

Name: \_\_\_\_\_

Date: \_\_\_\_\_

[5 pt] 1. What are the requirements for hydrogen bonding to occur? Draw a picture showing how 1-butanol would hydrogen bond with another 1-butanol molecule **AND** how it would hydrogen bond with water.

[10 pt] 2. Review: List the 5 Intermolecular Forces (IMFs) discussed in class in order from weakest to strongest and draw an example illustrating each.

(a)

(b)

(c)

(d)

(e)

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[3 pt] 3. How are the boiling point and melting point of molecules related to the Intermolecular Forces (IMF's) between them? Explain.

[10 pt] 4. Draw each molecule in the space provided. Circle the compound with the higher boiling point. Explain.

(a) hexane or 2-hexanol

(b) 1-butanol or 1,3-butandiol

(c) 2-methoxybutane or 3-pentanol

(d) 1-propanol or 1-octanol

(e) 2-heptyne or 2-heptanol

[3 pt] 5. The general rule for solubility is "like dissolves like" what is meant by this?

[3 pt] 6. What is the difference between a polar and nonpolar solvent?

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[10 pt] 7. Circle the compound in the following pairs with the higher solubility in water. Explain.

(a) hexane or 2-hexanol

(b) 1-butanol or 1,3-butandiol

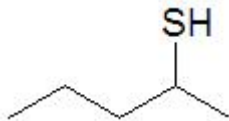
(c) 2-methoxybutane or 3-pentanol

(d) 2-propanol or 4-octanol

(e) 2-heptyne or 2-heptanol

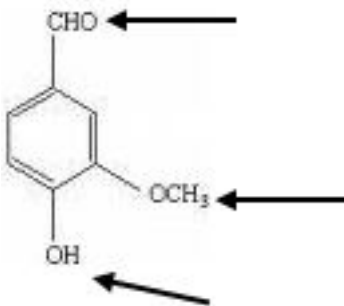
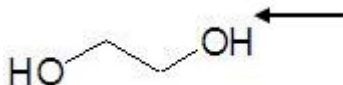
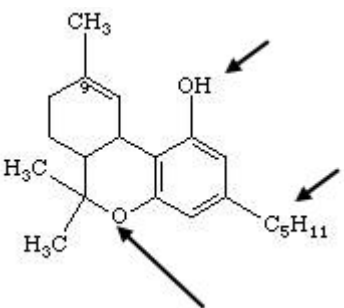
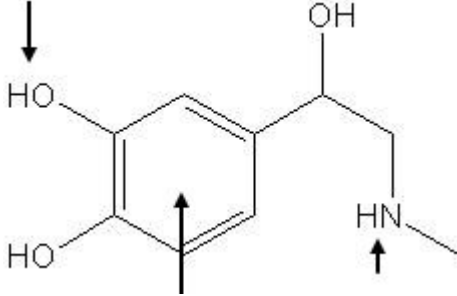
[4 pt] 8. Define primary, secondary and tertiary alcohols. Draw an example of each type. Why is it important to be able to identify the difference.

[2 pt] 9. Name the following molecule:



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[10 pt] 10. The following molecules can be found in your book. For each molecule: (1) give its name(IUPAC or Common name), (2) label the important functional groups, and (3) tell why the molecule is important.

 <p>Chemical structure of 3-methoxy-4-hydroxybenzaldehyde. The structure shows a benzene ring with a formyl group (CHO) at the top, a methoxy group (OCH<sub>3</sub>) at the meta position (3), and a hydroxyl group (OH) at the para position (4). Three arrows point to these functional groups: one to the CHO group, one to the OCH<sub>3</sub> group, and one to the OH group.</p>	 <p>Chemical structure of ethane-1,2-diol (ethylene glycol). The structure shows a two-carbon chain with hydroxyl groups (OH) attached to each carbon. An arrow points to the rightmost OH group.</p>
 <p>Chemical structure of a complex bicyclic molecule, likely a steroid derivative. It features a fused ring system with a methyl group (CH<sub>3</sub>) at the top, a hydroxyl group (OH) on the right, and a pentyl group (C<sub>5</sub>H<sub>11</sub>) at the bottom right. Three arrows point to these groups: one to the top CH<sub>3</sub>, one to the OH group, and one to the C<sub>5</sub>H<sub>11</sub> group.</p>	 <p>Chemical structure of a substituted benzene ring. The ring has a hydroxyl group (OH) at the top, two hydroxyl groups (HO) at the meta positions (3 and 5), and a secondary amine group (HN) at the para position (4). Three arrows point to these groups: one to the top OH, one to the dihydroxy group (HO), and one to the HN group.</p>