

Billy Gates

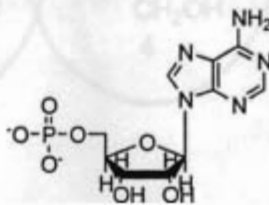
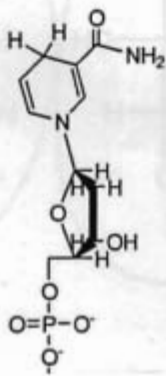
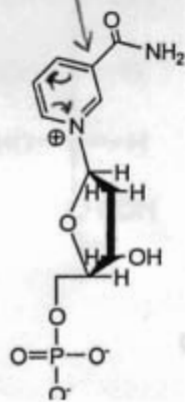
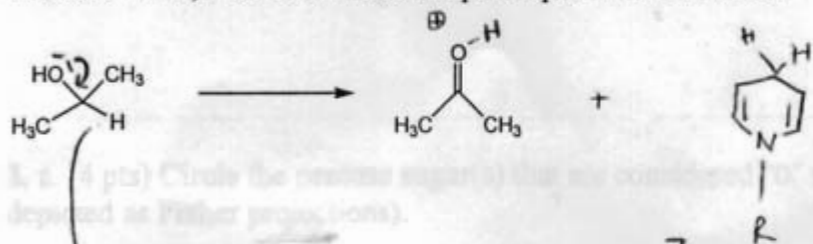
1. One of the 3 (A,B,C) molecules below is NAD⁺ (nicotinamide adenine dinucleotide) and another is NADH.

a. (2 pts) Which compound is NADH? (A, B or C) B

b. (2 pts) Which molecule could reduce an aldehyde to an alcohol? (A, B or C) B

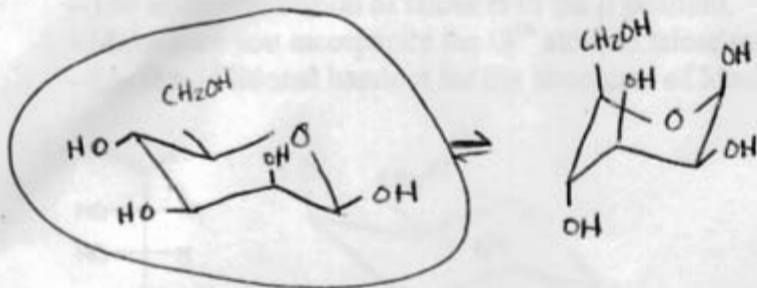
c. (2 pts) Which molecule could oxidize 2-propanol to acetone? (A, B or C) A

d. (6 pts) In the space below, show the mechanism of the oxidation of 2-propanol to acetone using your answer from part c above. Use an 'R' group to depict the part of the molecule in A, B or C that doesn't participate in the reaction.



2. (6 pts) Draw the cyclic form of β -D-Mannose.

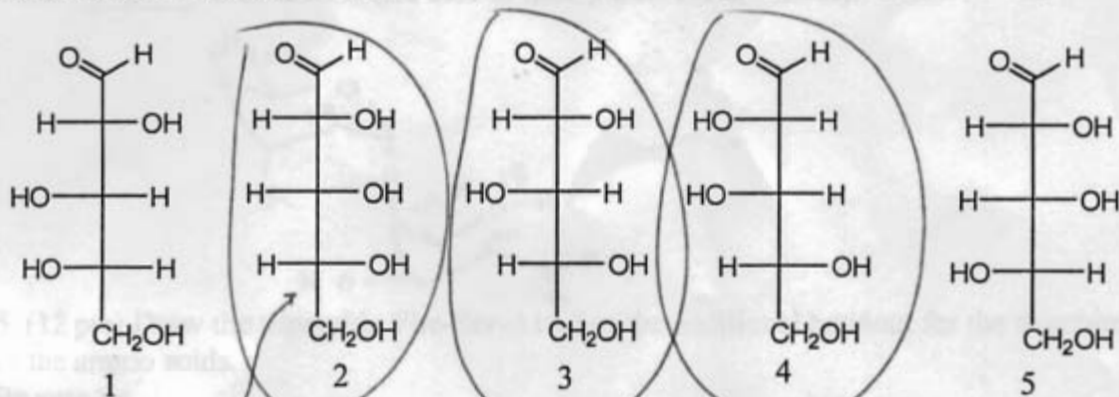
--Draw BOTH chair conformations and circle the one that is most stable



3. a. (4 pts) Circle the pentose sugar(s) that are considered 'D' sugars. (All structure are depicted as Fisher projections).

b. (2 pts) Would you find the circled sugars **naturally occurring** on this planet? yes

c. (2 pts) Which pair(s) of sugars below are enantiomers? 4 & 5



4 a. (12 pts) Draw the structure of a **disaccharide of D-Idose and D-talose**

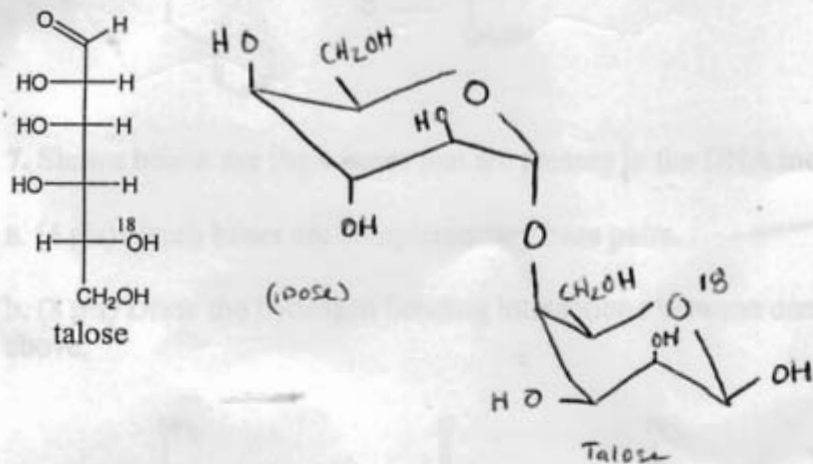
--For this structure the Idose C1 carbon is connected to the C4 of Talose

--The 1,4 Glycoside linkage is α .

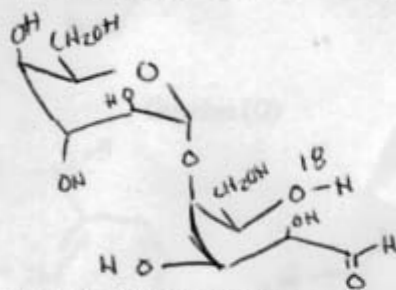
--The anomeric carbon of talose is in the β position.

--Make sure you incorporate the O^{18} atom in talose into the disaccharide

--See the additional handout for the structures of Idose.



b (4 pts) Does the disaccharide drawn above have an aldehyde form that is in equilibrium with? yes If so draw it (Be sure to incorporate the O^{18} atom).



5. (12 pts) Draw the tripeptide **Phe-Ser-Asn** See the additional handout for the structures of the amino acids.

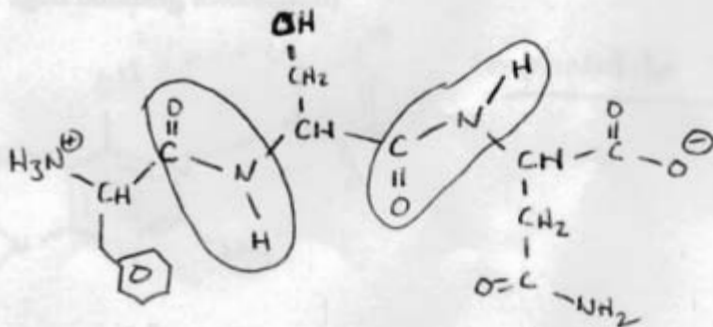
Be sure to:

--Circle the 'peptides bonds' that are present.

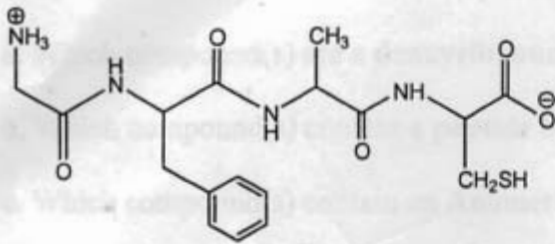
--Make sure the peptides bonds are in the 'trans' configuration

--Draw the zwitterions form

--You **do not** have to show stereochemistry of any chiral carbons.



6. (5 pts) Name the peptide below by the 3 lettered abbreviated amino acid notation (as in the previous question)



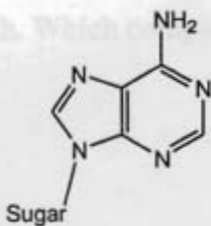
gly-phe-Ala-Cys

7. Shown below are the 4 bases that are present in the DNA molecule.

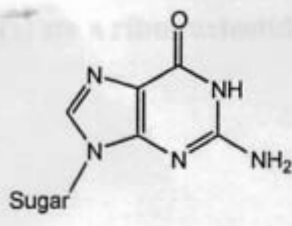
A and T
C and G

a. (4 pts) Which bases are complementary base pairs.

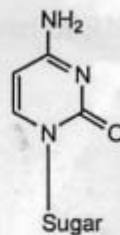
b. (8 pts) Draw the hydrogen bonding interactions between one of the base pairs listed above.



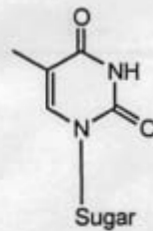
Adenine (A)



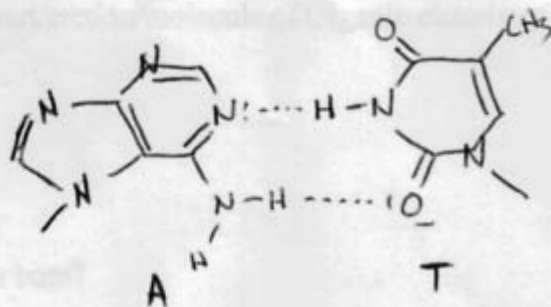
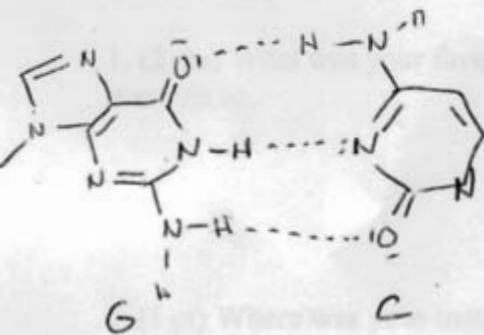
Guanine (G)



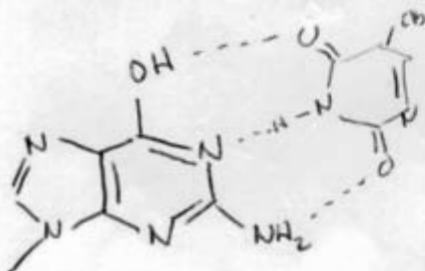
Cytosine (C)



Thymine (T)



c. (5 pts) If Guanine was in the aromatic 'enol' form what would that structure be and which base would it then be a complementary pair to? (you do not have to draw the hydrogen bonding interaction)



Compliment to T

'enol' form of G

8. (3 pts ea) Use the list of compounds shown on the next page to answer question 8 a-h. For each answer write in the number corresponding to the correct structure. There can be more than one answer for each question.

- a. Which compound(s) are a **deoxyribonucleotide** (part of DNA)? I
- b. Which compound(s) contain a **peptide bond(s)**? N
- c. Which compound(s) contain an **Anomeric carbon**? ABG (\pm L) also o.k.
- d. Which compound(s) would you consider to be a **disaccharide**? A
- e. Which compound(s) contain a **β Glycosidic linkage**? B, G
- f. Which compound(s) would you consider to be a **α -D-amino acid**? C
- g. Which compound(s) would you consider to be an **α -L-amino acid**? H
- h. Which compound(s) are a **ribonucleotide** (part of RNA)? L

Extra credit

1. (2 pts) What was your favorite part/section/molecule of Organic chemistry and why was this so.

2. (1 pt) Where was your instructor born?

Pullman Washington

These compounds are to be used for question #8 a-h

