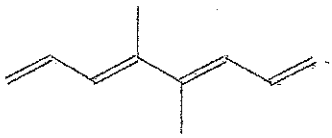
Fall 2011 final

1. What is the IUPAC name of the molecule shown below? (6 points, 6 minutes)

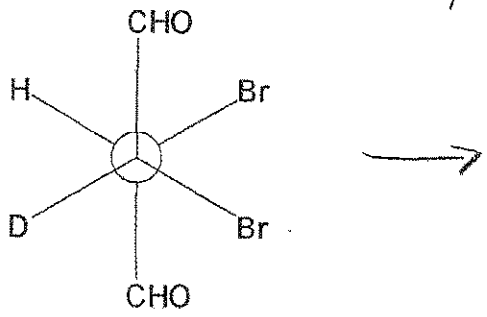


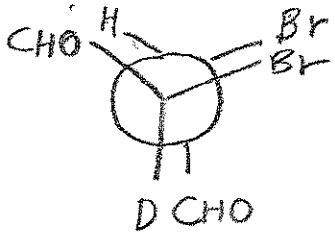
Ch. 2

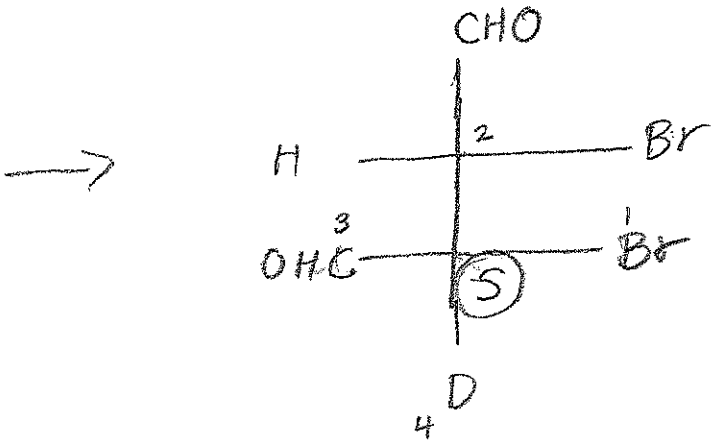
4, 5 - dimethyl -
1, 3, 5, 7 - octatetraene

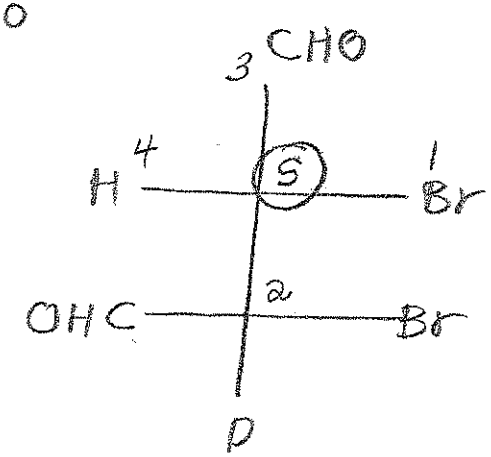
2a. How many chiral centers are present in the molecule shown below? 2 (7 points, 9 minutes)
2b. Label each chiral center as R or S.
2c. Is the overall molecule chiral? yes

Ch. 2 & 3

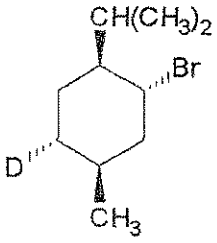




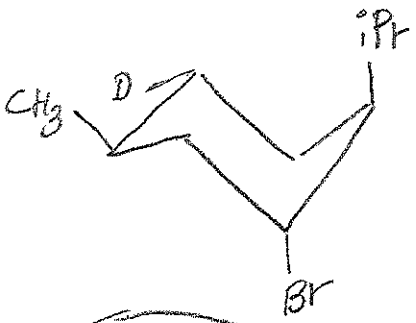


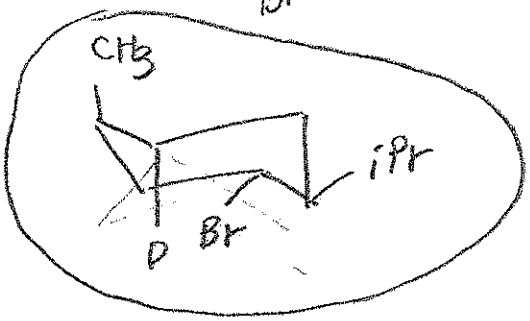


3. Draw both chair conformations of the molecule shown below and circle the one that is lower in energy. (7 points, 9 minutes)



Ch.2

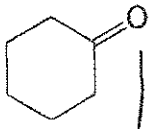




4. How could infra-red spectroscopy be used to distinguish between the following two compounds? (4 points, 4 minutes)

Ch.12

broad peak at ~ 3300 cm^{-1}



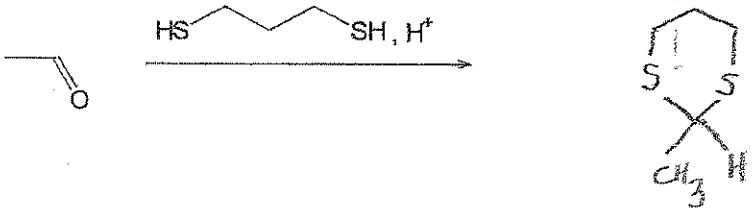
sharp, strong peak at ~ 1700 cm^{-1}

5. Show the **major** product or products of each of the following reactions. Do not show **minor** products. Be sure to show proper stereochemistry. (4 points each, 5 minutes each)

OMIT

Ch. 16

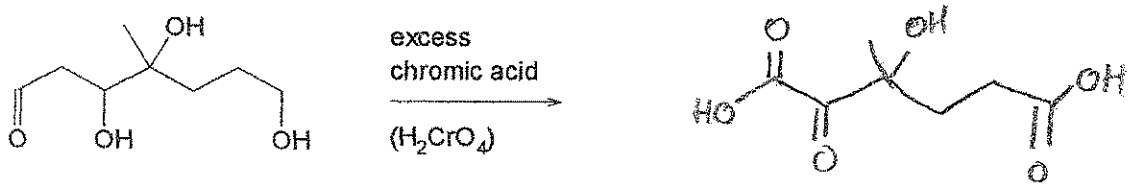
a.



OMIT

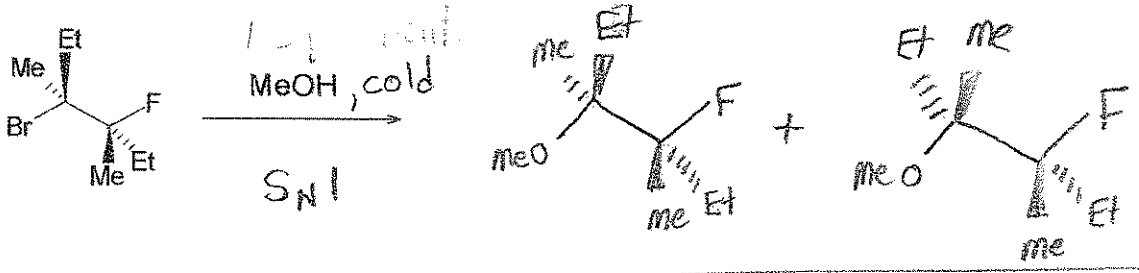
Ch. 10

b.

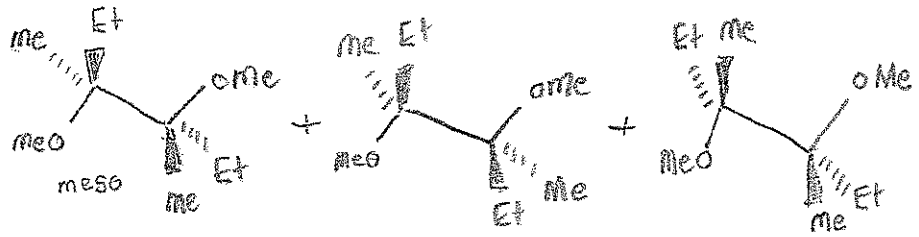


Ch. 9

c.

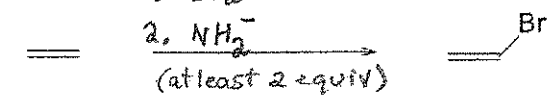


or



6. Give the reagent or reagents necessary to accomplish each of the following transformations. Number each step so it is clear when reagents must be added **together** or **separately**. Do **not** show **intermediates.** (4 points each, 5 minutes each)

a.



Ch. 6/7

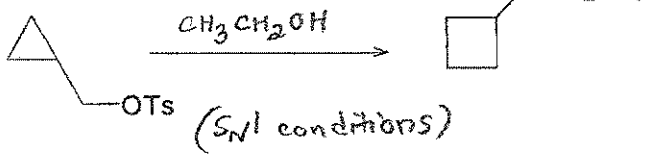
3. HBr

or

1. Br_2
2. NH_2^- 1 equiv

other strong bases are ok too

b.



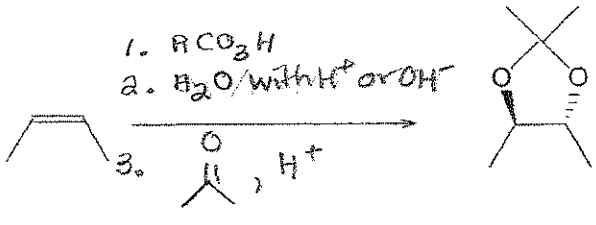
Ch. 9

NOTE:

~~OK~~ ^-OTs is a good leaving group

OMIT Ch. 11

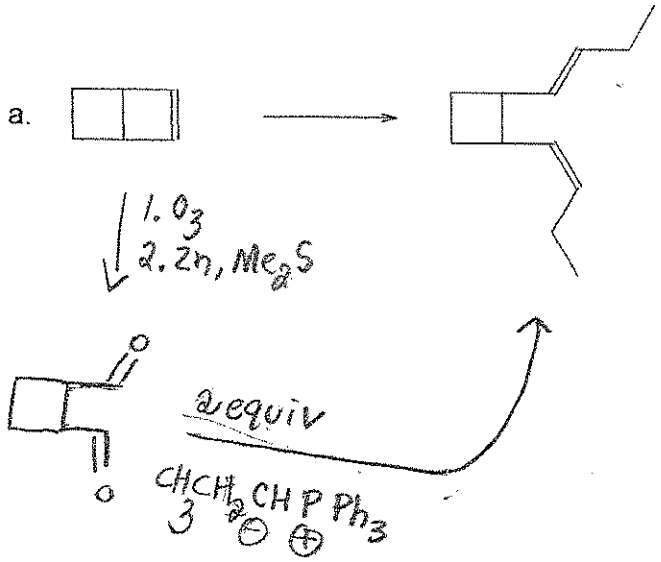
c.



78. Give the reagent or reagents necessary to accomplish each of the following synthetic transformations. Any needed carbon based reagents are allowed. **Show all intermediates.** (6 points each, 7 minutes each)

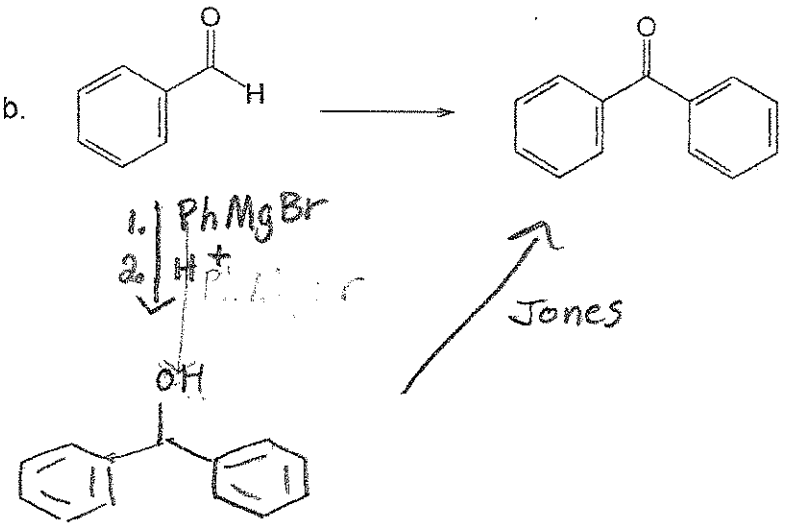
OMIT Ch. 16

a.



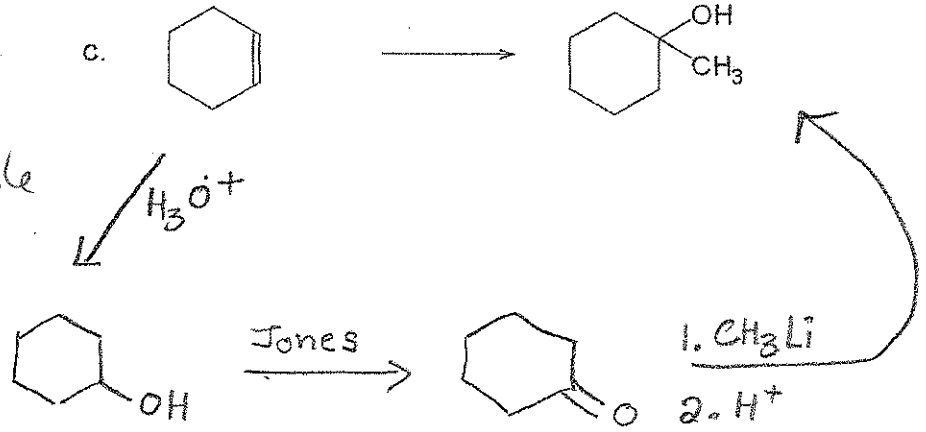
OMIT Ch. 10/16

b.



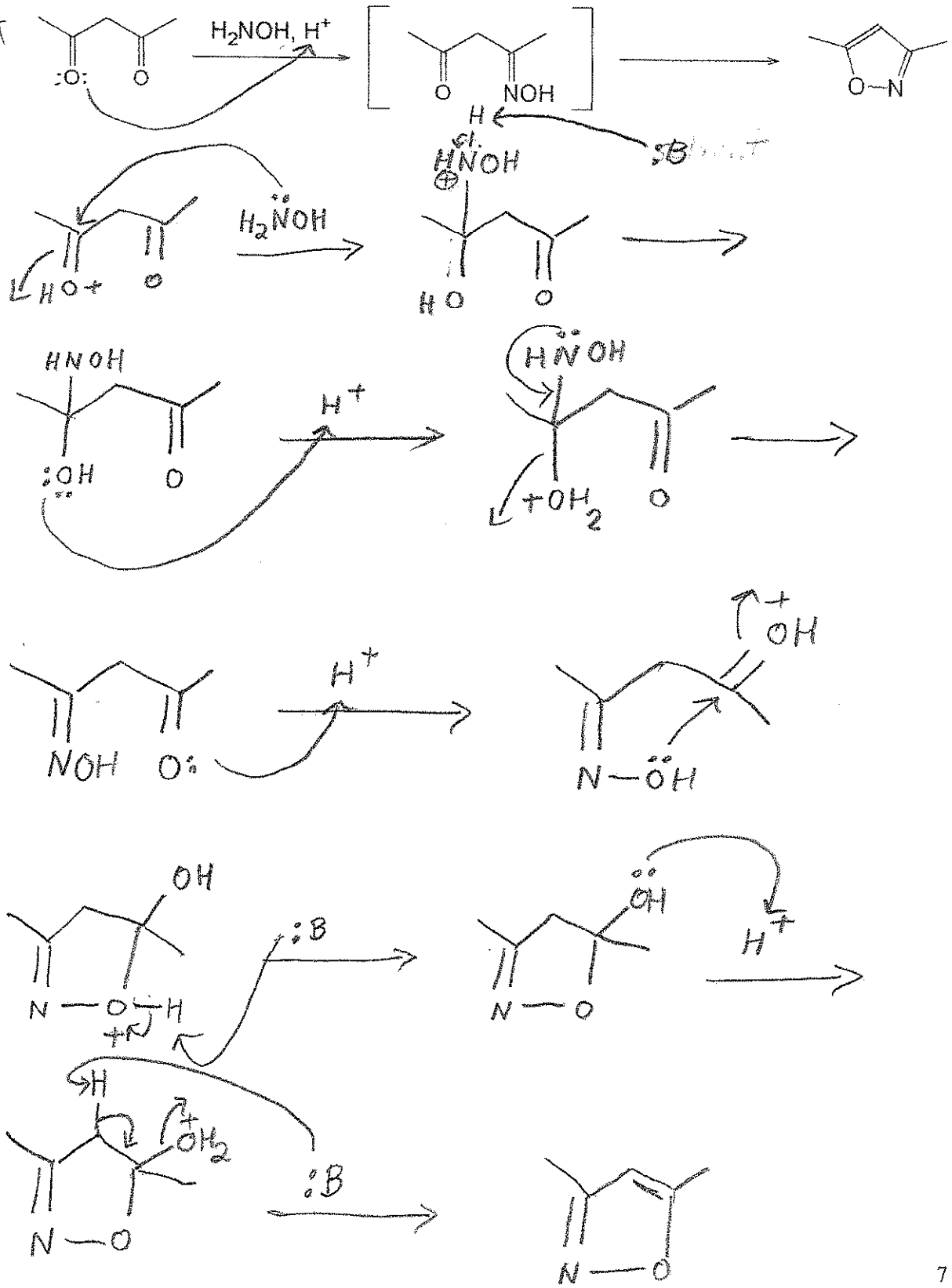
OMIT Ch. 10/16

c.



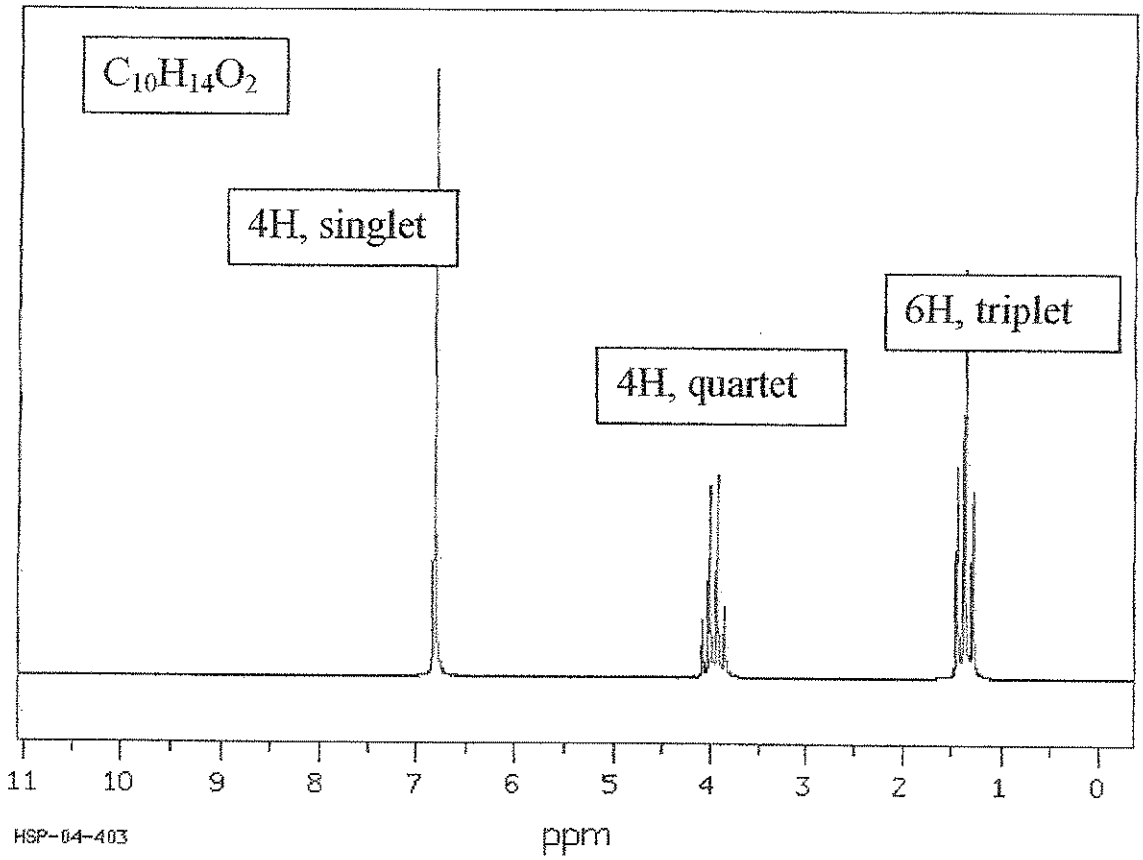
8 ¶. Show the mechanism for *both* steps of the following reaction. (18 points, 22 minutes)

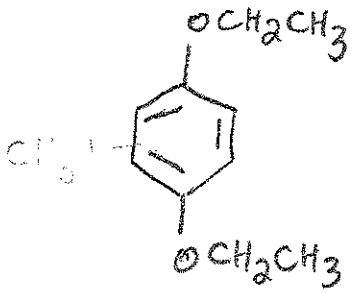
OMIT Ch. 16



9 & Determine the structure of the compound whose ^{1}H NMR spectrum is shown below. You must show your work in order to receive credit for your answer. (8 points, 10 minutes)

Ch.13





10%. Determine the structure of the compound whose ^{1}H NMR spectrum is shown below. You must show your work in order to receive credit for your answer. (8 points, 10 minutes)

Ch.13