

1. (5 points) For each multiple choice question, pick the most correct answer.

I. Which of the following is a derived lipid

- A. Fats
- B. Oils
- C. Steroids
- D. Waxes

II. Which of the following amino acids can form hydrogen bonds with their side (R) groups?

- A. Asparagine
- B. Aspartic acid
- C. Glutamine
- D. All of these

III. D-Alanine and L-Alanine are technically known as?

- A. Anomers
- B. Enantiomers
- C. Epimers
- D. Polymer

IV. Protein fluorescence arises primarily from which residue?

- A. Arginine
- B. Tryptophan
- C. Tyrosine
- D. Phenylalanine

V. Triacylglycerols are

- A. soluble in water
- B. insoluble in water
- C. soluble in water at elevated temperature
- D. partially soluble in water

VI. Cholesterol is the precursor of

- A. steroid hormones
- B. vitamin A
- C. bile salts
- D. both (a) and (c)

VII. Hydrolysis of lactose yields

- A. galactose and fructose
- B. galactose and glucose
- C. glucose and fructose
- D. fructose and galactose

VIII. The sugar which forms major component of nucleic acids is

- A. ribose
- B. galactose
- C. mannose
- D. maltose

IX. Nucleoside is a pyrimidine or purine base

- A. covalently bonded to a sugar
- B. ionically bonded to a sugar
- C. hydrogen bonded to a sugar
- D. none of the above

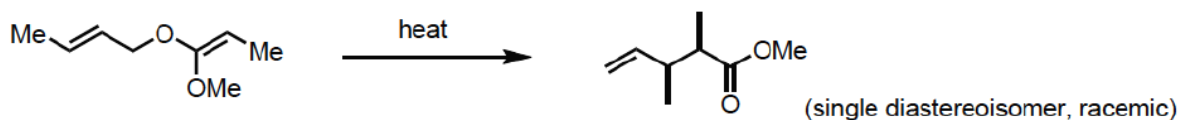
X. purine with an amine (NH₂) group on the 6th carbon is

- E. adenine
- F. cytosine
- G. thymine
- H. guanine

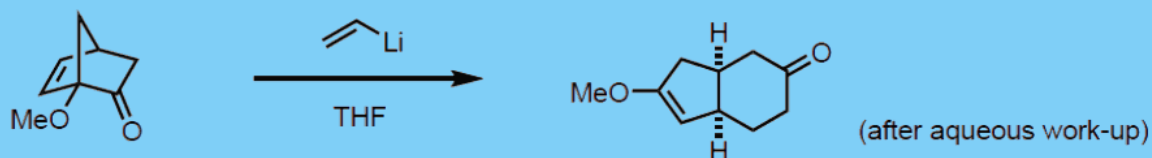
2. (5 points) Using dicyclohexylcarbodiimide (DCC) alone for the amide bond forming step is often unsatisfactory for peptide synthesis. Briefly explain why, show how the troublesome process occurs and what is done to circumvent the problem.

3. (4 points)

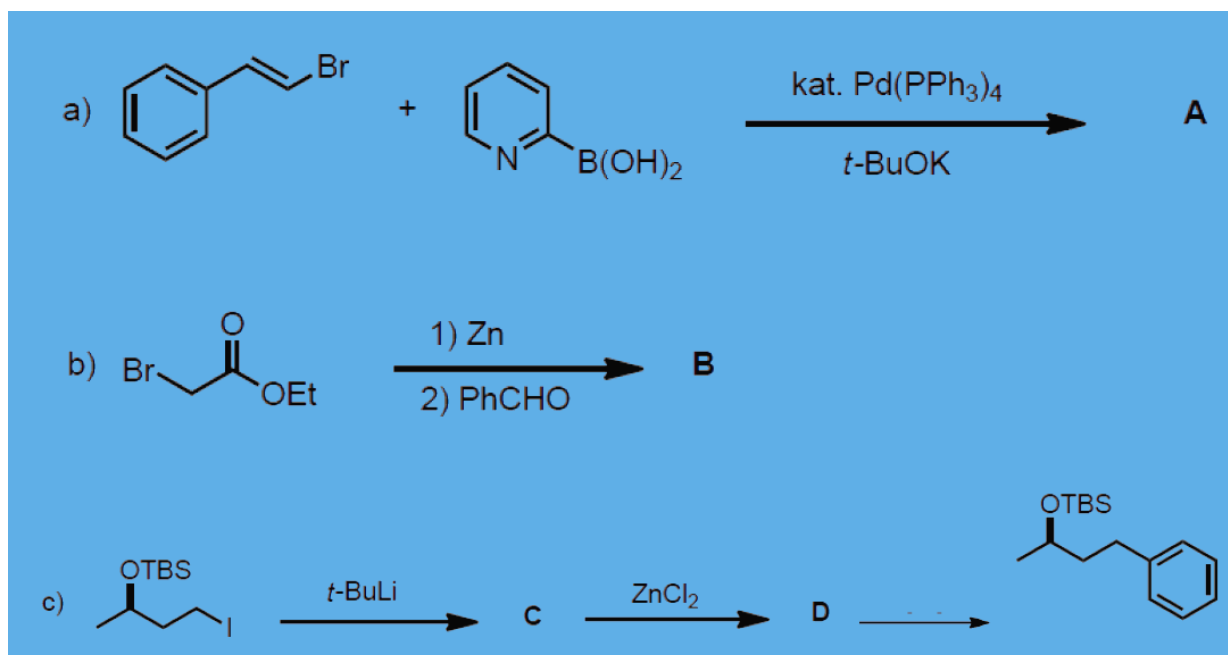
1. In the following sigmatropic rearrangement, a single diastereoisomer is formed. Explain the observed diastereoselectivity.



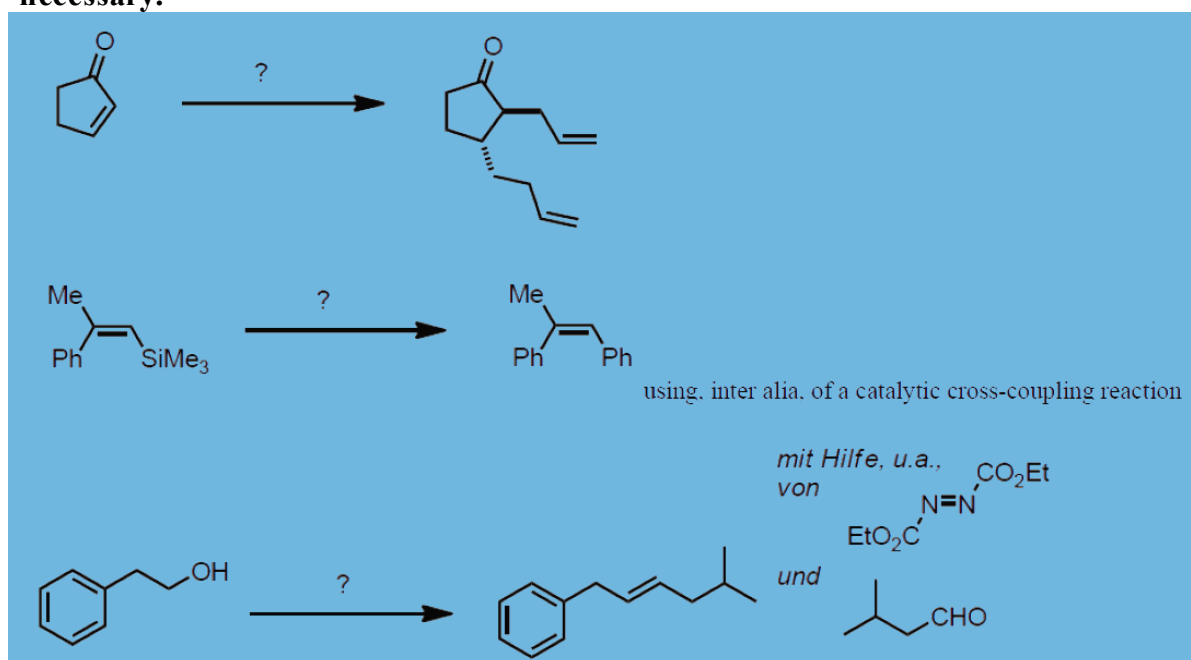
2. Propose a mechanism for the following transformation



4. (5 points) Which products are obtained in the following reactions? Formulate reasonable and complete mechanism.

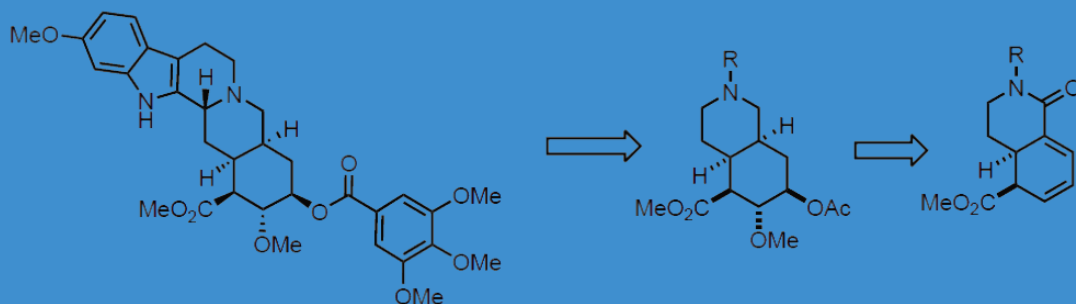


5. (5 points) How would you perform the following conversions? Several steps can be necessary.



6. (6 points)

Retrosynthetic analysis



Direct synthesis

