

**BASIC PHARMACEUTICAL SCIENCE FOR THE PRACTICING PHARMACIST  
MEDC 527, Fall 2008**

Exam #1, Dr. Desai, 200 points; October 7, 2008

<b>STUDENT NAME (in CAPITAL Letters ONLY)</b>	<b>HONOR Pledge</b>
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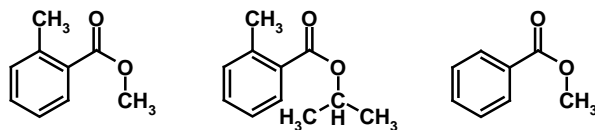
	<b>IV</b>	<b>V</b>	<b>VI</b>	<b>VII</b>
<b>2</b>	C	N	O	F
<b>3</b>	Si	P	S	Cl
<b>4</b>	Ge	As	Se	Br
<b>5</b>				I

1. Draw complete structure of the following natural  $\alpha$ -amino acid at pH 7.0 in appropriate charged form. (8 pts)

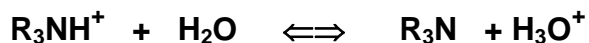
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A basic amino acid A polar, but not basic, amino acid

2. Rank the following compounds on their ability to undergo hydrolysis at pH 1 ( $H^+/H_2O$ ). Use 1 for most easily hydrolyzable and 3 for least. (9 pts)



3. Write the Henderson – Hasselbach equation for the following equilibrium. Define the terms involved. (12 pts)




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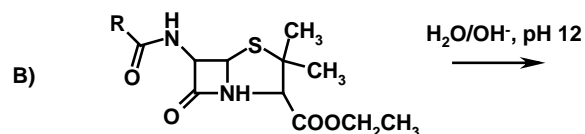
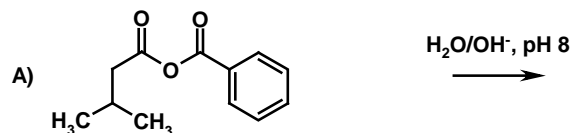
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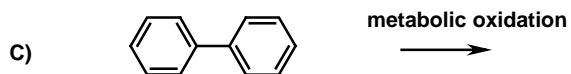
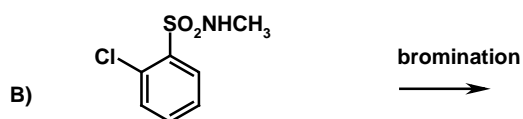
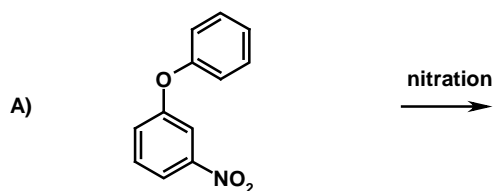
4. The three important functions of lipids are (6 pts) :

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_

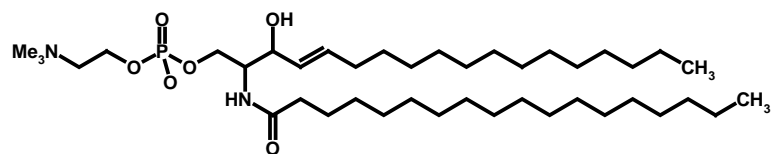
5. Draw product(s) of the following hydrolytic reactions assuming that complete hydrolysis. Write appropriate charges on functional groups formed in the reaction. If there is no product, write NONE. (16 pts)



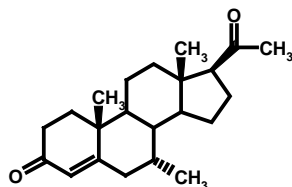
6. Predict the major product (not all the products) in the following reactions. If there is no product, write NONE. **NOTE:** More than one major product would fetch negative points. (15 pts)



7. Identify the class of the following lipids (8 pts)



\_\_\_\_\_



\_\_\_\_\_

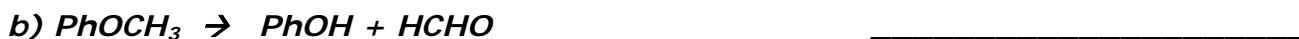
8. HDL particles are different from LDL particles in \_\_\_\_\_ (4 pts)
- 1) their overall composition
  - 2) their density
  - 3) their size
  - 4) all of the above

9. Two phase I metabolic reactions include \_\_\_\_\_ and \_\_\_\_\_, while two phase II metabolic reactions include \_\_\_\_\_ and \_\_\_\_\_ (8 pts)

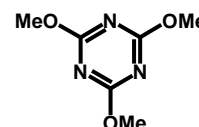
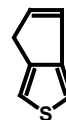
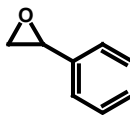
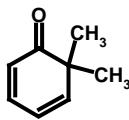
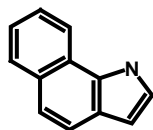
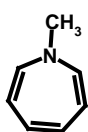
10. Predict the order of melting transition of following three natural lipids (all double bonds are cis). Use 1 for lowest melting and 3 for highest melting (9 pts).



11. Name the type of the following metabolic reactions. (8 pts)



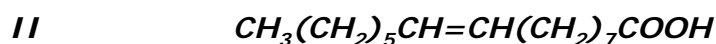
12. Circle that part of the following structures which is aromatic. Clearly identify the part. If the entire molecule is aromatic, encircle the whole molecule. **Note:** Negative points for identifying wrong parts/molecule as aromatic. (8 pts)



13. The four most important constituents of lipoprotein particles are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ (8 pts).

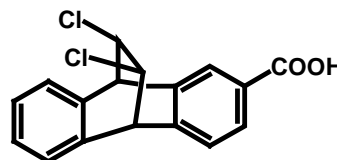
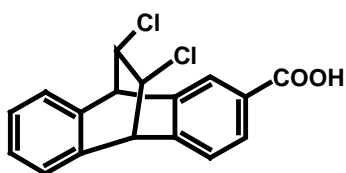
These constituents are held together through \_\_\_\_\_ (identify the type of interaction) (2 pts). The surface of lipoprotein particles is lined with \_\_\_\_\_ groups (2 pts). This makes lipoprotein particles \_\_\_\_\_ in aqueous medium (2 pts).

14. In not more than 5 sentences explain why lipid I is likely to be more beneficial for a human body in comparison to lipid II? (5 pts)



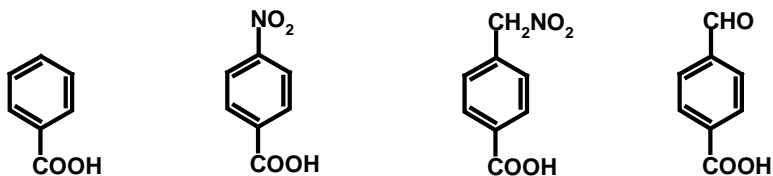
\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

15. Circle the acid that is expected to exhibit higher pKa in the following pair of acids. (5 pts)

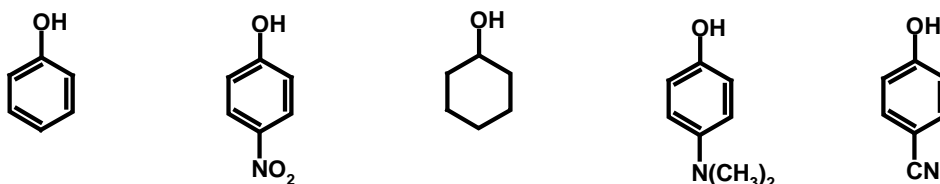


16. Rank the molecules/ions in each series according to their acidity. Use 1 for the least acidic, 2 for slightly higher, and so on. (28 pts)

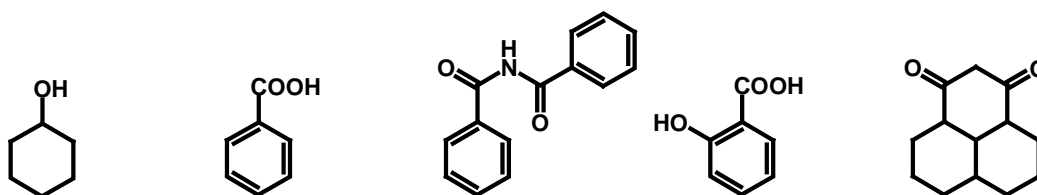
a)



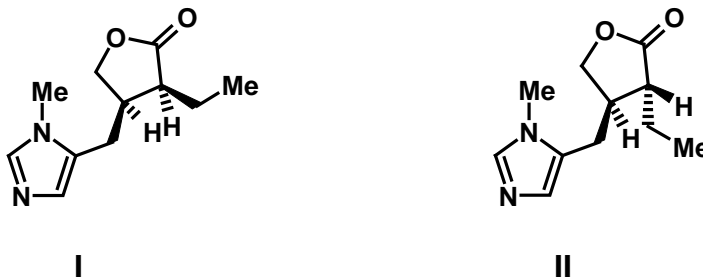
b)



c)



17. Why does molecule I hydrolyze faster in our body than molecule II? (6 pts)




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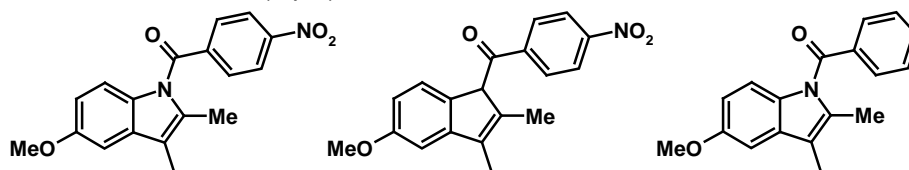


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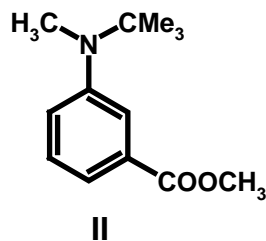
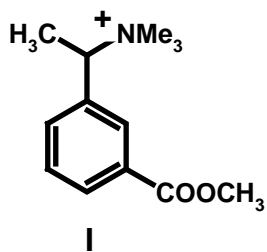


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18. Rank the following compounds on their ability to undergo hydrolysis under basic conditions ( $\text{H}_2\text{O}/\text{OH}^-$ ). Use 1 for least hydrolyzable and 3 for most. (9 pts)



19. The pH of kidney ranges from 4.5 to 8.0. In the un-metabolized form, which of the following two compounds below will most rapidly excreted and why? (8 pts)




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20. Circle ionizable functional group(s) (pH range 0 -14) in the following molecules and indicate their approximate  $pK_A$  value or range. If there are no ionizable groups, write NONE. (14 pts)

