Chemistry 248 sample exam 5 [a table of amino acid names and pKa values will be provided]

1. In each case, draw the structure of the given compound. For amino acids, draw the form that predominates at pH 7. **[Hint: The table on the cover of this exam gives lots of clues.]**

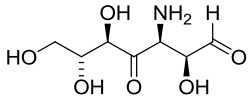
a) D-glucose
b) α-D-allopyranose
c) 2-deoxy-D-ribose
d) L-leucine
e) L-histidine
f) L-arginine
g) L-aspartic acid (aspartate)
h) L-tyrosine
i) L-proline
j) L-glutamine

2. Draw a structure of an example of each of the following:

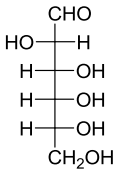
a) a phosphoacylglycerol involving choline
b) a steroid (of your invention!) with a β-amino group
c) a cyclic hydrocarbon sesquiterpene
d) a fat
e) a lipid wax

3. Draw…

a) …the Fischer projection corresponding to

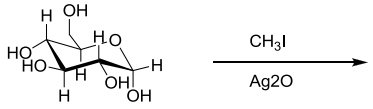


b) …the Haworth projection for the α-pyranose of

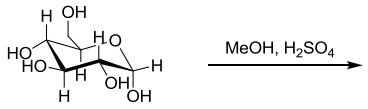


4. Give the product of each of the following reactions:

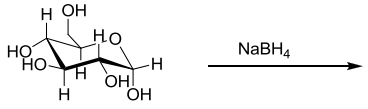
a)



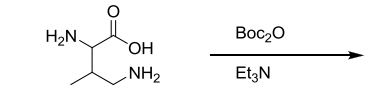
b)



c)

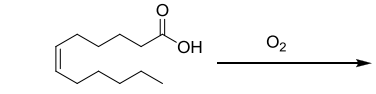


d)



(for full credit, show Boc structure, not just "Boc")

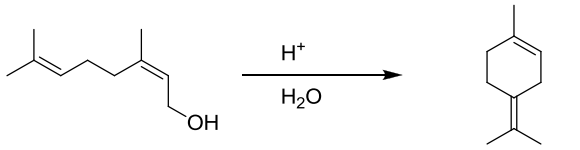
e)



(just draw one possible product)

5. Consider the table on the cover of this exam. Draw a scale of pH from 0 to 14 and mark it with the pK_a values of cysteine. Indicate the various major protonation forms of cysteine below it (as was done in class and at that web page dealing with pI). Based on this information, what is the pI of cysteine?

6. Propose a mechanism for the following reaction:



nerol terpinolene