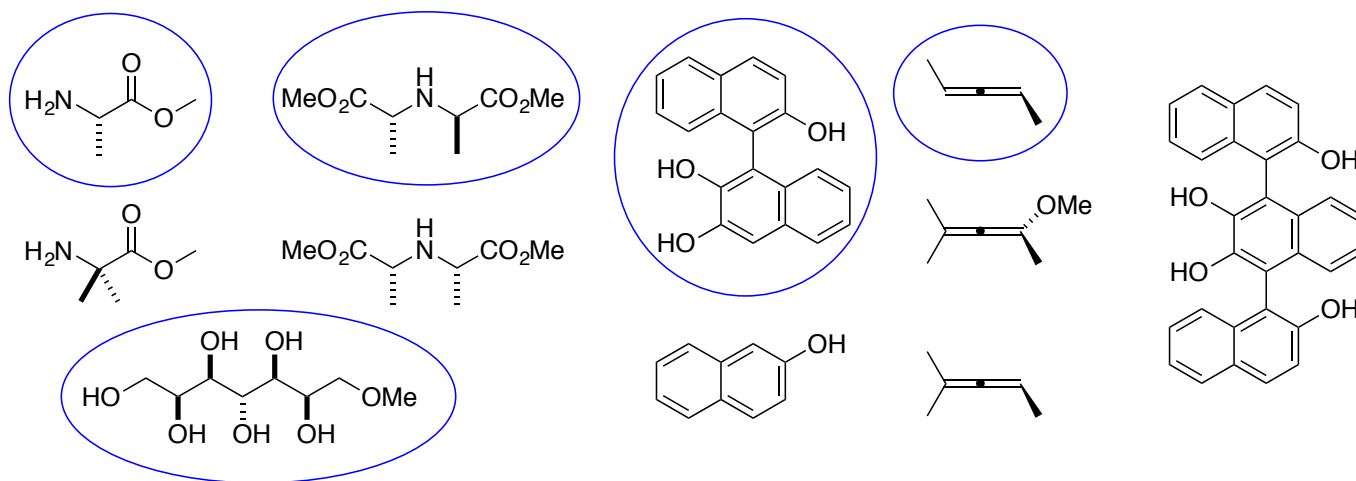
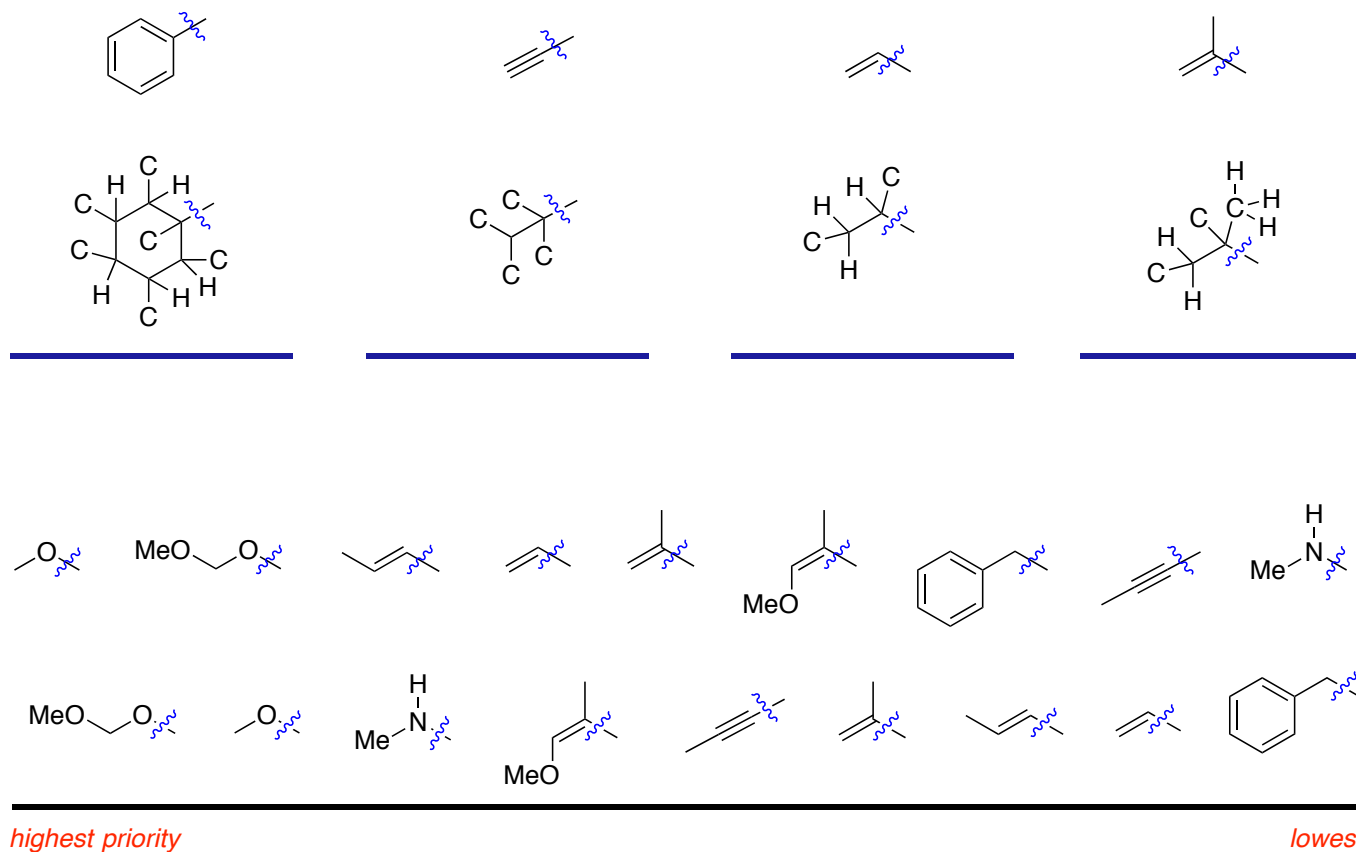


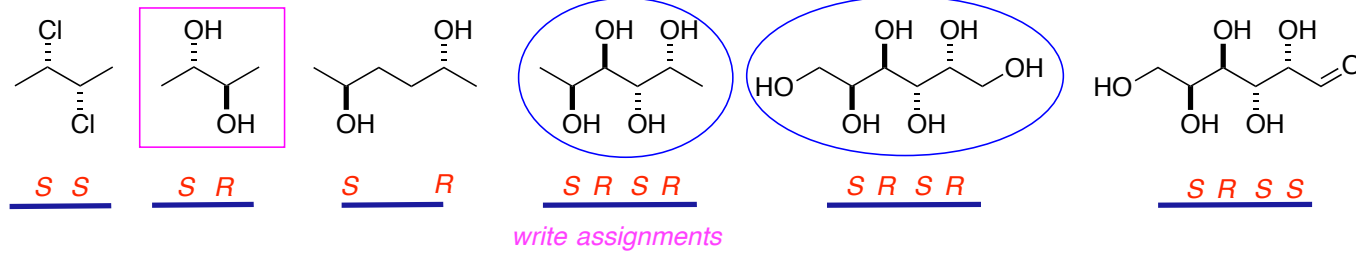
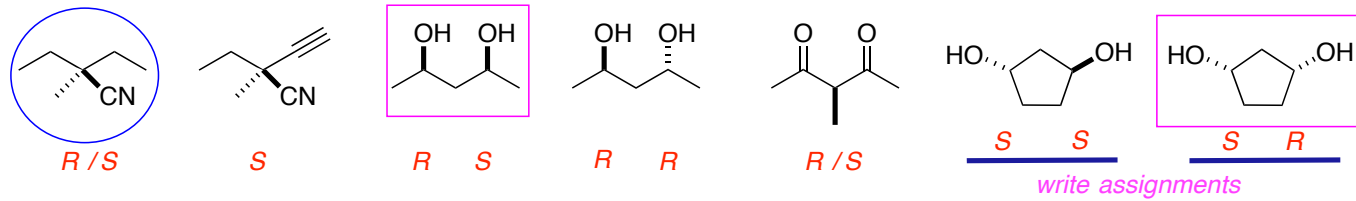
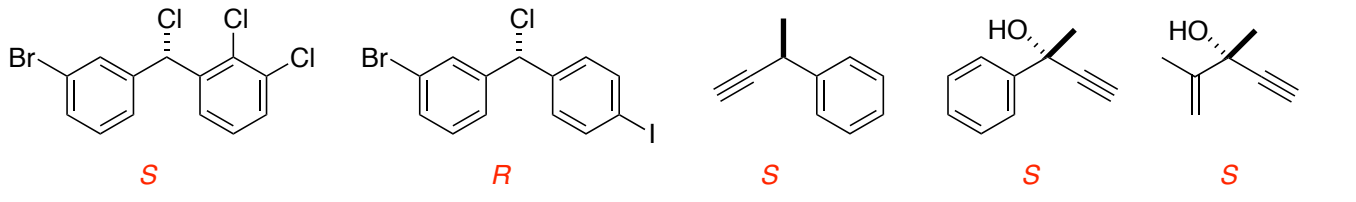
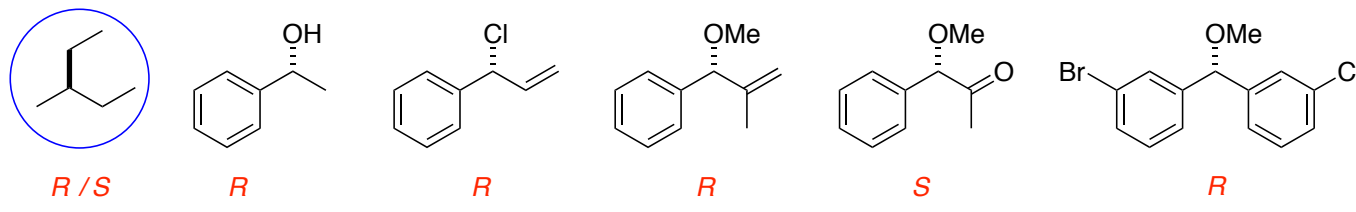
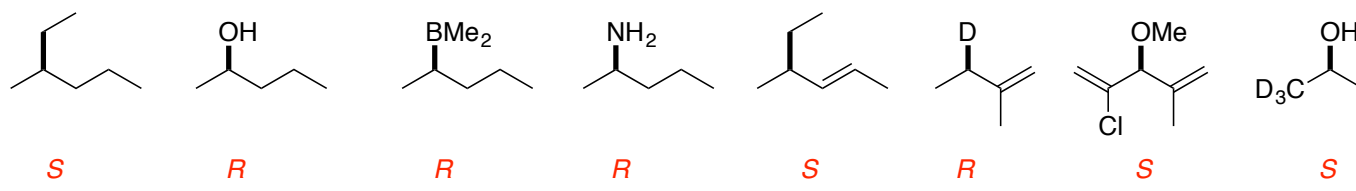
Stereochemistry Illustrated By Carbohydrates

from chapter(s) _____ in the recommended text

A. Introduction

B. Assigning R- and S-Configurations

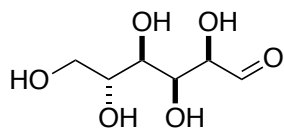




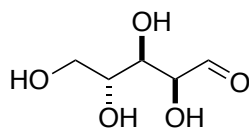
C. Stereochemical Representations Of Carbohydrates

are all used to describe compounds in this series.

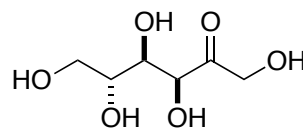
(eg **glucose**): if they contain an aldehyde they are called **aldoses**
ketoses.



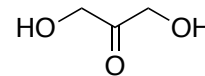
D-glucose
aldose



D-ribose
aldose

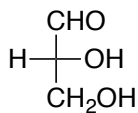


D-fructose
ketose

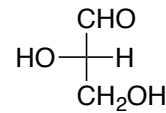


dihydroxyacetone
ketose

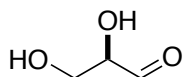
top



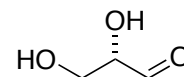
D-glyceraldehyde Fischer projection



L-glyceraldehyde Fischer projection

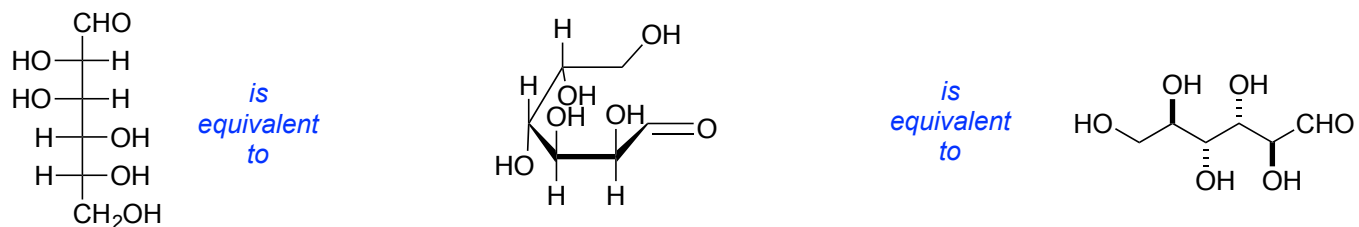
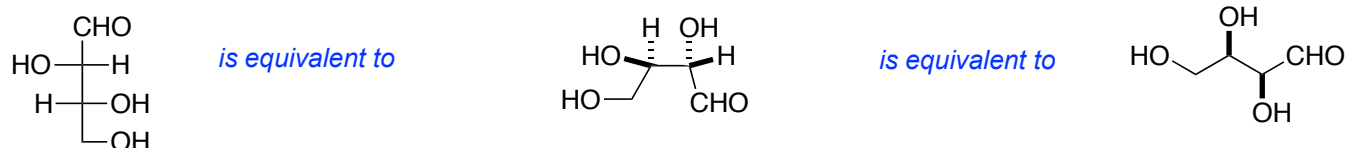
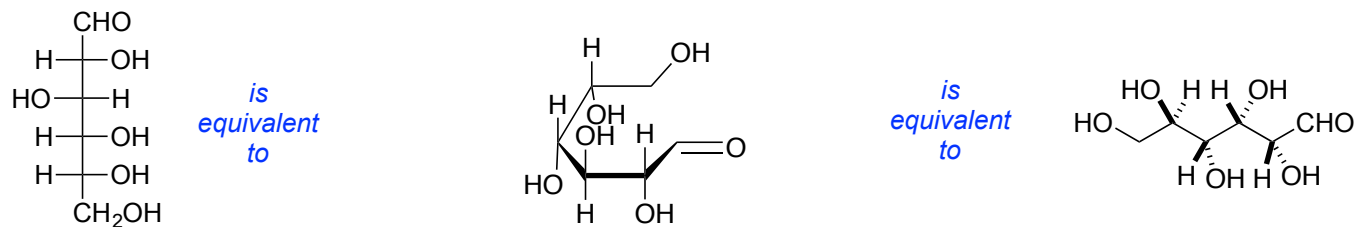
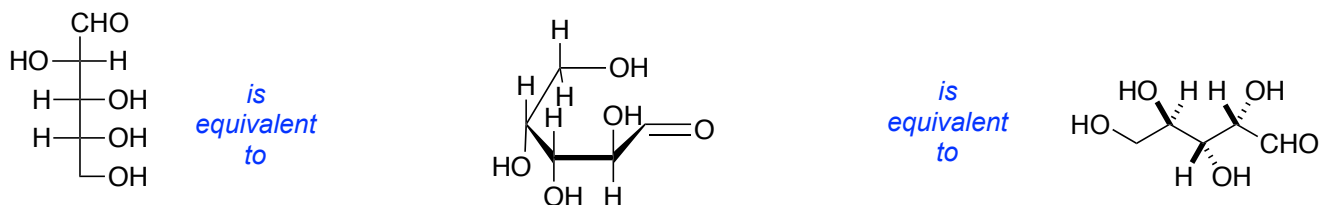
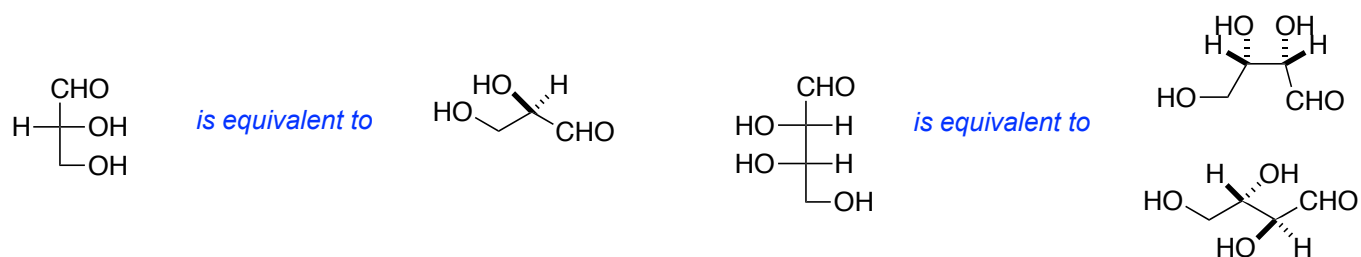


D-glyceraldehyde zig-zag



L-glyceraldehyde zig-zag

be *D*-
are *D*-



D. Carbohydrates Can Cyclize To Hemiacetals Or Hemiketals



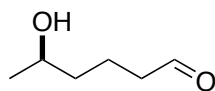
THF



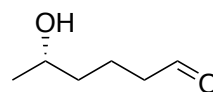
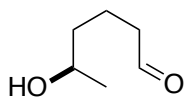
4H-pyran



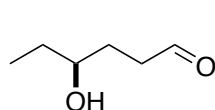
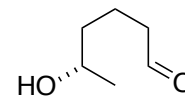
tetrahydropyran



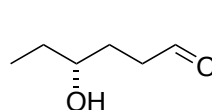
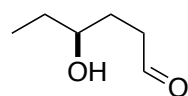
is the same as



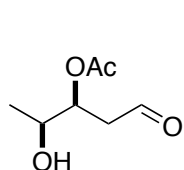
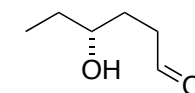
is the same as



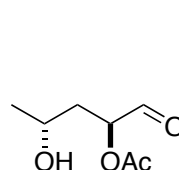
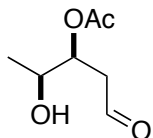
is the same as



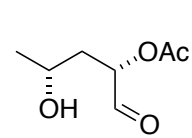
is the same as



is the same as

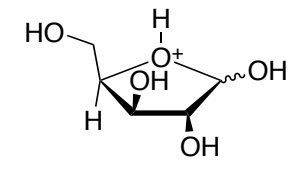
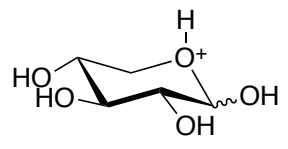
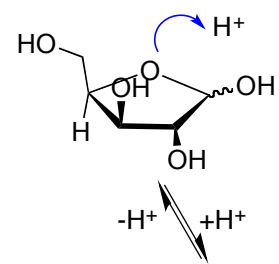
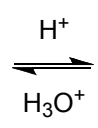
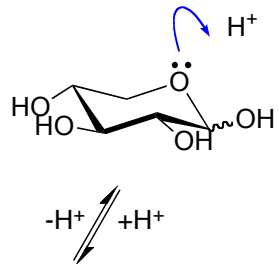


is the same as



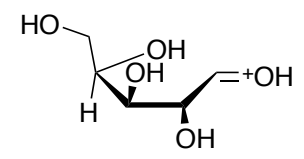
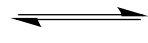
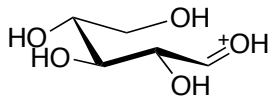
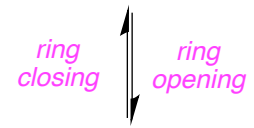
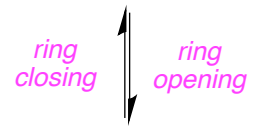
(*six*-membered ring)

(*five*-membered ring)



protonated pyranose form

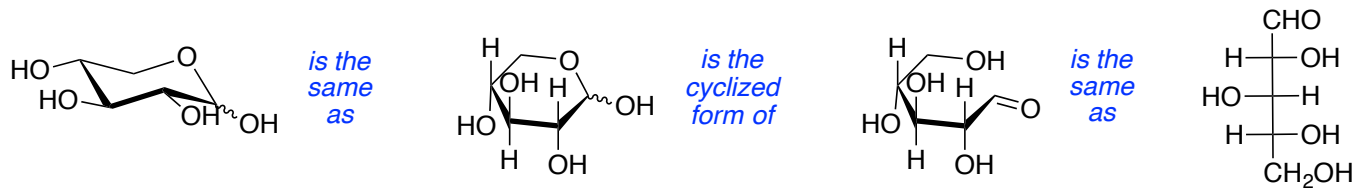
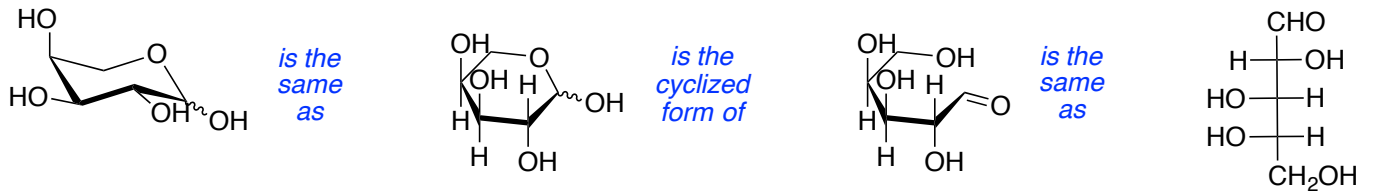
protonated furanose form



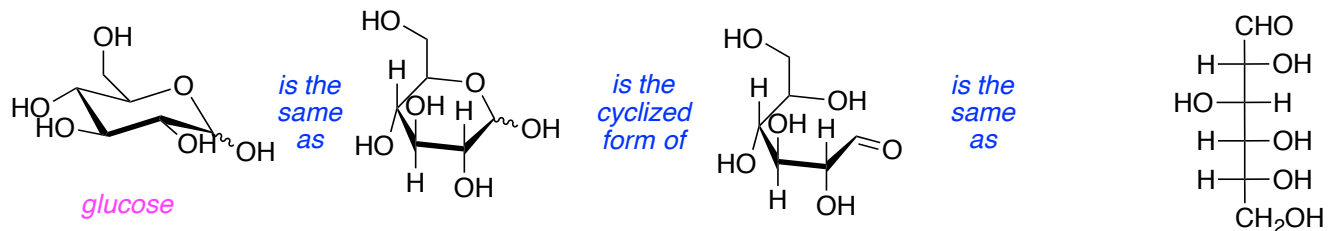
protonated aldehyde

*protonated aldehyde redrawn
poised for 5-membered ring formation*

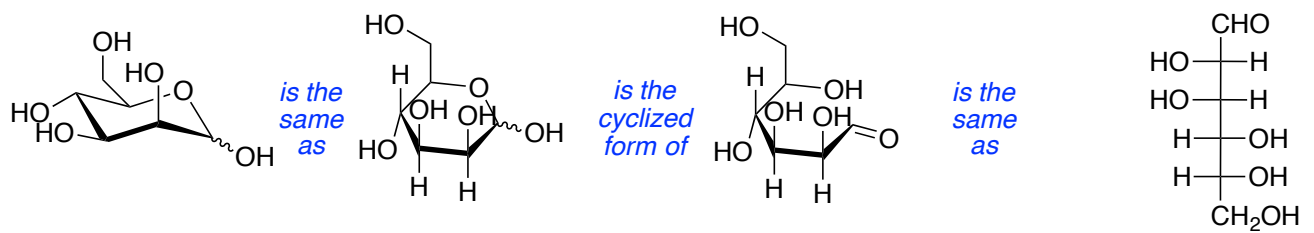
Glucose *and*

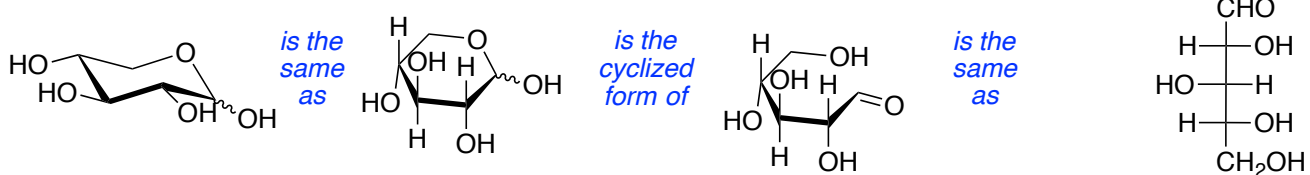
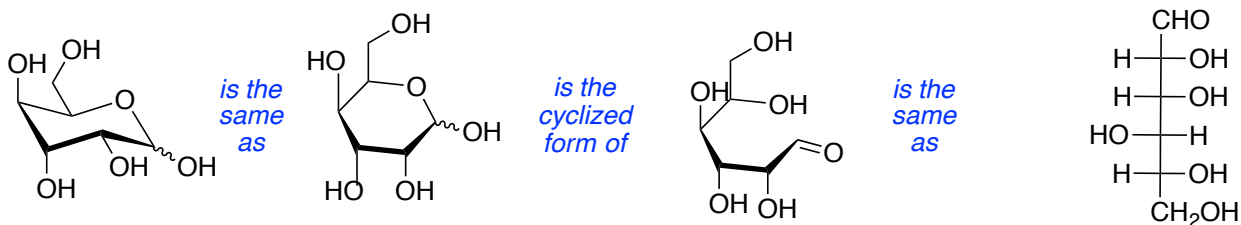


pyranose
hexoses to Fischer projections.

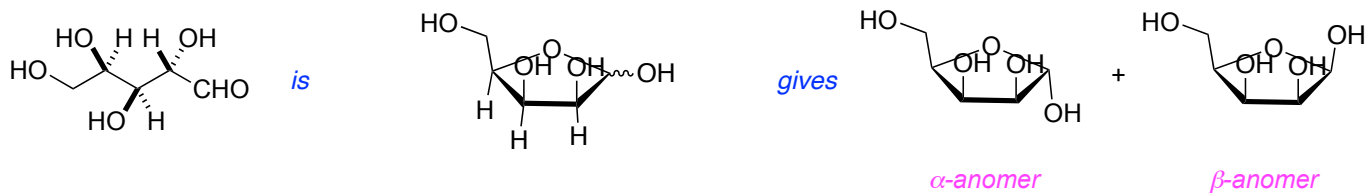


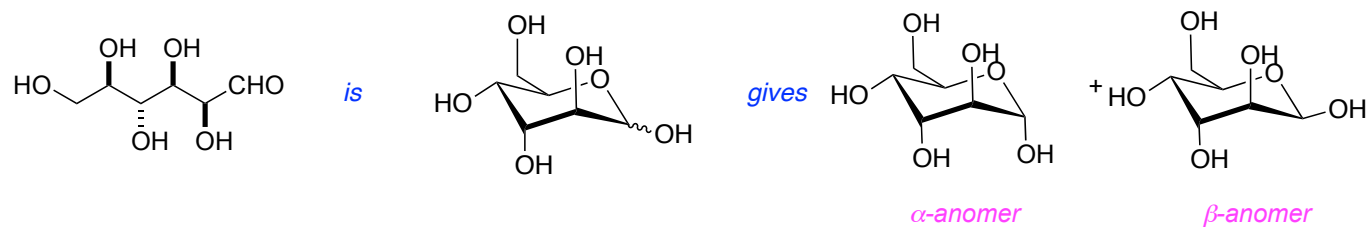
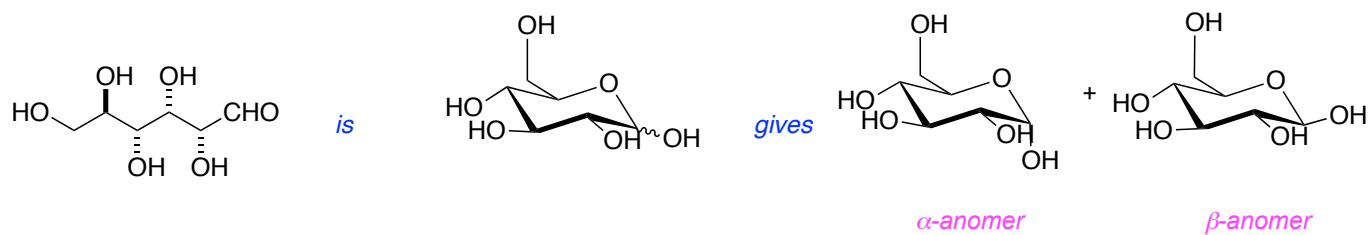
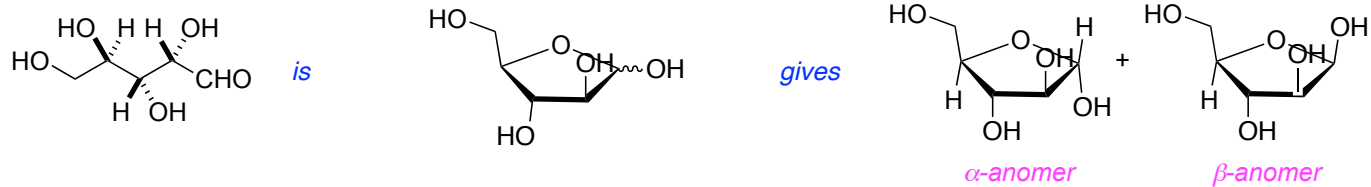
is β -.

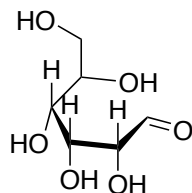
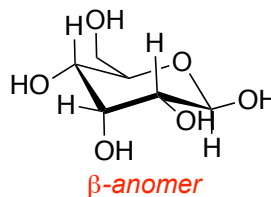
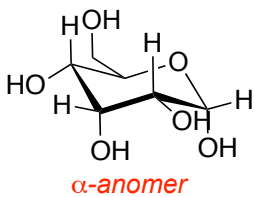
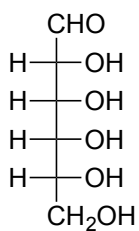




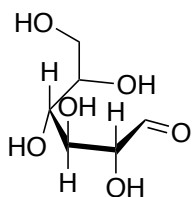
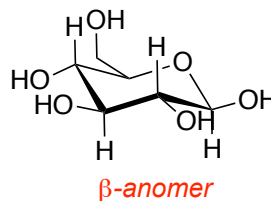
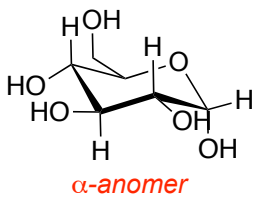
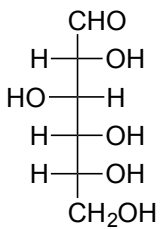
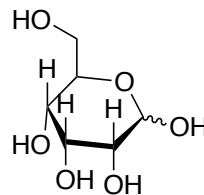
trans to the -CH₂OH



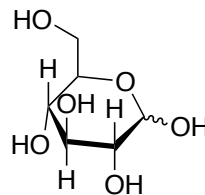


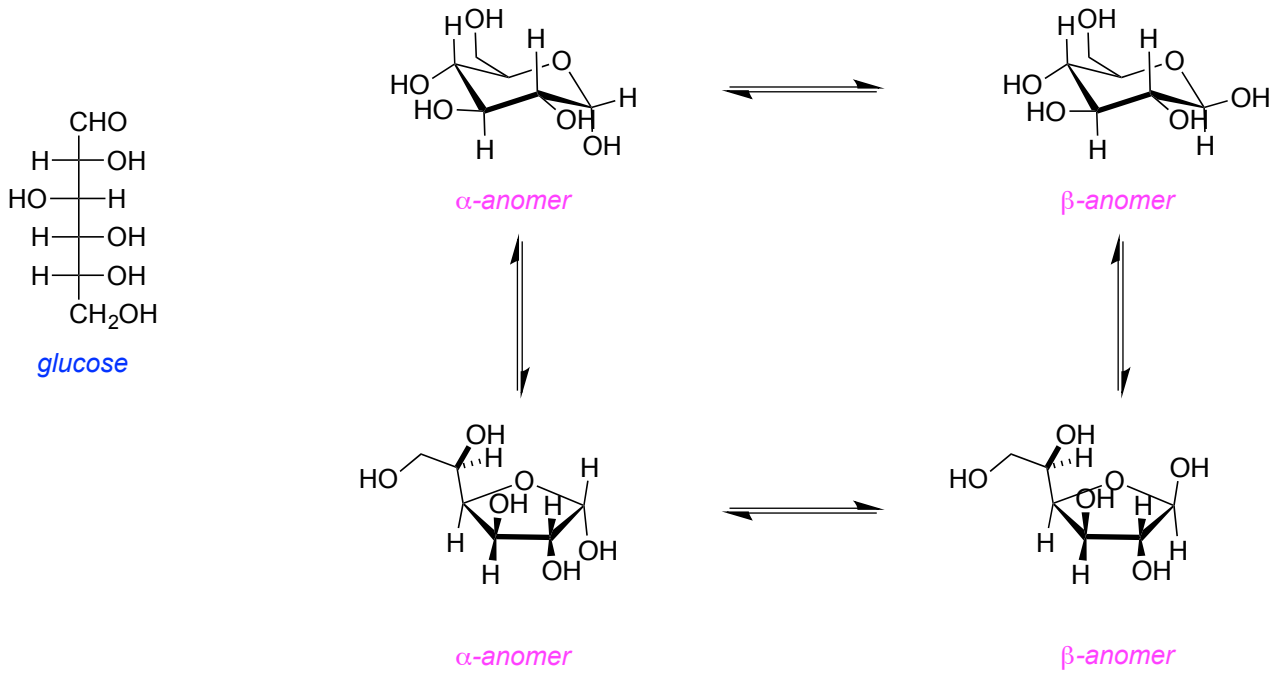


convert to the cyclized form

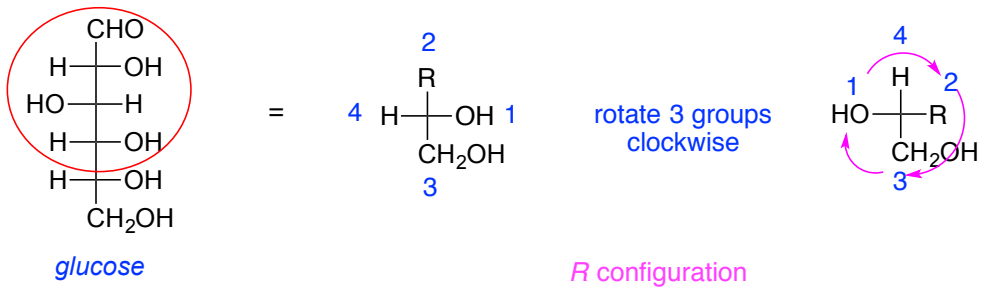


convert to the cyclized form





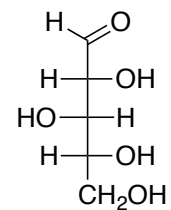
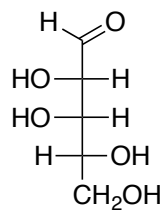
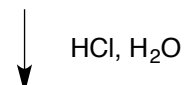
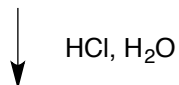
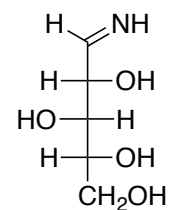
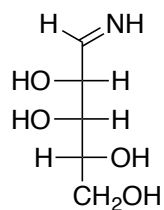
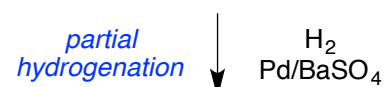
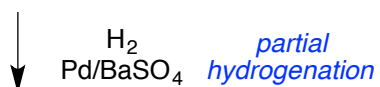
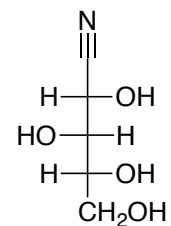
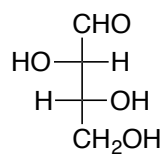
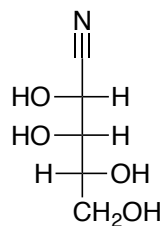
box for reasoning, write answers above



E. Homologation Of Sugars By Reaction With HCN

imines

aldoses

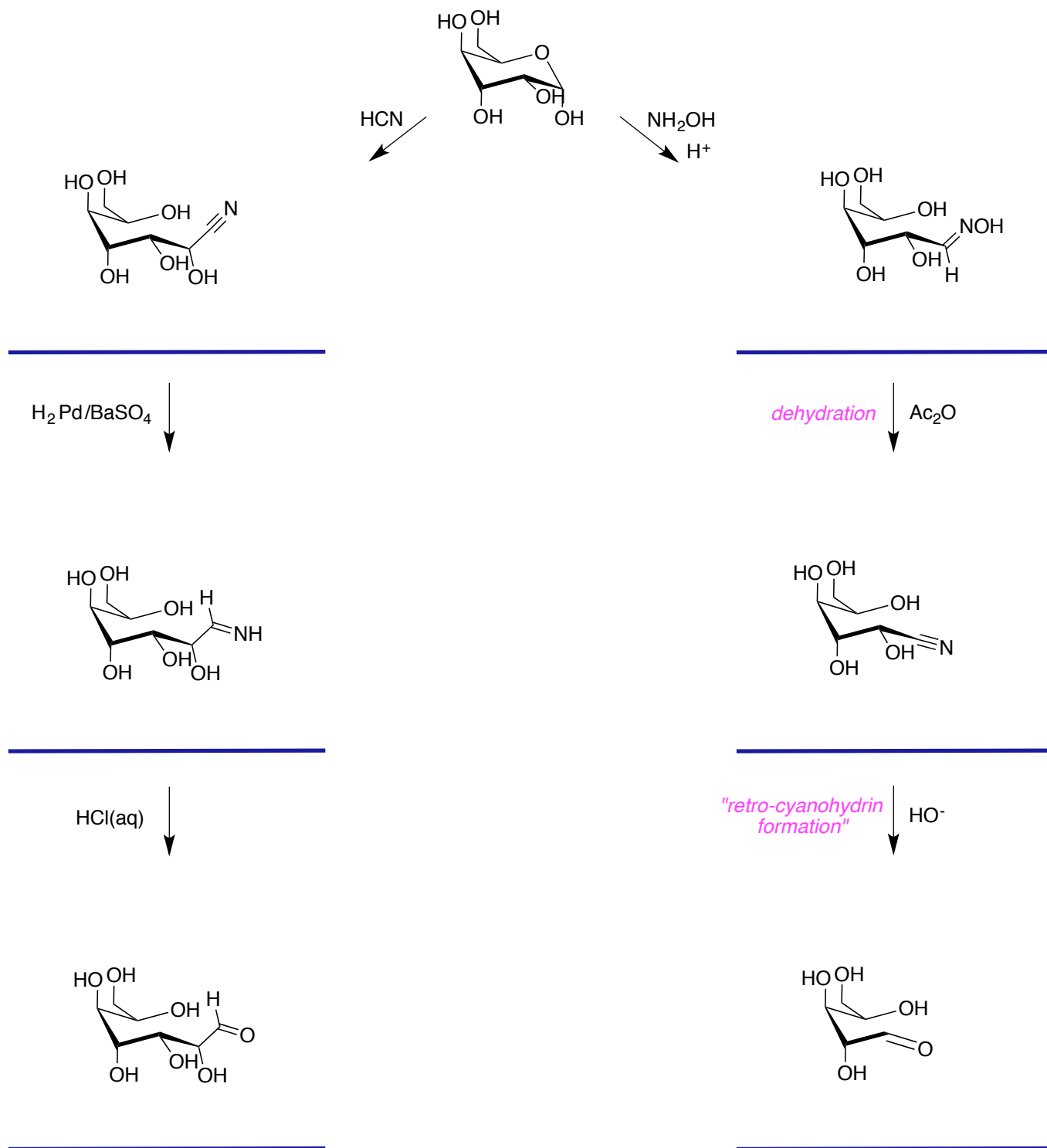


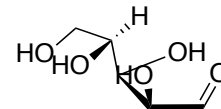
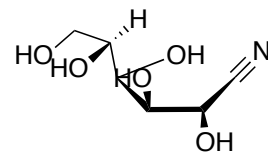
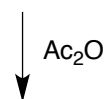
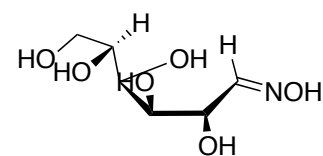
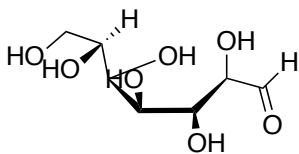
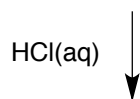
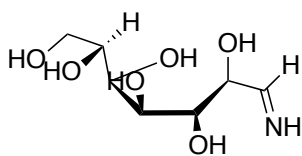
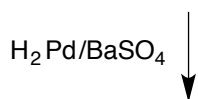
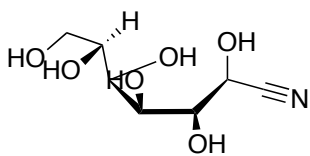
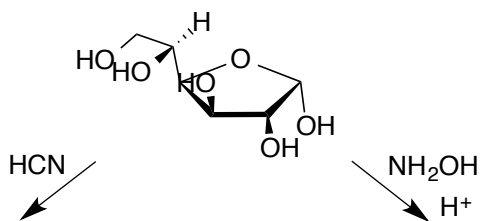
epimers

would be

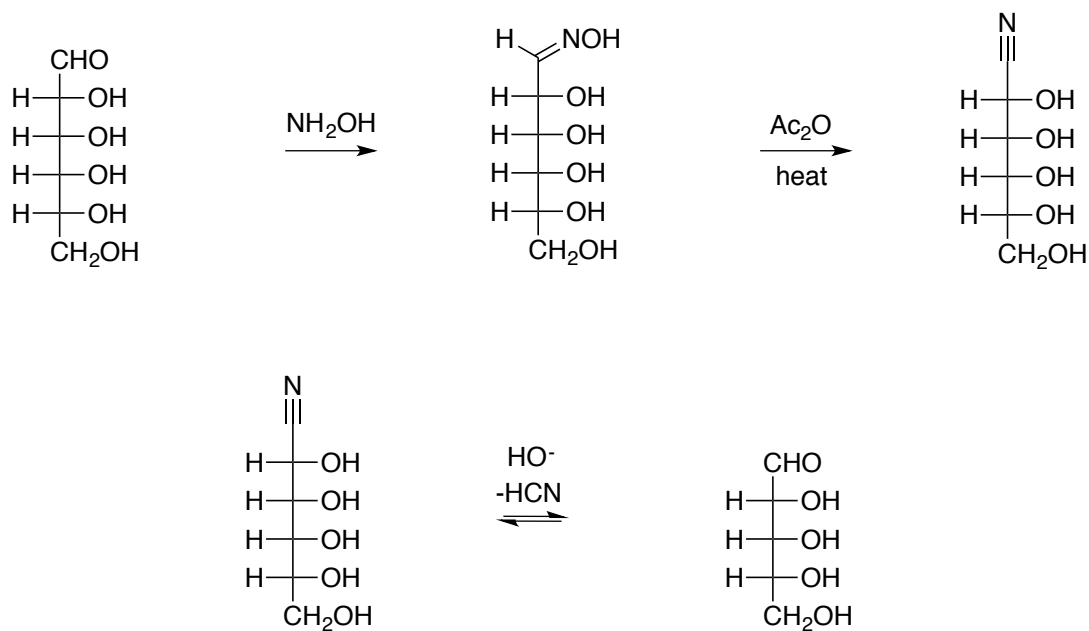
F. Conversion Of Aldoses To Lower Homologs

left
right.





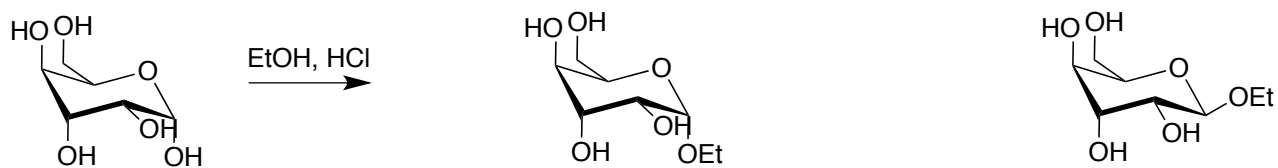
Fill in the gaps in the following sequence.



G. Other Reactions Of Sugars

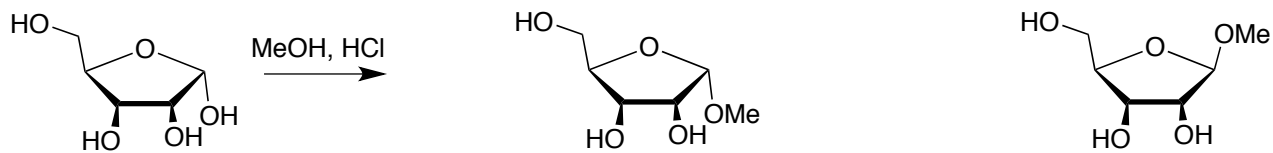
oxidized

reducing



α-anomer

β-anomer

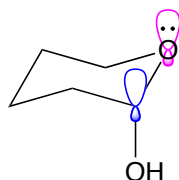


α-anomer

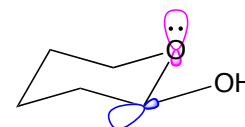
β-anomer

H. Relative Stabilities Of Anomers

axial non-bonded



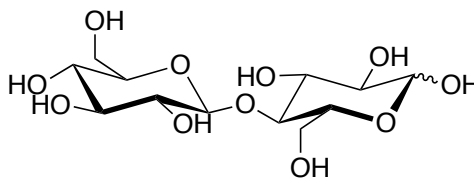
α-anomer
 σ -to- σ^* interactions possible



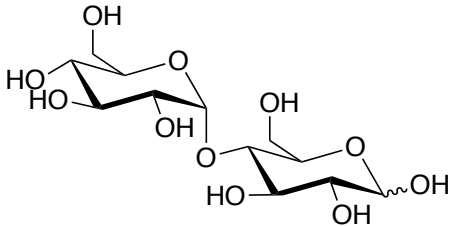
β-anomer
 σ -to- σ^* interactions impossible

I. Di- And Oligosaccharides

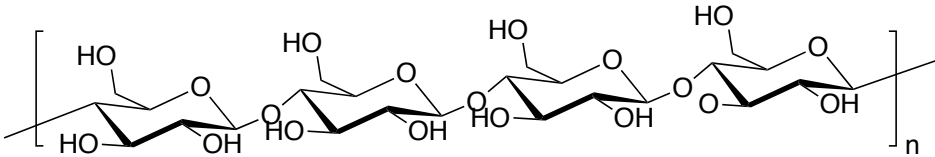
acetal or ketal



cellobiose

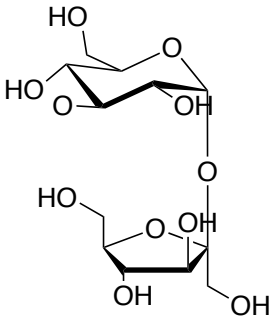


maltose



cellulose

linkages are: β -1,4

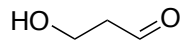


sucrose

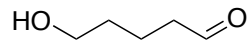
linkage is: α 1, β 2

poly-saccharide,
di-saccharide.
photosynthesis.

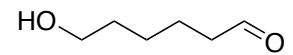
J. Carbohydrates In Summary



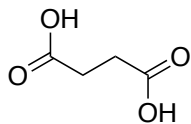
D-(+)-glyceraldehyde



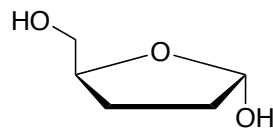
D-ribose



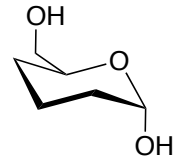
D-glucose



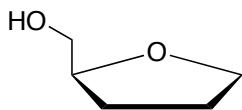
D-(-)-tartaric acid



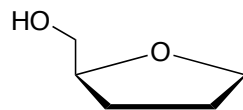
α-D-ribofuranose



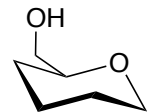
α-D-glucopyranose



β-D-2-deoxyribofuranose



β-D-ribofuranose



β-D-glucopyranose

β-D-ribofuranose.

β-D-2-deoxyribofuranose.