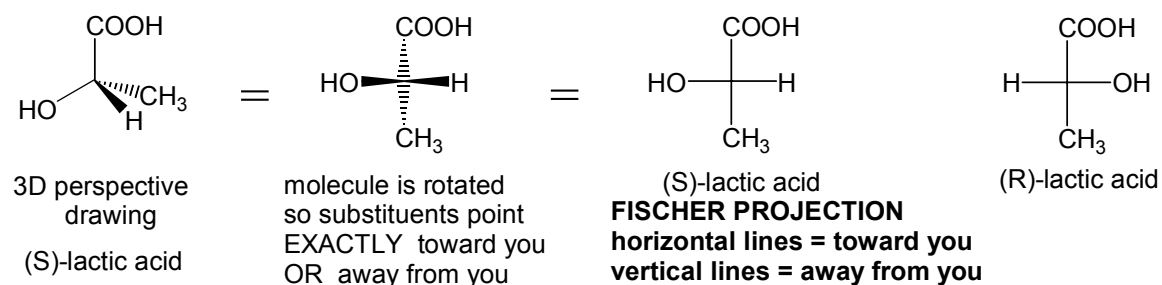


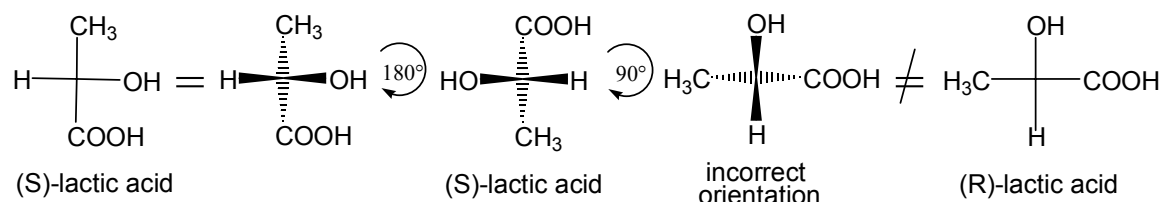
## INTRODUCTORY ORGANIC CHEMISTRY I --- PROBLEM SET #3

INSTRUCTIONS: HAND IN STAPLED, COMPLETED ASSIGNMENT AT THE BEGINNING OF CLASS on Thursday Nov. 27. LATE SUBMISSIONS WILL NOT BE ACCEPTED.

**# 1.** Molecules with several stereogenic centres, such as sugars, are time-consuming to draw with full 3-D representations using dashes and wedges. Another representation, called a Fischer projection, can be used to rapidly draw such molecules.



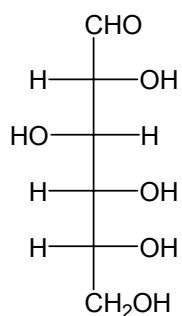
Care must be taken when manipulating Fischer projections --- the configuration at the chiral centres may be accidentally changed! Rules: put the most highly oxidized end of the molecule at the top of the projection...but more importantly...Fischer projections can be rotated by 180°, but NEVER by 90°!



**TASK #1: DRAW FISCHER PROJECTIONS OF THE FOLLOWING MOLECULES:**

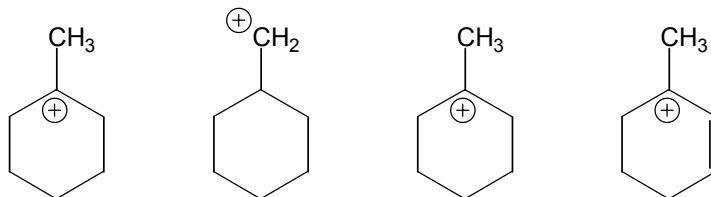
(a) (S)-1,2-dibromobutane    (b) (R)-1,2-dibromobutane    (c) (R)-glyceraldehyde (HOCH<sub>2</sub>CH(OH)CHO)

**TASK #2: DRAW the Fischer projection for the ENANTIOMER OF GLUCOSE (glucose shown here):**



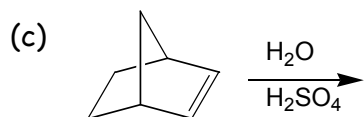
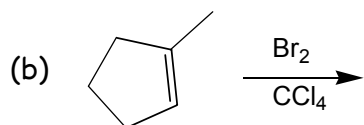
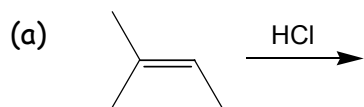
## INTRODUCTORY ORGANIC CHEMISTRY I ----- PROBLEM SET #3 ----- DUE: NOV. 27/03

# 2. Rank these four carbocations according to their stability (most stable = 1; least stable = 4):

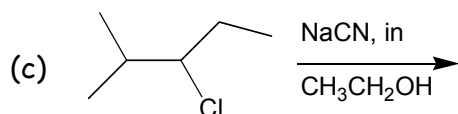
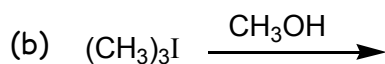
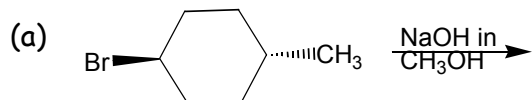


RANKING:     \_\_\_            \_\_\_            \_\_\_            \_\_\_

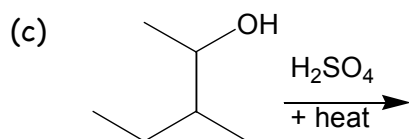
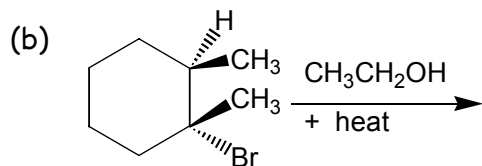
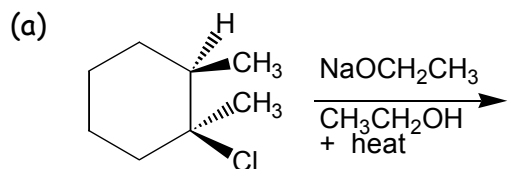
# 3. Predict the major products of the following electrophilic addition reactions. Show the structures of any intermediates, and include the stereochemistry of the products where appropriate.



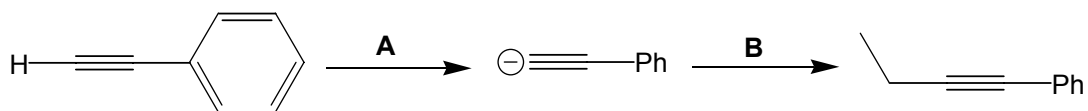
# 4. Predict the major products of the following nucleophilic substitution reactions, including stereochemistry. State the mechanism by which the reaction proceeds ( $S_N1$  or  $S_N2$ ).



**# 5.** Predict the products of the following elimination reactions, and label the mechanism (E1 or E2) by which the reaction would likely proceed.



**# 6.** Suggest reagents that would be suitable for carrying out the following transformation.



**# 7.** Provide mechanisms (i.e., use "arrow pushing" to show where the electrons are going in each step of the processes) to explain the formation of these two products in the following reaction:

