**CHE-2060 Lecture 6 Quiz KEY**

Problems must be solved, or written out, in their entirety with all work shown on engineering graph paper. You must label each set in the upper left hand corner with your name, the date and the chapter. Problems must be identified by number and all work must be shown with answers boxed. Be sure your handwriting is legible.

**6.1: Symmetry & asymmetry**

1. Which of these molecules has a plane of symmetry? Draw planes of symmetry where you find them.



2. These molecules may, or may not, have chiral carbons. Find them and mark them with asterisks.

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**6.2: Nomenclature of stereocenters**

3. For the molecule shown here:

a. Mark the chiral carbon(s) with an asterisk.

b. Prioritize the four substituents 1 through 4 (1 is high, 4 is low).

c. Label as R or S.



4. Draw the enantiomer of the molecule in the previous problem using either dash-wedge or a Fisher diagram.

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**6.3: Properties of asymmetric molecules**

5. Why does only one enantiomer have a biological effect (or the expected biological effect) while the other does not?

All biological molecules are chiral. So receptors, enzymes and other molecules that bind to organic molecules have a handedness. In essence, drugs or ligands are like grounded electric plugs and receptors and enzymes are like receptacles. Each prong of the plug fits into a specific slot in the receptacle. If the 3D orientation of the prongs is reorganized or changed, the plug will no longer fit into the receptacle. Likewise, only one enantiomer fits into a receptor or enzyme; the other enantiomer will not work.

**6.5: Fisher projections**

6. Label each chiral carbon and determine whether each is R or S.



7. Draw a Fisher diagram of the molecule shown here.



**6.6: Molecules with two or more stereocenters**

8. For the molecule shown here:

a. Label the chiral centers.

b. Draw the enantiomer.

c. Draw a diastereomer.



9. Compare the four molecules shown here. I suggest using models!



1. Label the chiral centers.
2. For the first and last molecules, label each chiral center as R or S.
3. What is the relationship between the first and the last molecule? identical
4. Compare the first and second molecules. What is their relationship? diastereomers
5. Are any of these molecules meso? First & last

