

DEPARTMENT OF MEDICINAL CHEMISTRY
SCHOOL OF PHARMACY

BASIC PHARMACEUTICAL SCIENCE FOR THE PRACTICING PHARMACIST
MEDC 527, Fall 2008

Quiz #4, Dr. Desai, 100 points; November 4, 2008

KEY

NAME (In CAPITAL Letters ONLY)

I affirm that I have not taken aid from anybody for this test. **Please sign**

1. Glycated hemoglobin is a reasonable marker of diabetic condition. What is glycated hemoglobin? Why is it a marker of diabetes? What level of glycated hemoglobin in plasma is thought to correspond to hyper-glycemia? (8 pts)

2. Identify the order of stability of the following molecules at pH 10. Use 1 for most stable and 3 for least stable. (8 pts)



3. Define the following two terms in one sentence. (8 pts)

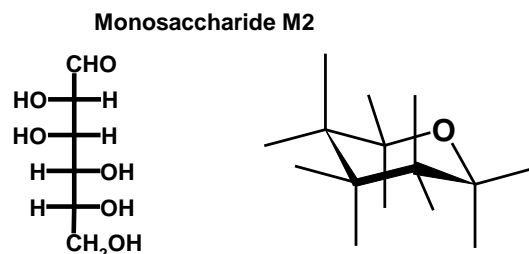
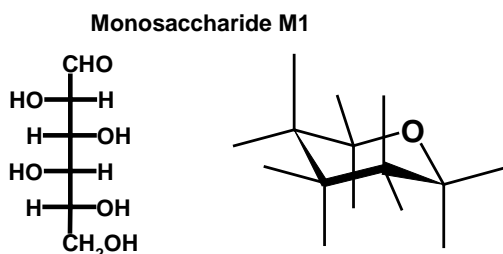
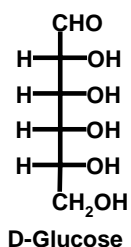
Enantiomers are _____

Diastereomers are _____

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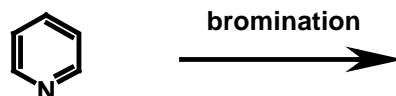
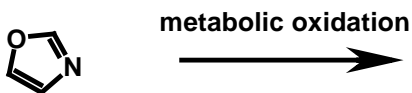
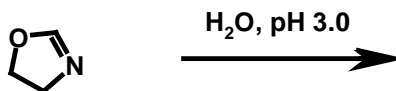
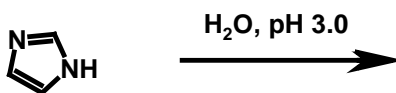
4. Penicillin, thienamycin, cephalosporin, penems, and other anti-biotics contain a key heterocyclic ring, which is the major cause for their anti-biotic action. What is the generic name of this heterocyclic ring? What is the role of this heterocyclic ring in the anti-bacterial action of these drugs? Using simple chemical structures, draw a plausible mechanism of action of these anti-biotics. (8 pts)

5. The open-chain form of D-glucose is as shown below. Draw the **alpha-form** of monosaccharide M1 and **beta-form** of monosaccharide M2 from their open-chain forms. {Use the cyclic structures and write the appropriate substituents.} (10 pts)

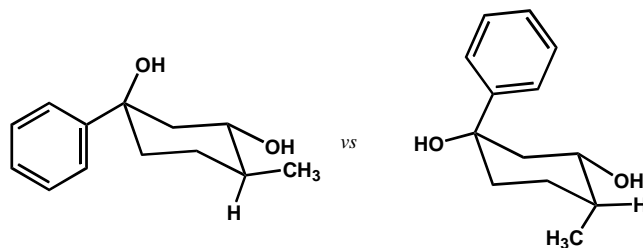
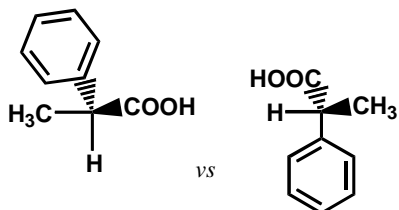


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SCHOOL OF PHARMACY

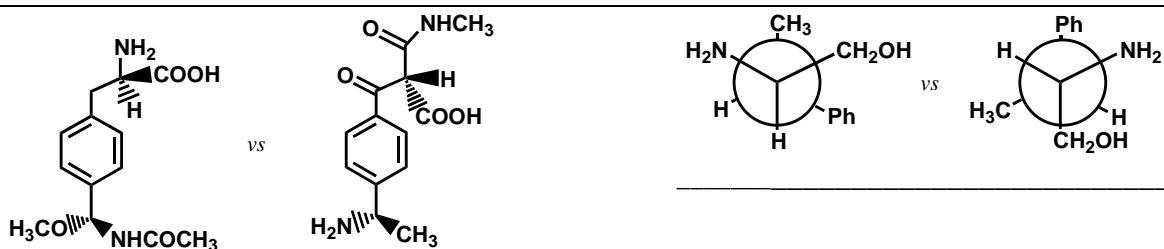
6. Following molecules are exposed to reaction conditions as shown below. Draw the structure of the major product (if any) expected from the reaction. Draw the structure of product in appropriate charge form. **NOTE: The structure of only one major product is to be drawn. No points will be given if there is more than one structure for any reaction.** (12 pts)



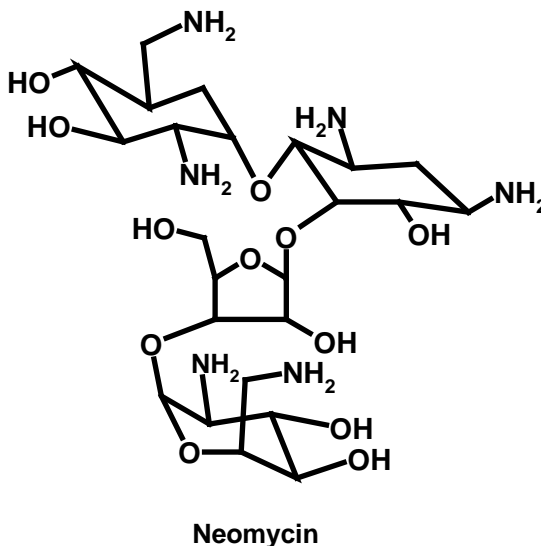
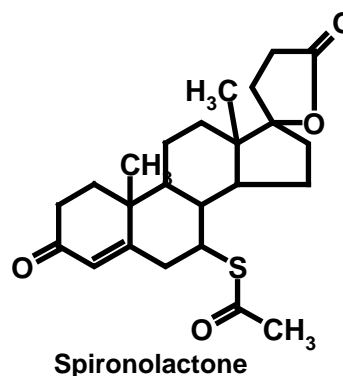
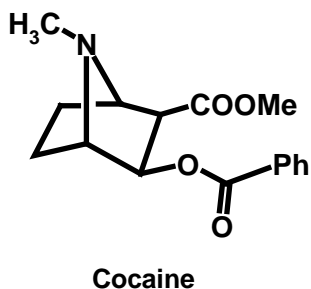
7. Which of the following terms best describes each pair of compounds shown below: (16 pts).
- Conformational isomers
 - Enantiomers
 - Diastereomers
 - Meso compounds
 - Positional isomers
 - Functional group isomers
 - All of the above
 - None of the above



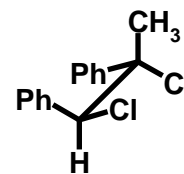
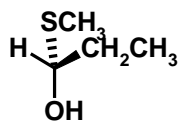
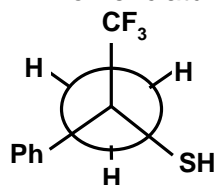
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8. Circle chiral centers in the following molecules. If there are no chiral centers in a molecule, write **NONE**. Note: Each chiral center should contain only one atom. Minus one point for identifying centers that are not chiral centers. (10 points)

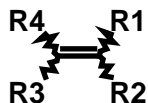


9. Identify the chirality of the chiral centers shown in the following molecules. Use 'R' or 'S' nomenclature. (8 points)



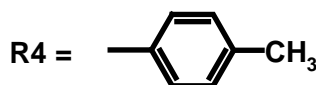
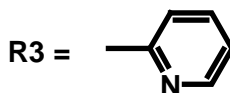
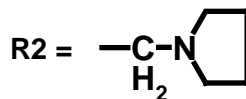
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10. The trans form of triprolidine is 1000-times more potent as an anti-histaminic agent than its cis isomers. Triprolidine has the following generic structure. Draw the cis and trans forms of this molecule. (8 points)

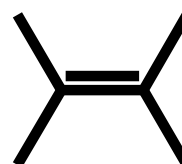
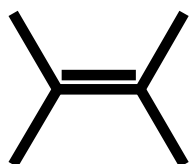


where R1, R2, R3, and R4 are ::

R1 = H



Note: Use the structures shown below and draw appropriate groups to show trans and cis structures



11. Can the following objects exhibit enantiomerism? Write Yes (Y) or No (N) in the space provided. (4 points)

A right handed screw

A necklace of 11 spherical black beads

Rubik's cube with a different color for each side, i.e., a six-sided cube with different color for each side

A human being's left hand

Statue of Liberty