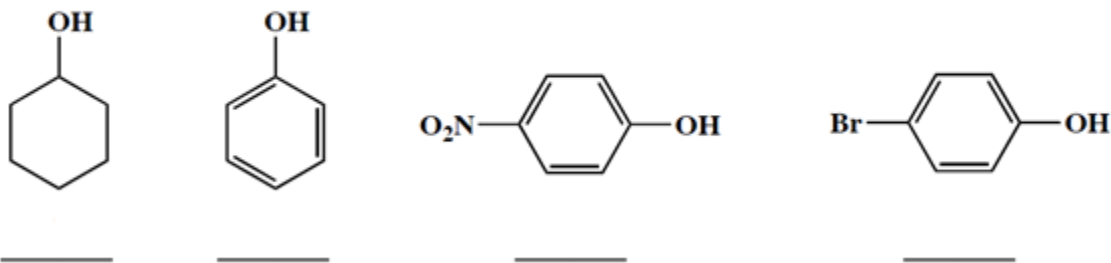
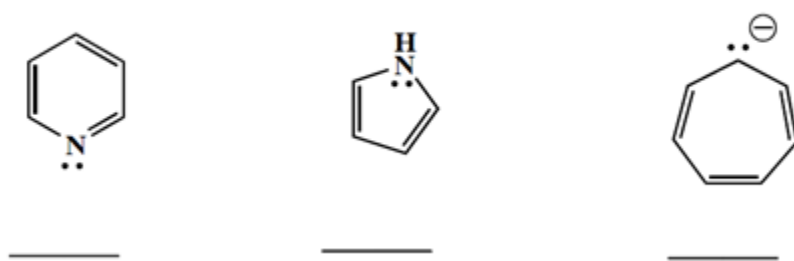


Tuesday Problem Solving Session 5/5/15

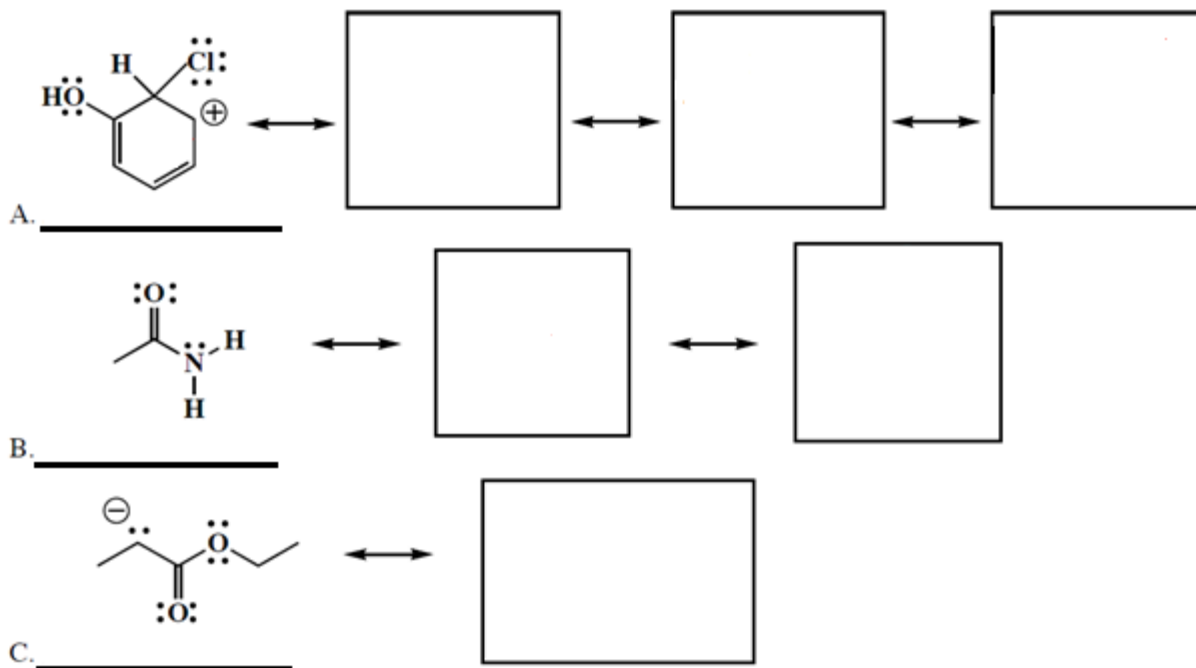
Rank from least to most acidic, with a **1** under the least acidic and a **4** under the most acidic molecule.



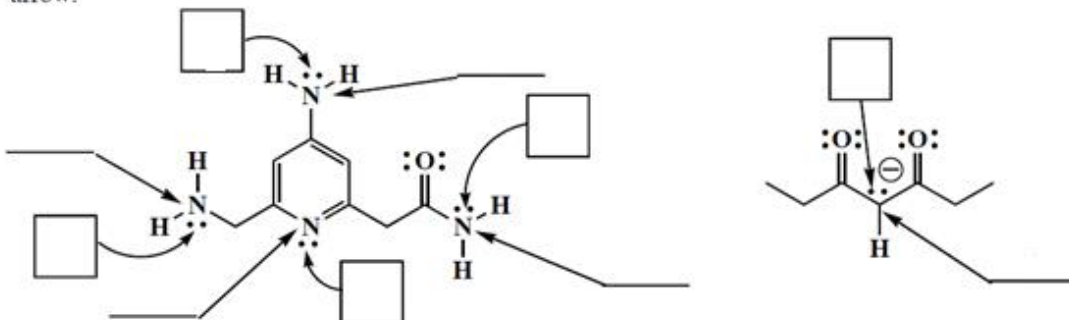
Rank from least to most basic, with a **1** under the least basic and a **3** under the most basic molecule.



Draw the indicated number of most important resonance contributing structures. Show all lone pairs, pi bonds and formal charges. Use arrows to indicate the redistribution of electrons on each molecule to the left, that leads to the contributing structure you draw immediately to its right. Only the structure on the farthest right will have no arrows. For each set, A, B, and C indicate the type of molecule/ion.



9. (2 pts each) On the lines provided, state the hybridization state of each atom indicated in the following molecule. In the box provided, state what type of atomic orbital contains the lone pair indicated by the arrow.



For the following structures, draw a circle around the terms that provide the most accurate description.

A.

$$\begin{array}{c}
 \text{CHO} \\
 | \\
 \text{HO} - \text{C} - \text{H} \\
 | \\
 \text{H} - \text{C} - \text{OH} \\
 | \\
 \text{HO} - \text{C} - \text{H} \\
 | \\
 \text{H} - \text{C} - \text{OH} \\
 | \\
 \text{CH}_2\text{OH}
 \end{array}$$

L carbohydrate
 D carbohydrate
 X-rated carbohydrate
 S carbohydrate

B.

Furanose
 Pyranose
 Runny nose
 Bloody nose
 Bottleneck

C.

Monomeric carbon
 Anomeric carbon
 Polymeric carbon
 All-American carbon

D.

α -D-Glucose
 β -D-Glucose
 $\beta\beta$ -D-Glucose
 ΣAE -D-Glucose
 Fiji-D-Glucose

E.

α -D-Glucose
 β -D-Glucose
 $\beta\beta$ -D-Glucose
 ΣAE -D-Glucose
 Fiji-D-Glucose

F.

α -1,5-Glycosidic bond
 β -1,5-Glycosidic bond
 α -1,3-Glycosidic bond
 β -1,3-Glycosidic bond
 α -1,6-Glycosidic bond
 β -1,6-Glycosidic bond

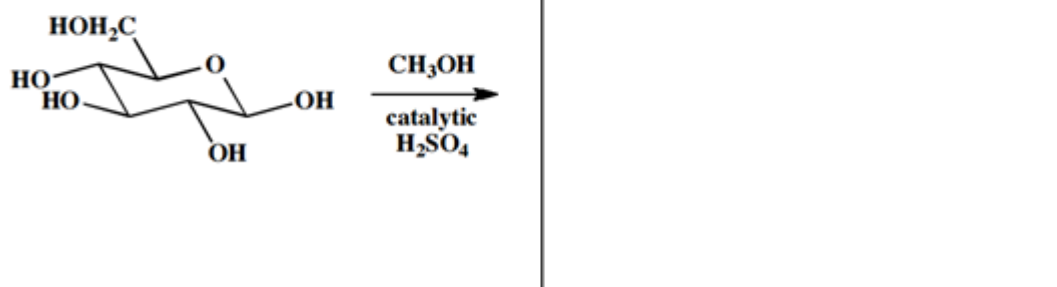
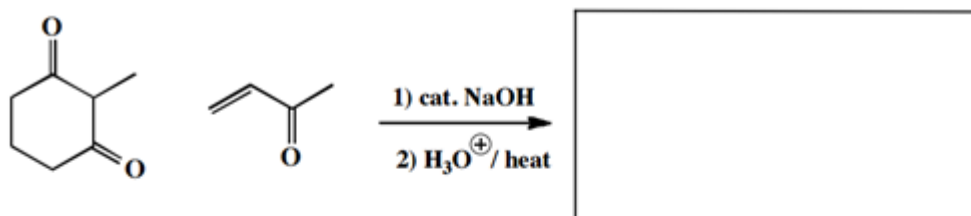
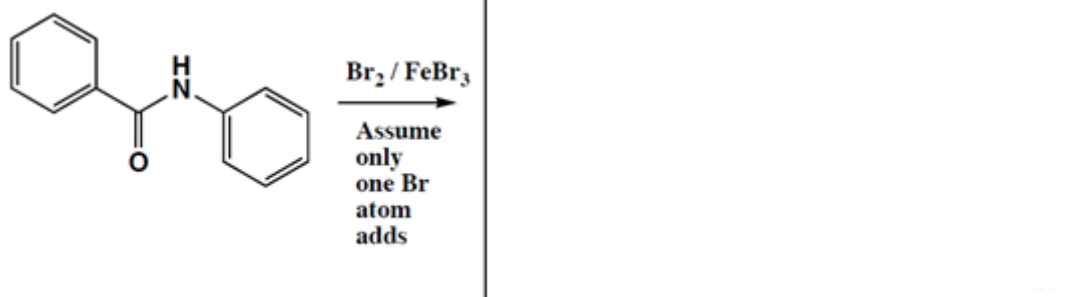
α -1,4-Glycosidic bond
 β -1,4-Glycosidic bond
 α -1,3-Glycosidic bond
 β -1,3-Glycosidic bond
 α -1,5-Glycosidic bond
 β -1,5-Glycosidic bond

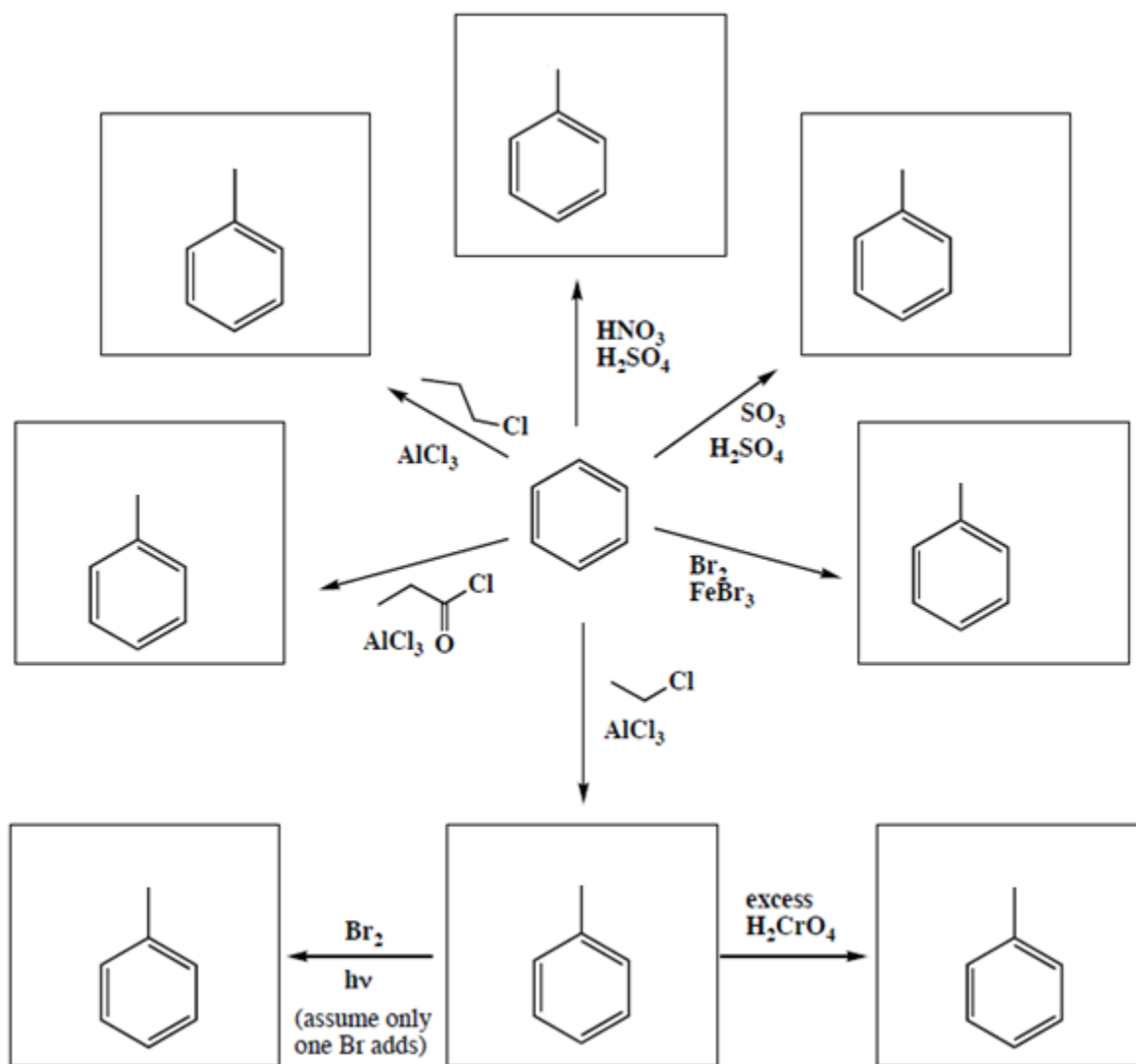
G.

$$\begin{array}{c}
 \text{CH}_2\text{OH} \\
 | \\
 \text{C} = \text{O} \\
 | \\
 \text{H} - \text{C} - \text{OH} \\
 | \\
 \text{HO} - \text{C} - \text{H} \\
 | \\
 \text{H} - \text{C} - \text{OH} \\
 | \\
 \text{CH}_2\text{OH}
 \end{array}$$

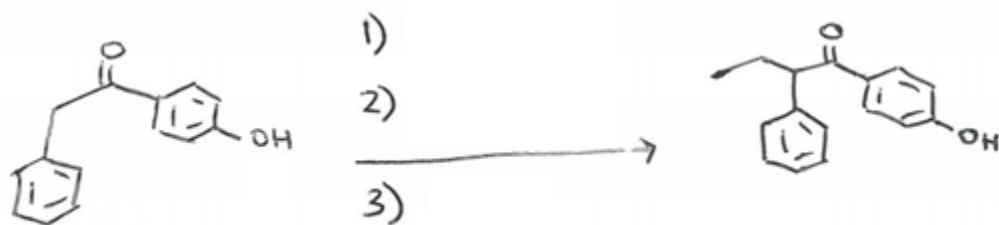
Aldohexose
 Ketohexose
 Aldopentose
 Pointy toes

Predict the product(s):

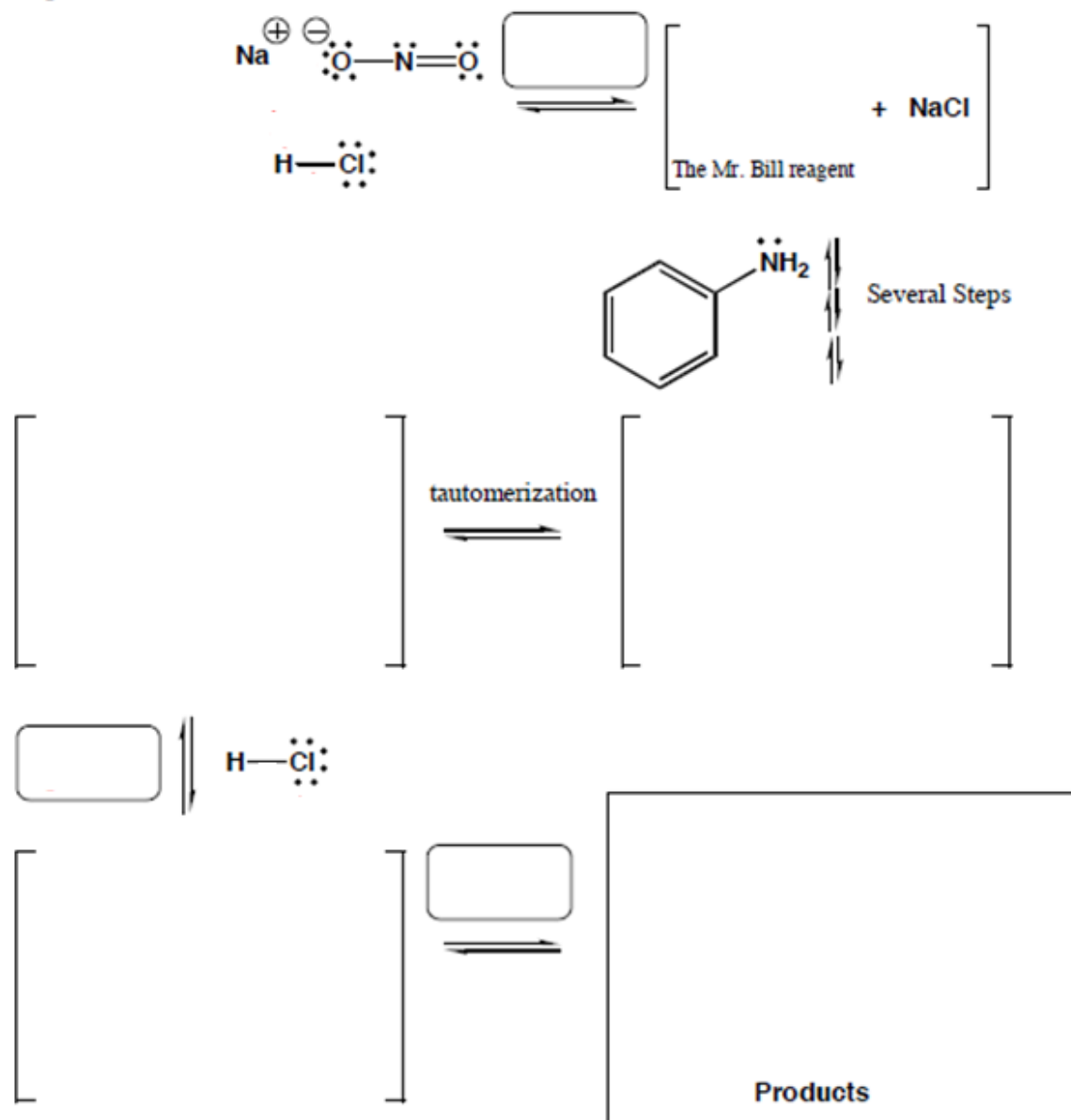


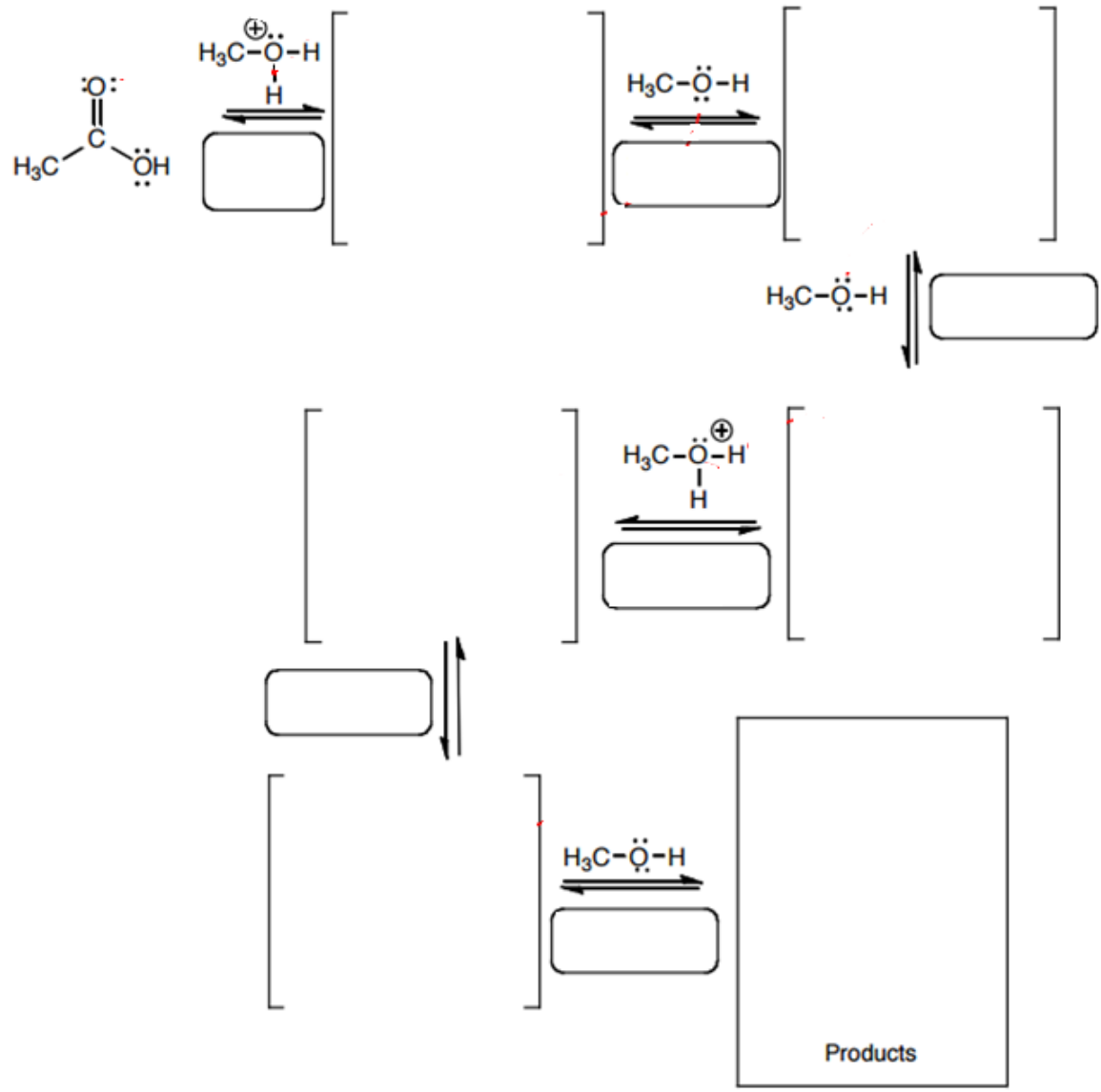


Predict the Reagents:



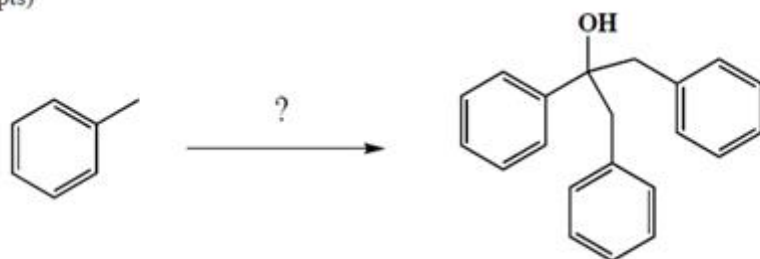
12. (17 pts) Complete the mechanism for the Mr. Bill reaction. Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step. Remember, I said all the products for each step. IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR THE PRODUCTS, MARK IT WITH AN ASTERISK AND LABEL AS "RACEMIC" IF RELEVANT. IN THE BOX BY EACH SET OF ARROWS, WRITE WHICH OF THE 4 MECHANISTIC ELEMENTS IS INDICATED IN EACH STEP OF YOUR MECHANISM (For example, "Add a proton").



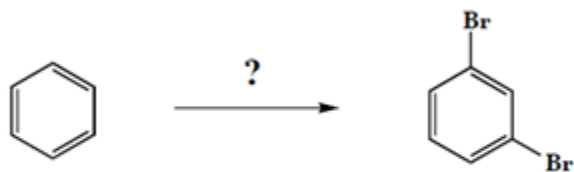


18. Using any reagents turn the starting material into the indicated product. All the carbons in the product must come from the given starting material or starting materials. Draw all molecules synthesized along the way. When it doubt, draw the molecule! If an ortho/para mixture will be the major products of a reaction, you can choose whether you would like to isolate the ortho or para product for your synthesis.

C) (16 pts)

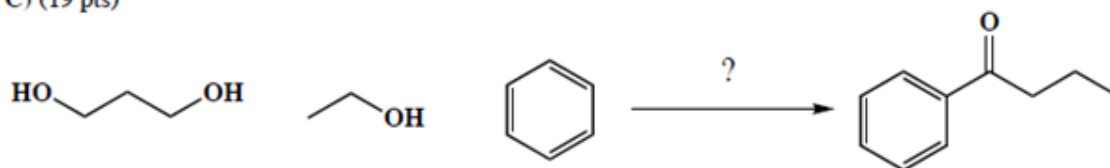


(13 pts)



11. Using any reagents turn the starting material into the indicated product. All the carbons in the product must come from the given starting material or starting materials. Draw all molecules synthesized along the way. When in doubt, draw the molecule!

C) (19 pts)



(13 pts)

