

Your Name _____

ORGANIC CHEMISTRY FOR HEALTH AND NUTRITION
FINAL EXAM
MAY 18, 2015

Periodic Table of the Elements
 Ground State Electron Configurations

Ground State Electron Configurations

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About Chemistry

1A																		2A																		3A										4A										5A										6A										7A										8A																																																																																																					
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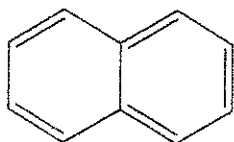
Lanthanides															
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La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
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Actinides															
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[Rn]6d ¹ 7s ²	[Rn]6d ² 7s ²	[Rn]5f ² 6d ¹ 7s ²	[Rn]5f ³ 7s ²	[Rn]5f ⁴ 7s ²	[Rn]5f ⁶ 7s ²	[Rn]5f ⁷ 7s ²	[Rn]5f ⁸ 7s ²	[Rn]5f ⁹ 7s ²	[Rn]5f ¹⁰ 7s ²	[Rn]5f ¹⁰ 6d ¹ 7s ²	[Rn]5f ¹¹ 7s ²	[Rn]5f ¹² 7s ²	[Rn]5f ¹³ 7s ²	[Rn]5f ¹⁴ 7s ²	

* values are based on theory and are not verified

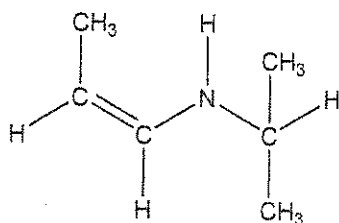
Good luck on this exam!

Please try to relax. Remember it is your job to simply **SHOW ME WHAT YOU KNOW.**

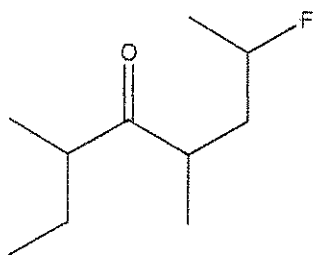
1. Convert the following from Line Bond Notation to a Lewis Structure. (4 pts)



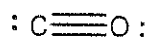
2. Convert the following Lewis Structure to Line Bond Notation. (4 pts)



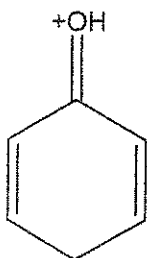
3. Give the official IUPAC name of the molecule shown below. (4 pts)



4. Fill in all missing non-zero formal charges on the molecule shown below. (4 pts)



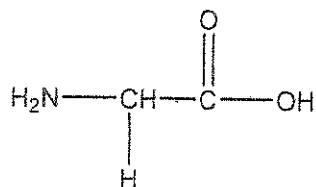
5. Draw a resonance structure for the molecule shown below. If your resonance structure has any formal charges, be sure to show them clearly. (4 pts)



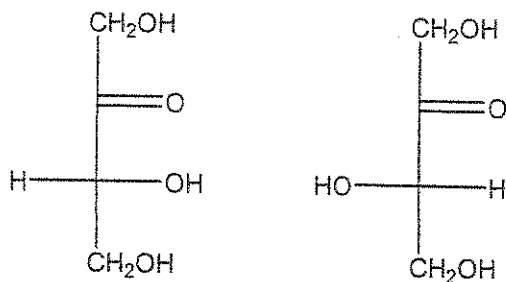
6. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would convert to the structure on the right and how the structure on the right would convert to the structure to the left. (4 pts)



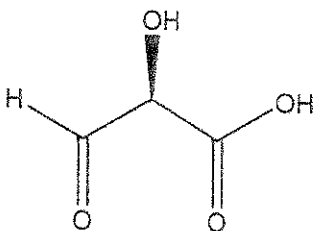
7. Draw the structure of the polymer that would form upon polymerization of the following amino acid with itself. (4 pts)



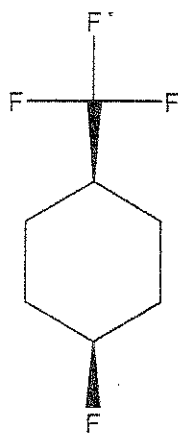
8. What is the relationship between the following two molecules? Are they identical, enantiomers or diastereomers? (2 pts)



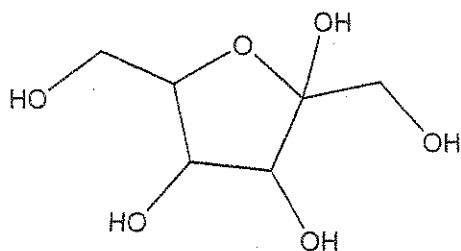
9. Determine the R/S configuration of each chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon. (4 pts)



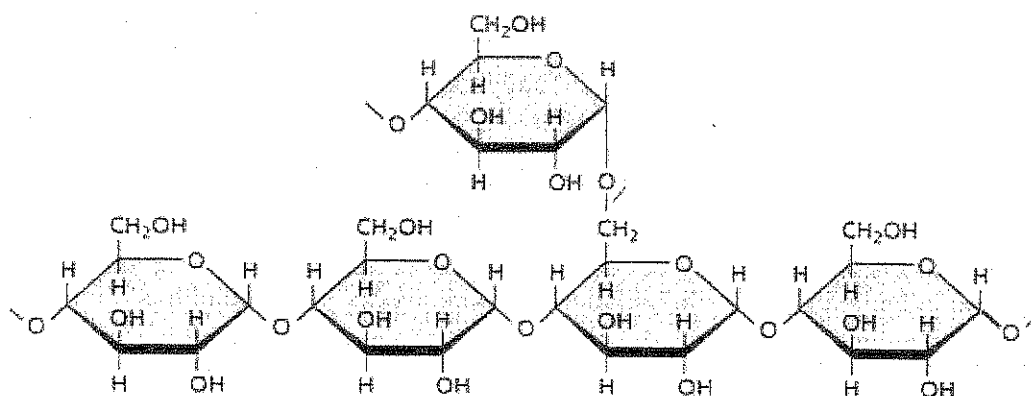
10. Draw both chair conformations of the following cyclohexane compound and circle the one that is lower in energy. (8 pts)



- 11a. Label the anomeric carbon on the sugar shown below. (6 pts)
 b. Is this a reducing sugar?
 c. Is it in its alpha or beta form?

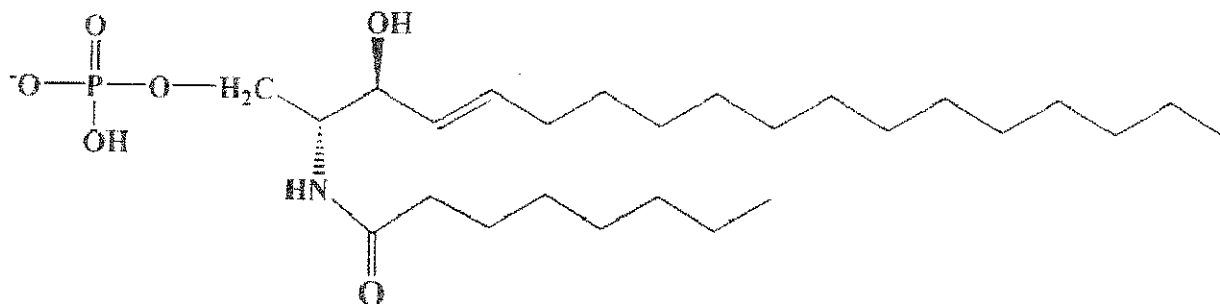


12. Glycogen, a polymer of glucose, is shown below (4 pts)
 a. Label the 1,4 linkages with stars *.
 b. Label the 1,6 linkages with triangles Δ .

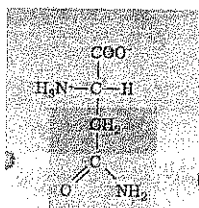


13. The following diagram depicts a sphingolipid. (4 pts)

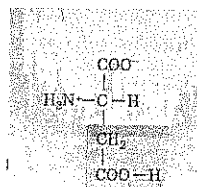
- Carefully circle and label the hydrophilic part(s).
- Carefully circle and label the non-polar part(s).
- Which end faces an aqueous environment?



14. Construct a **tripeptide** ASN-ASP-ASN from the amino acids shown below. Make sure to draw it in the form it would take in your body (at physiological pH). (8 pts)

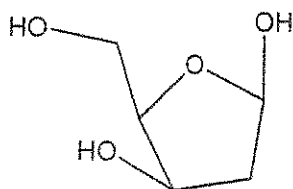


Asparagine (Asn, N)

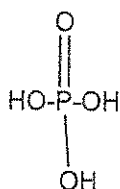


Aspartic acid (Asp, D)

15. Given the structures below, draw deoxyribose 5-diphosphate (4 pts):



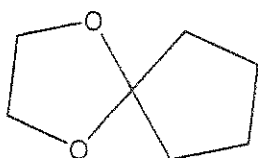
deoxyribose



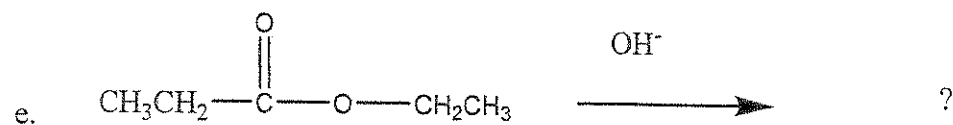
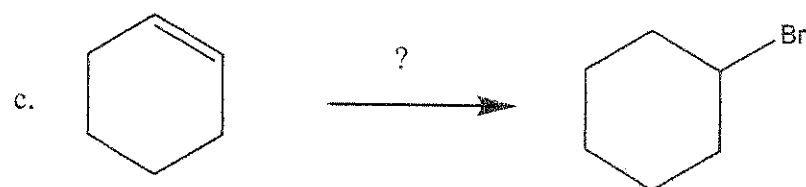
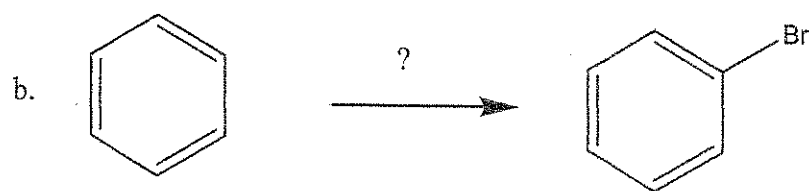
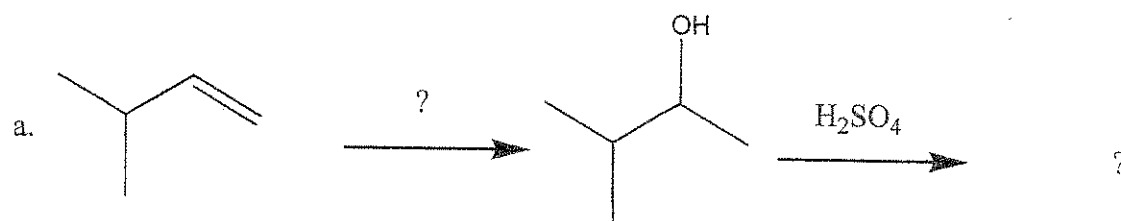
phosphoric acid

16a. What functional group is shown below? (4 pts)

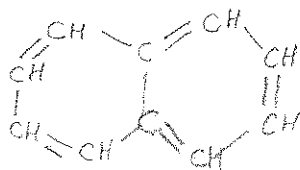
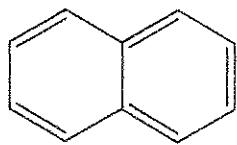
- Draw the structures of the ketone and alcohol(s) that were used to synthesize this compound:



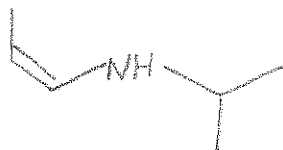
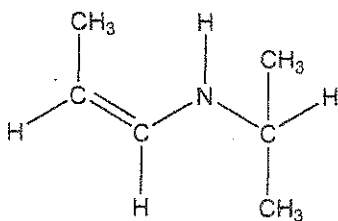
17. Fill in the missing reagent(s) or products in the reactions shown below (28 pts)



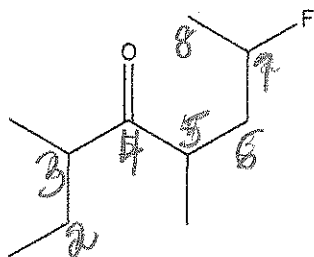
1. Convert the following ~~structure~~ from Line Bond Notation to a Lewis Structure. (4 pts)



2. Convert the following Lewis Structure to Line Bond Notation. (4 pts)



3. Give the official IUPAC name of the molecule shown below. (4 pts)

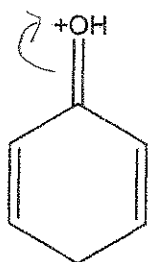


7-fluoro-3,5-dimethyloctanone

4. Fill in all missing non-zero formal charges on the molecule shown below. (4 pts)



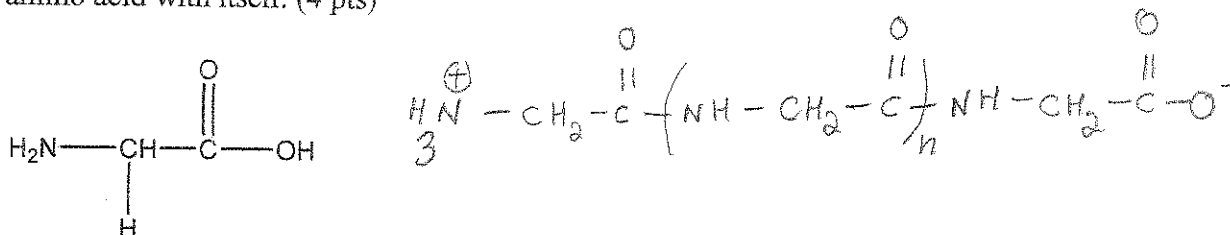
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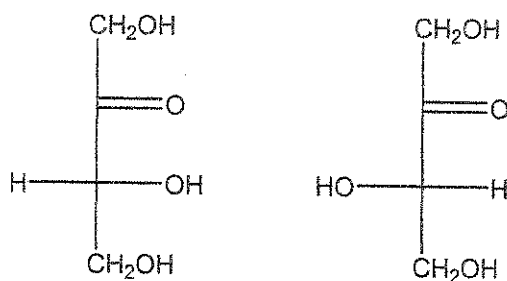
6. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would convert to the structure on the right and how the structure on the right would convert to the structure to the left. (4 pts)



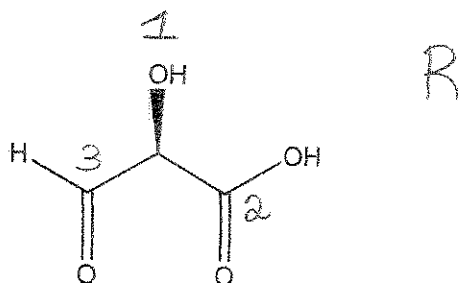
7. Draw the structure of the polymer that would form upon polymerization of the following amino acid with itself. (4 pts)



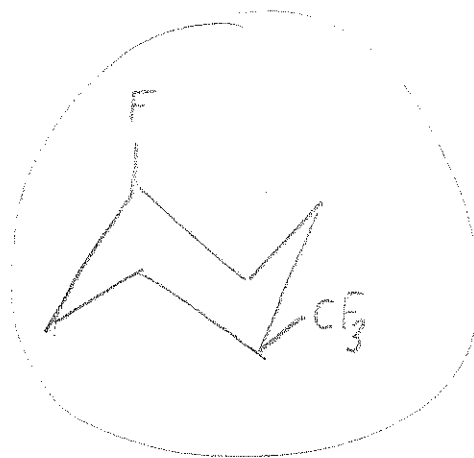
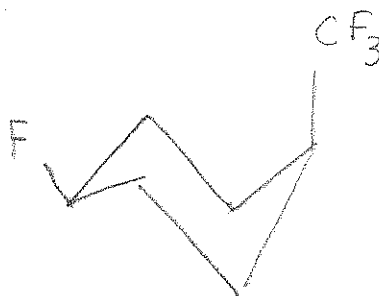
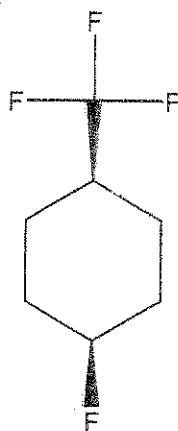
8. What is the relationship between the following two molecules? Are they identical, enantiomers or diastereomers? (2 pts)



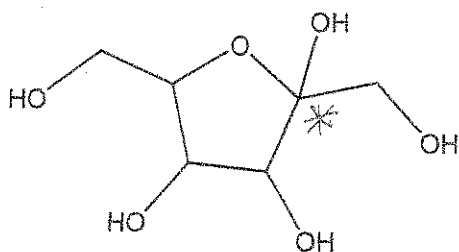
9. Determine the R/S configuration of each chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon. (4 pts)



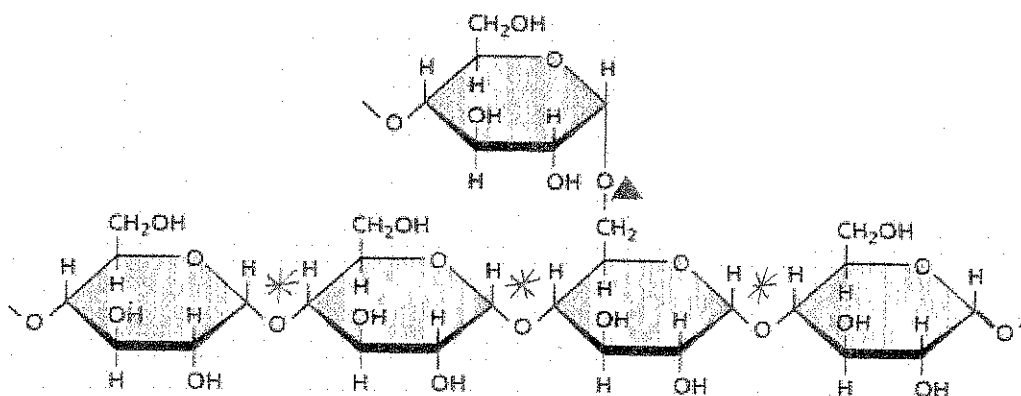
10. Draw both chair conformations of the following cyclohexane compound and circle the one that is lower in energy. (8 pts)



- 11a. Label the anomeric carbon on the sugar shown below. (6 pts)
 b. Is this a reducing sugar? *yes*
 c. Is it in its alpha or beta form? *beta*

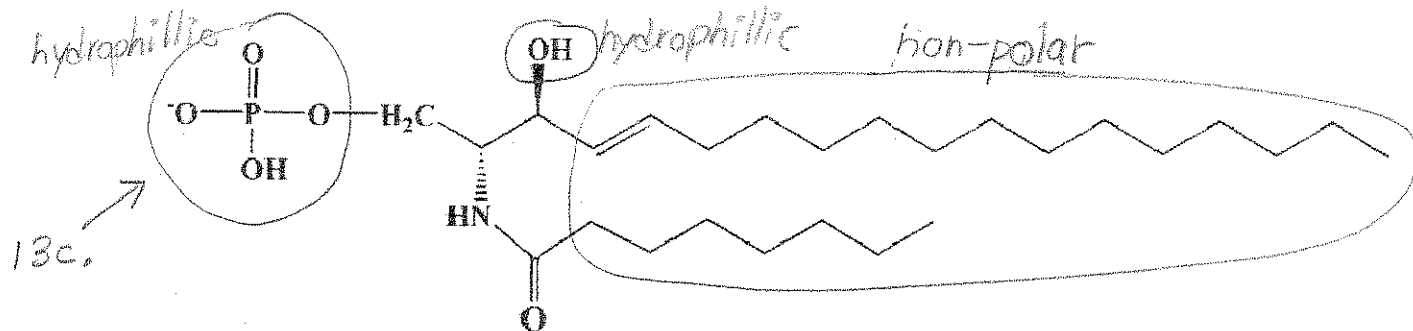


12. Glycogen, a polymer of glucose, is shown below (4 pts)
 a. Label the 1,4 linkages with stars *.
 b. Label the 1,6 linkages with triangles Δ.

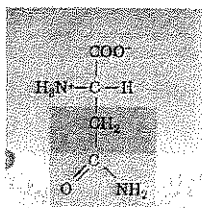


13. The following diagram depicts a spingolipid. (4 pts)

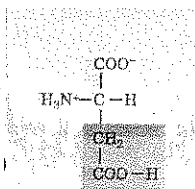
- Carefully circle and label the hydrophilic part(s).
- Carefully circle and label the non-polar part(s).
- Which end faces an aqueous environment?



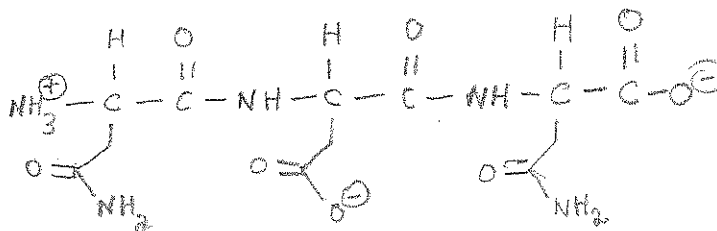
14. Construct a **tripeptide** ASN-ASP-ASN from the amino acids shown below. Make sure to draw it in the form it would take in your body (at physiological pH). (8 pts)



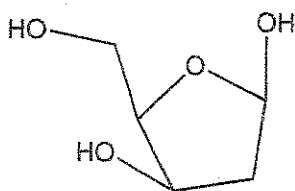
Asparagine (Asn, N)



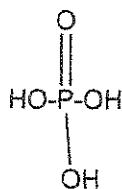
Aspartic acid (Asp, D)



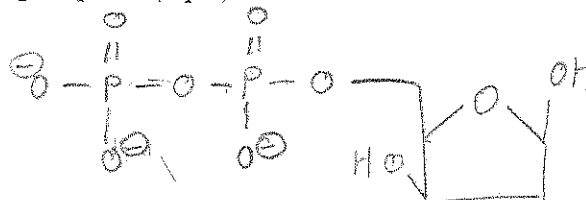
15. Given the structures below, draw deoxyribose 5-diphosphate (4 pts):



deoxyribose



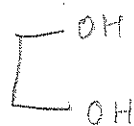
phosphoric acid



16a. What functional group is shown below? (4 pts)

acetal

b. Draw the structures of the ketone and alcohol(s) that were used to synthesize this compound:



17. Fill in the missing reagent(s) or products in the reactions shown below (28 pts)

