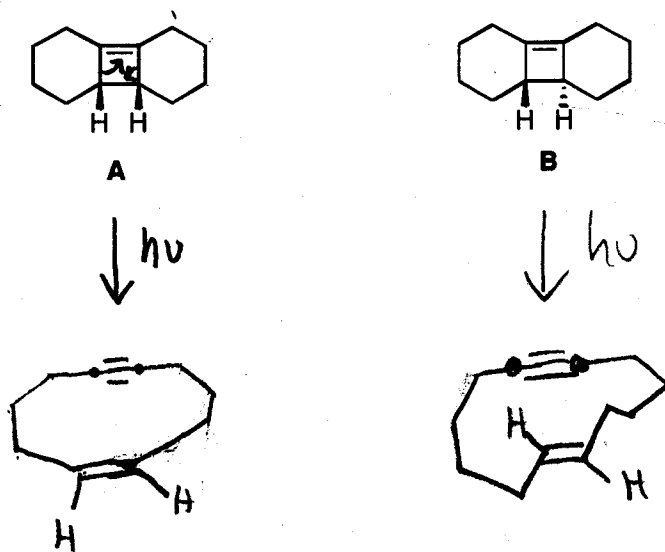


reaction of CD_3 [1,5] sigmatropic
under thermal conditions

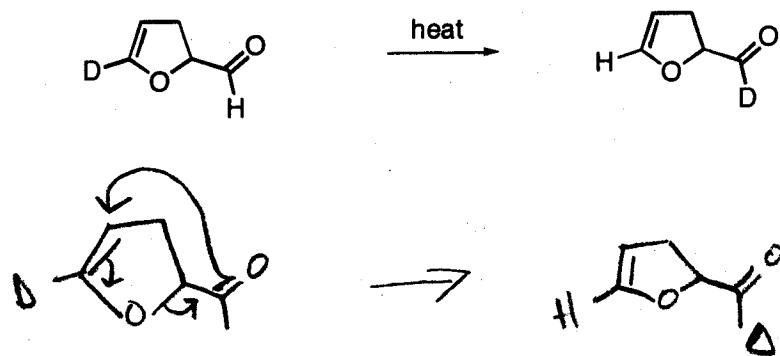


3.

- a. Under photochemical conditions, compound **A** reacts to give a *monocyclic* compound **A'**, while **B** reacts under the same conditions to give monocyclic **B'**. Give structures for **A'** and **B'**.

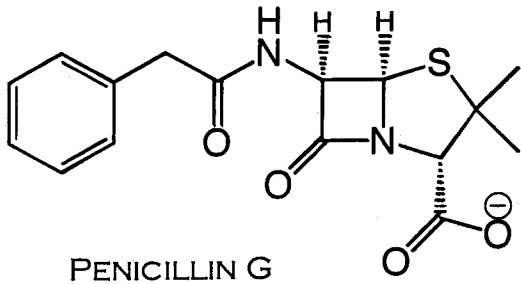


- b. Give the mechanism for the reaction below.



(25 points)

5. Penicillins (β -lactams) are powerful antibiotics that cause bacterial cells to rupture (see photo) by disrupting the enzyme responsible for inserting the dipeptide D-alanine-D-alanine into the bacterial cell wall.

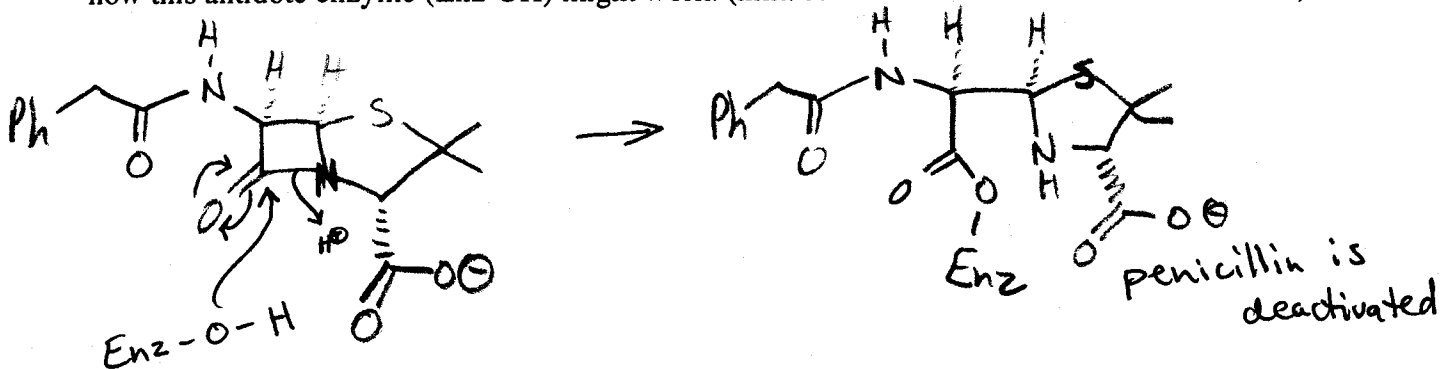


- a. Propose a mode of action for penicillin antibiotics (hint: ruptured cells have the drug molecule incorporated into their cell walls!)

Penicillin mimicks D-Alanine-D-alanine. The enzyme that builds the bacterial cell wall inserts penicillin instead of the dipeptide, making the cell wall unstable & leading to rupture.

or Penicillin acts as a suicide inhibitor, blocking the active site of the enzyme responsible for building bacterial cell walls. (6/10 this is a reasonable answer but it does not account for penicillin incorporation into the cell wall)

- b. Some bacteria are resistant to penicillin because they produce an antidote called " β -lactamase." Explain how this antidote enzyme (Enz-OH) might work. (hint: remember an "esterase" cleaves esters)



(20 points)

or the antidote can remove the offending penicillin that has been incorporated into the cell wall