

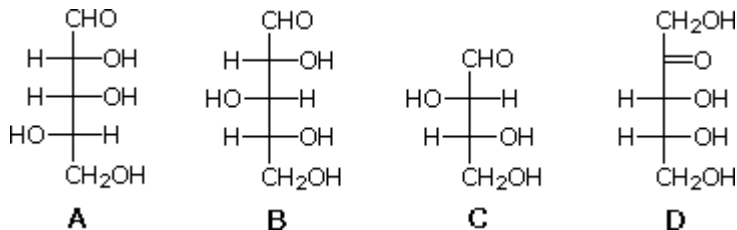
Name

Last name

17/12/2014

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

I. Which of the following is an L-saccharide?



II. Which of the following is **not** a disaccharide?

- A) sucrose
- B) mannose
- C) lactose
- D) maltose

III. Peptides are composed of amino acids joined by amide bonds. Which of the following statements is **not** correct?

- A) amide groups are more resistant to hydrolysis than are similar ester groups.
- B)  $p-\pi$  resonance stabilizes the amide bond.
- C) stable conformations of peptides are restricted to those having planar amide groups.
- D) amide groups do not participate in hydrogen bonding interactions.

IV. You have a mixture of three amino acids: E (pI=3.2), Y (pI=5.7) & K (pI=9.7). Under electrophoresis at pH=7.7, in which direction will each component of the mixture move?

- A) E to anode; Y & K to cathode
- B) E to anode; Y stationary; K to cathode
- C) E to cathode; Y stationary; K to anode
- D) E & Y to anode; K to cathode

V. Sanger's reagent, 2,4-dinitrofluorobenzene, reacts with which functional groups in a peptide?

- A) free amino groups
- B) the phenolic hydroxyl group in tyrosine
- C) the aromatic heterocyclic rings of histidine and tryptophan
- D) the sulfide group of methionine

VI. Which of the following is not an important secondary structural feature in large peptides and proteins?

- A) the  $\alpha$ -helix.
- B) the  $\beta$ -turn.
- C) chair conformations.
- D) the  $\beta$ -pleated sheet.

VII. Lipids are insoluble in water because lipid molecules are:

- A) Hydrophilic
- B) Neutral
- C) Zwitter ions
- D) Hydrophobic

Which of the following nucleotide sequences contains four pyrimidines bases?

- A) GATCAATGC
- B) UAGCGGUAA
- C) GCUAGACAA
- D) Both b and c

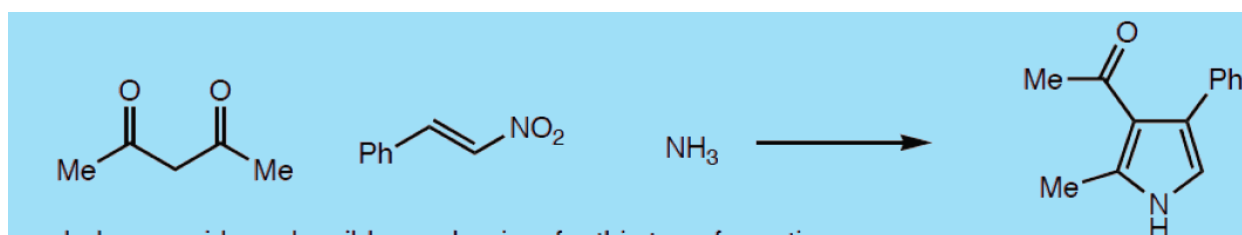
VIII. Cholesterol is a/an

- A) saturated fat
- B) unsaturated fat
- C) steroid
- D) essential oil

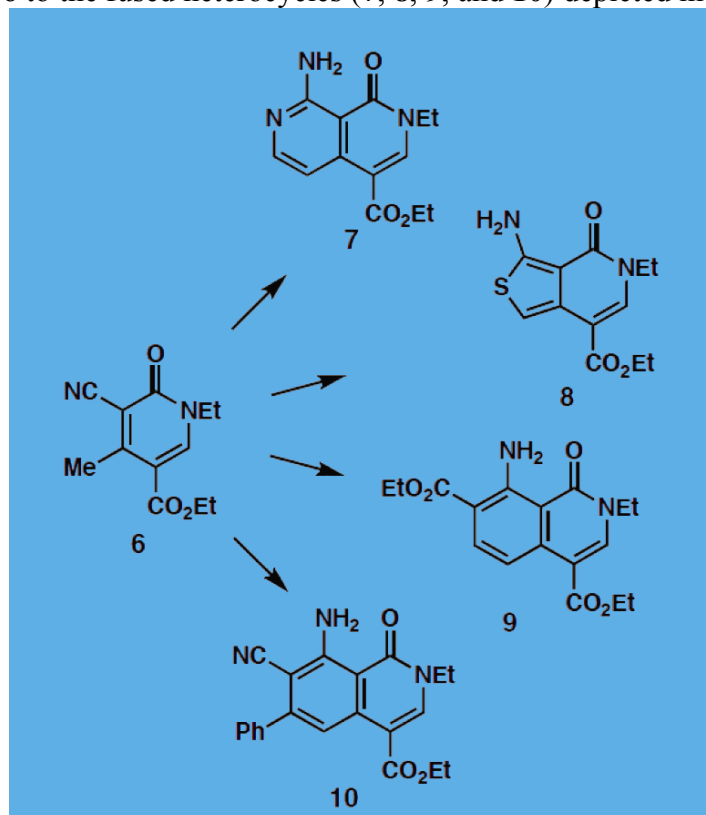
IX. Nucleic acids are polymers of:

- A) nucleosides
- B) clobulins
- C) nucleons
- D) nucleotides

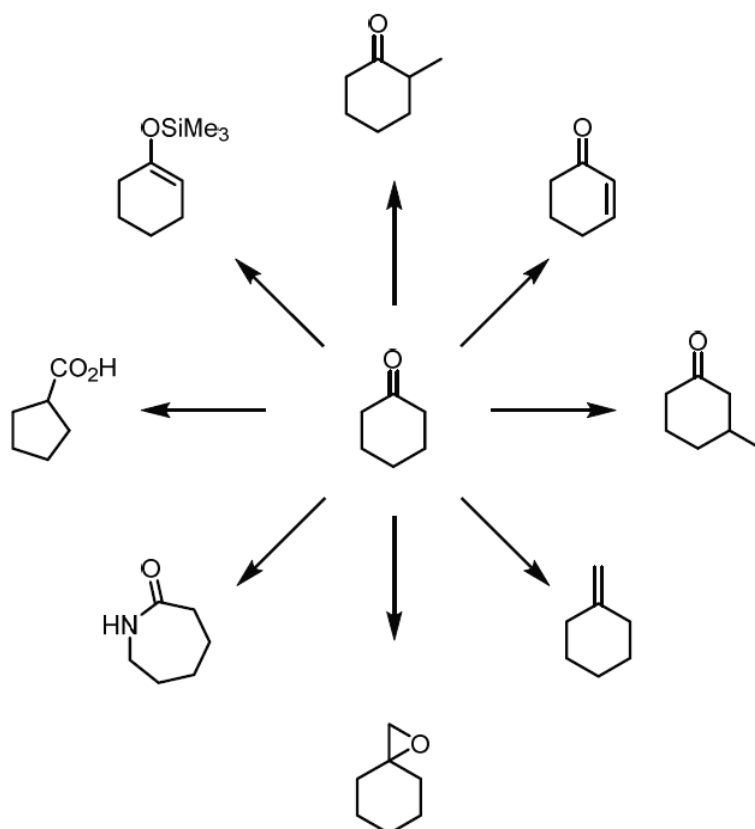
2) (5 points) The following is a general reaction for the formation of pyrroles. In this condensation, any of the three reaction constituents may be widely varied. Provide a plausible mechanism for this transformation.



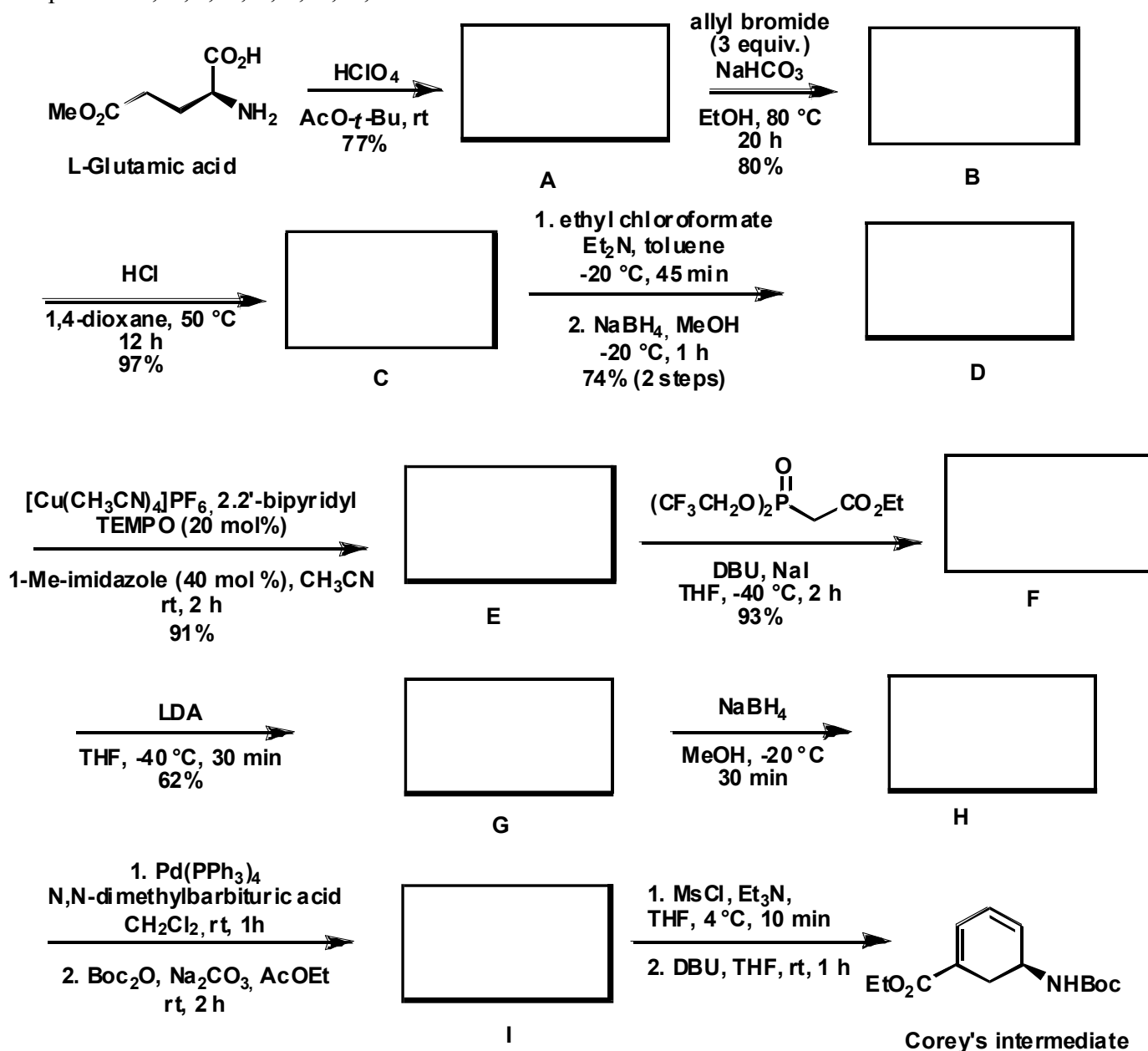
3) (6 points) Propose a reasonable synthesis of pyridyl nitrile **6**, and suggest reagents and conditions for converting **6** to the fused heterocycles (**7**, **8**, **9**, and **10**) depicted in the scheme.



4) (4 points) Suggest reagents for each of the following transformations (each transformation can be more than one step).



5) (4 points) In the synthesis of Corey's intermediate for Tamiflu, you are asked to propose the structure of compounds A, B, C, D, E, F, G, H, and I.



6) (6 points) For the antimicrobial dialkyl-resorcinols (**1**) depicted below please provide: Retrosynthetic disconnections and forward synthesis (with reagents and conditions, NO MECHANISM!) starting from alkylideneacetones (**2**) and diethylmalonate (**3**)

