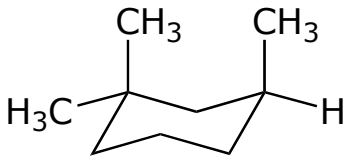
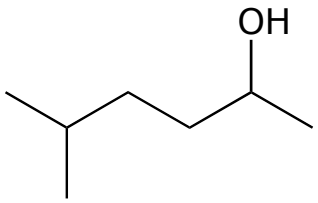
ORGANIC CHEMISTRY **CH 384, Fall 2009**

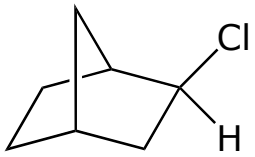
WORKSHOP 7a

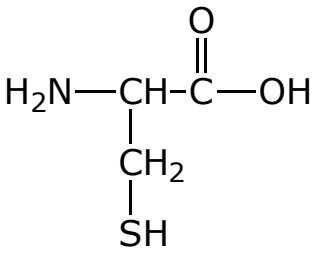
Stereochemistry

1. Identify all the stereocenters in the following compounds.

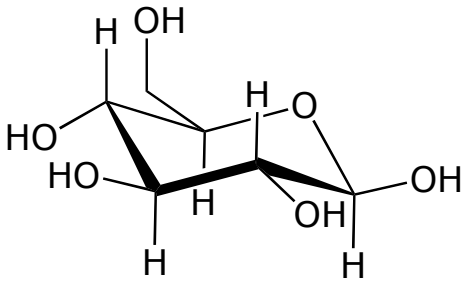




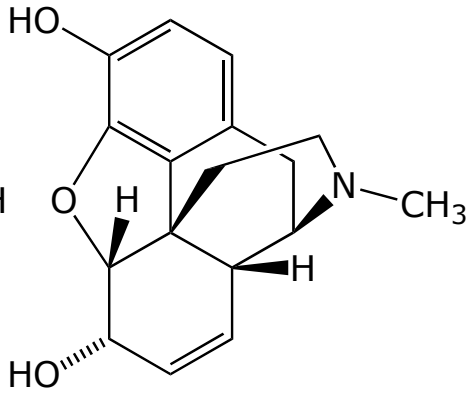




cysteine

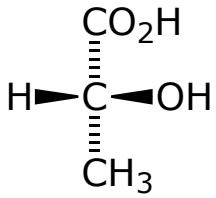


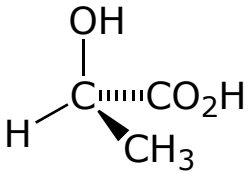
β-D-glucose

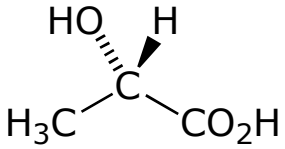


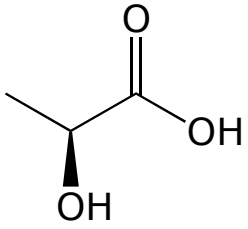
morphine

2. a) Determine the relationship between the compounds in each of the following pairs.
b) Identify the optically active (chiral) compounds and any **meso** compounds.
c) Assign **configuration (R or S)** to all stereocenters.

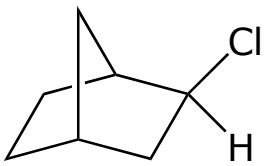


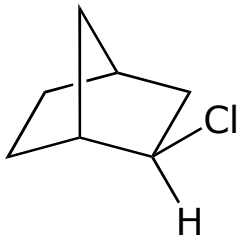


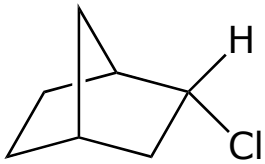


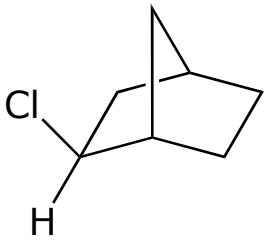


Note: among four structures, there are six pairwise relationships.









3. For each of the following reactions, give a careful representation of the structure of the product and predict whether the product will be optically active, a racemic mixture or achiral. **Explain your choice.**

a. (+)–2–chlorobutane $\xrightarrow[\text{in } CCl_4]{Br_2,\ h\nu}$ 2–bromo–2–chlorobutane

b. (+)–2–chlorobutane $\xrightarrow[\text{in } CCl_4]{SO_2Cl_2,\ h\nu}$ 1,2–dichlorobutane

Several other products are formed.
This product is separated by gas chromatography and collected for analysis.

c. (+)–2–chlorobutane $\xrightarrow[\text{in EtOH}]{KOH}$ $\xrightarrow[\text{ether}]{HBr\ in}$

d. *cis*–2–butene $\xrightarrow[\text{in } CCl_4]{Cl_2}$

e. (+)–1,3–dimethylcyclopentene $\xrightarrow[\text{in CCl4}]{NBS\ \ h\nu}$

f. (+)-3-methylcyclopentene $\xrightarrow{PtO_2\ H_2}$