

Last Name

First name

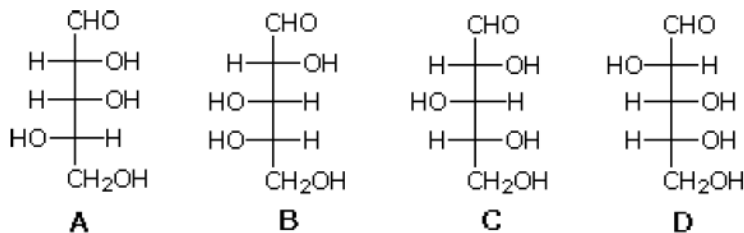
16/04/2015

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

1. There are several levels of protein structure, the most complex of which is

- A) primary
- B) secondary
- C) tertiary
- D) quaternary

2. (+)-Arabinose is (2R, 3S, 4S)-aldopentose. Which of the following is (+)-arabinose?



3. Triacylglycerol contains fatty acids and

- A) glucose
- B) glycogen
- C) glycerol
- D) guanine
- E) an amino group

4. Assuming they all had the same number of carbon atoms, which of the following has the most C-H bonds?

- A) an unsaturated fat
- B) a polyunsaturated fat
- C) a polysaccharide
- D) a saturated fat

5. What type of macromolecule carries out catalysis in biological systems?

- A) proteins called enzymes
- B) carbohydrates called starches
- C) lipids called steroids
- D) nucleic acids called DNA
- E) carbohydrates called sugars

6. Nucleic acids are chains of 5-carbon sugars linked by _____ bonds with an organic base protruding from each sugar.

- A) amino
- B) phosphodiester
- C) carboxyl
- D) phosphate

7. Which of the following is not a lipid?

- A) chitin
- B) terpenes
- C) steroids
- D) prostaglandins
- E) unsaturated fat

8. In the formation of a macromolecule, what type of reaction would join two subunits together?

- A) hydrophobic reaction
- B) hydrolysis reaction
- C) dehydration reaction
- D) denaturation reaction

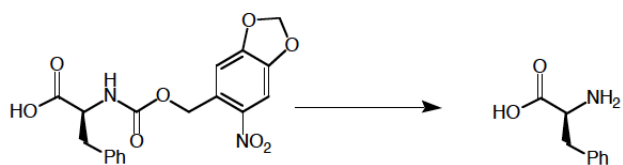
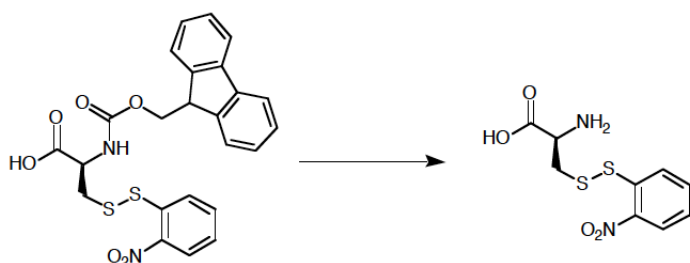
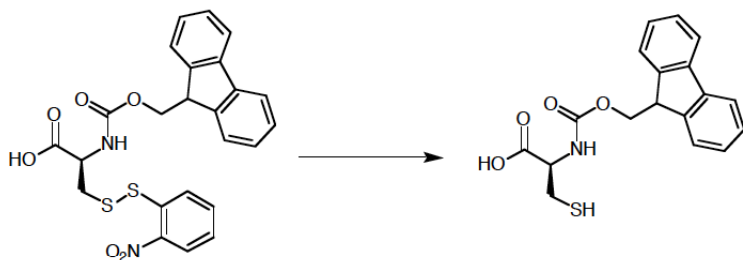
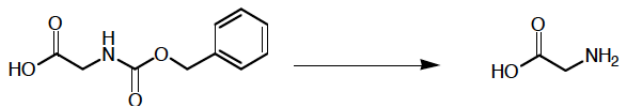
9. Which element occurs in nucleic acids?

- A) calcium
- B) phosphorus
- C) manganese
- D) sulfur
- E) iron

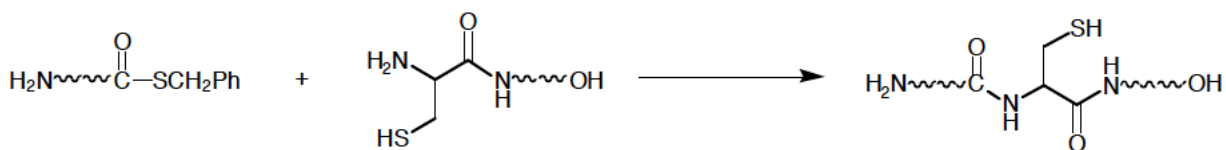
10. The two strands of a DNA double helix are held together by:

- A) ionic bonds.
- B) hydrogen bonds.
- C) nonpolar covalent bonds.
- D) polar covalent bonds.
- E) hydrophobic exclusions.

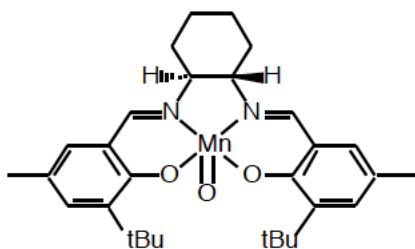
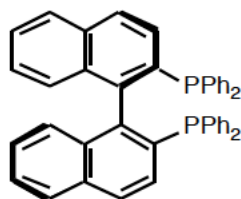
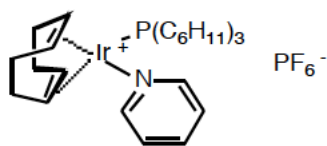
2. Provide reagents for the following deprotection reactions (5 pts):



3. A large peptide (or protein) can be synthesized by joining together two smaller peptides. This is known as a convergent peptide ligation. Give the mechanism for this process. Show only the relevant portions of the peptides. (5 pts)

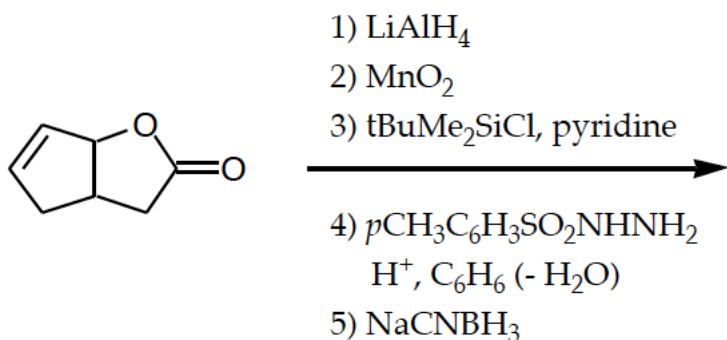


4. What are the following reagents used for. Please be specific. (4 pts)

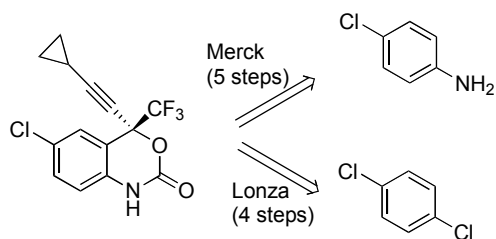


Bu_2BOTf , iPr_2NET

5. Provide the product and all intermediates for the following sequence of reactions. (5 pts)



6. Efavirenz is an essential medicine (life-saving drug) for the treatment of HIV, which is still inaccessible to millions of people worldwide. Two major routes to Efavirenz have been disclosed thus far: a five-step production method from parachloroaniline developed by Merck and Lonza recently patented four-step synthesis from 1,4-dichlorobenzene. (6 pts)



Please provide the forward synthesis (Both Merck and Londa) for this useful molecule.