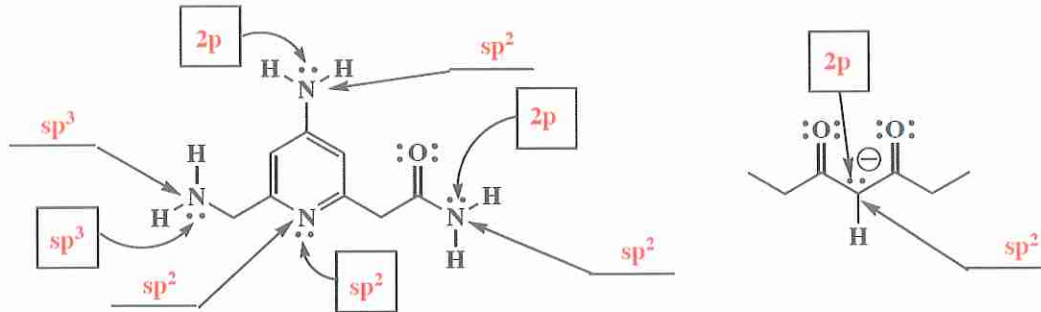


9. (2 pts each) On the lines provided, state the hybridization state of each atom indicated in the following molecule. In the box provided, state what type of atomic orbital contains the lone pair indicated by the arrow.



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

A.

O=C[C@@H](O)[C@H](O)[C@@H](O)CO

L carbohydrate
 D carbohydrate
 X-rated carbohydrate
 S carbohydrate

B.

O=C1OC(O)C(O)C1O

Furanose
 Pyranose
 Runny nose
 Bloody nose
 Bottlenose

C.

O=C1OC(O)C(O)C1O

Monomeric carbon
 Anomeric carbon
 Polymeric carbon
 All-American carbon

D.

O=C1OC(O)C(O)C1O

α -D-Glucose
 β -D-Glucose
 $\beta\beta$ -D-Glucose
 $\Sigma\Delta E$ -D-Glucose
 Fiji-D-Glucose

E.

O=C1OC(O)C(O)C1O

α -D-Glucose
 β -D-Glucose
 $\beta\beta$ -D-Glucose
 $\Sigma\Delta E$ -D-Glucose
 Fiji-D-Glucose

F.

O=C1OC(O)C(O)C1O[C@@H]2[C@@H](O)[C@H](O)[C@@H](CO)O2

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

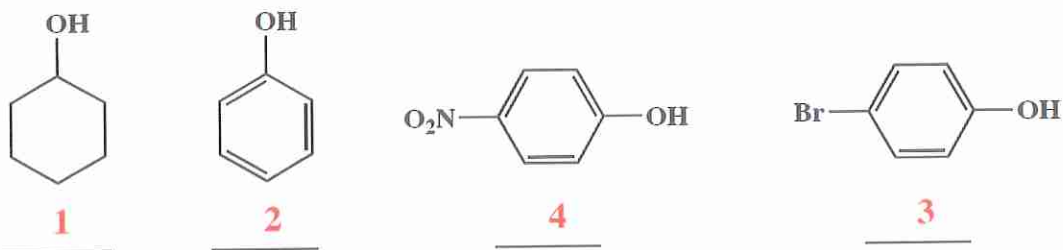
G.

O=C[C@@H](O)[C@H](O)[C@@H](O)CO

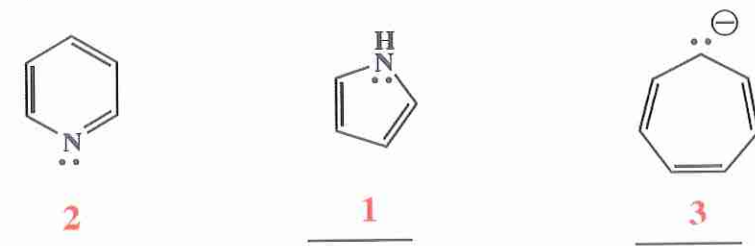
Aldohexose
 Ketohexose
 Aldopentose
 Pointy toes

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.

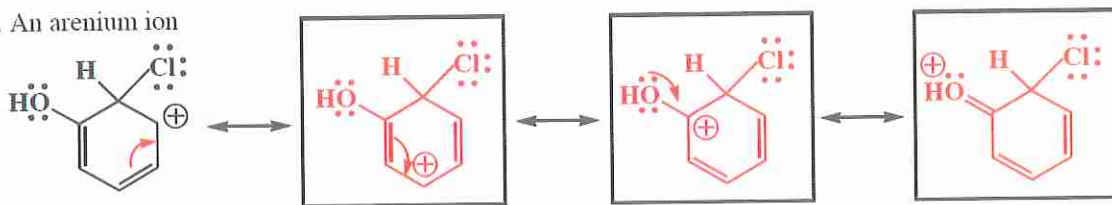


Rank from least to most basic, with a **1** under the least basic and a **3** under the most basic molecule.

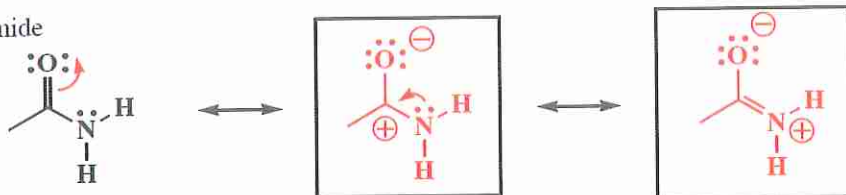


Draw the indicated number of most important resonance contributing structures. Show all lone pairs, pi bonds and formal charges. Use arrows to indicate the redistribution of electrons on each molecule to the left, that leads to the contributing structure you draw immediately to its right. Only the structure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

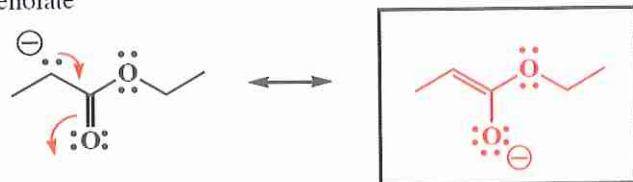
A. An arenium ion



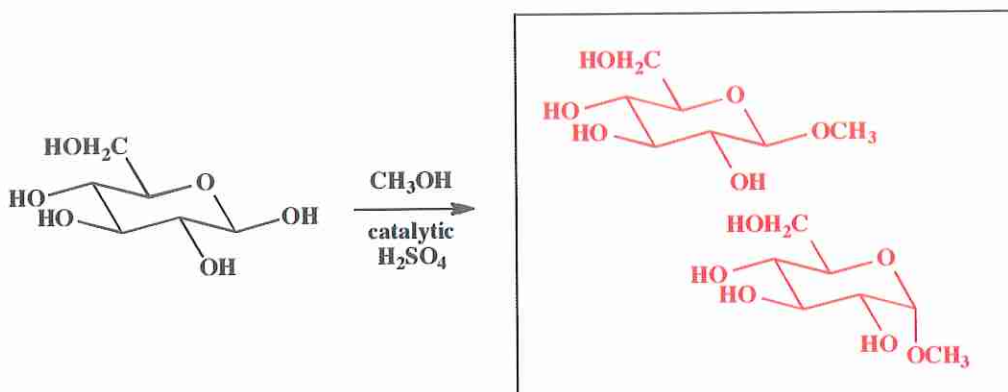
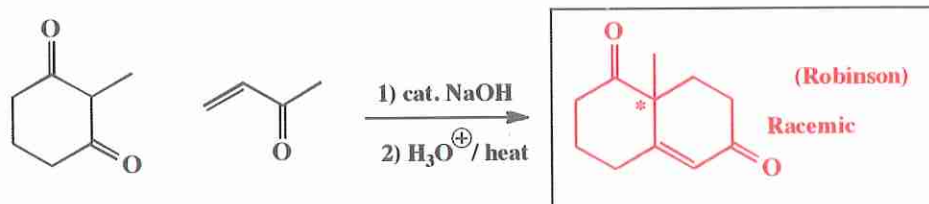
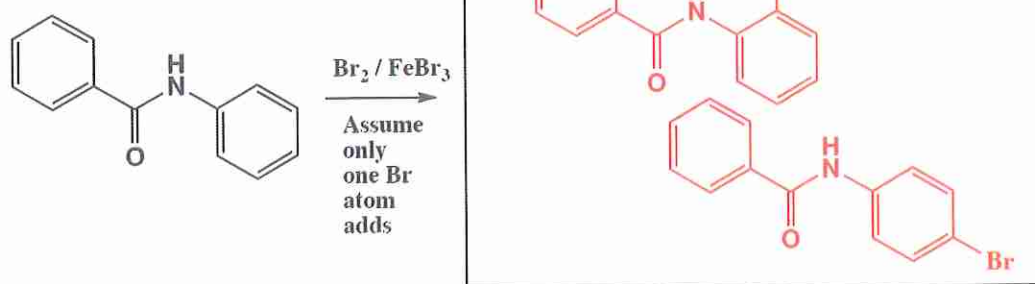
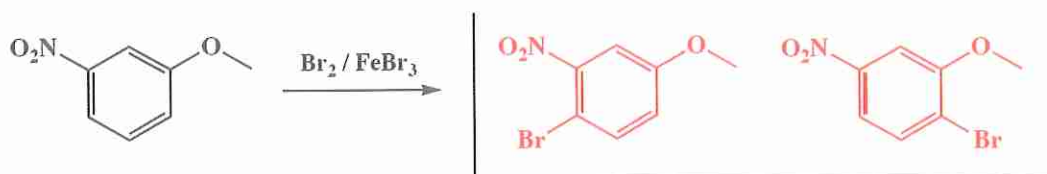
B. An amide

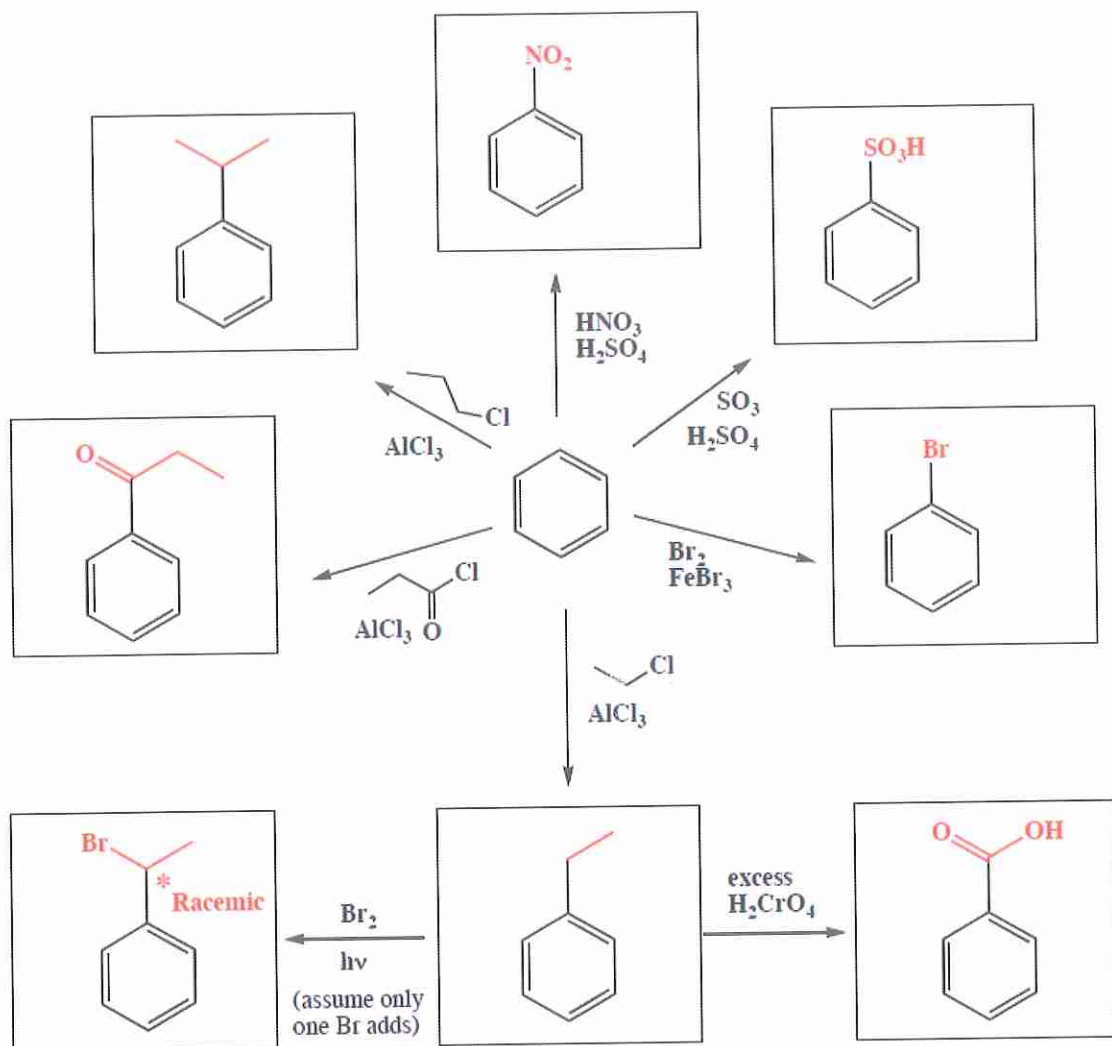


C. An enolate

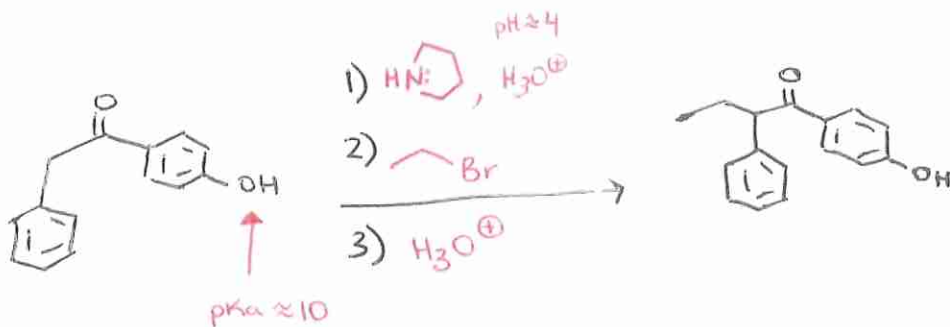


Predict the product(s):





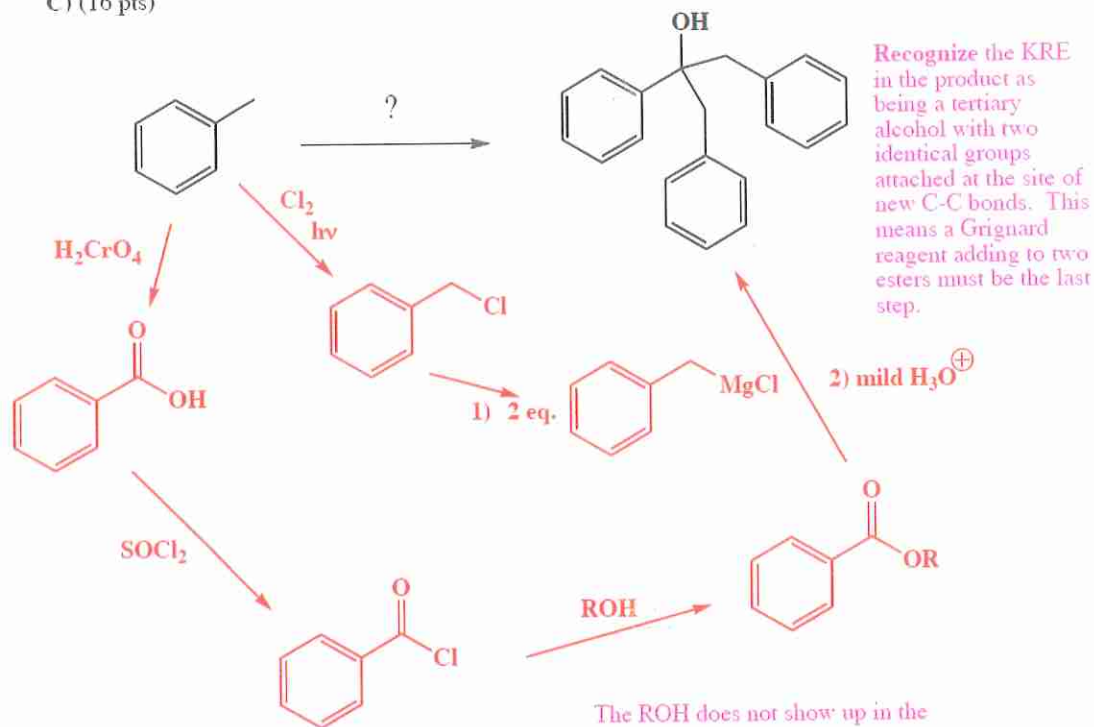
Predict the Reagents:



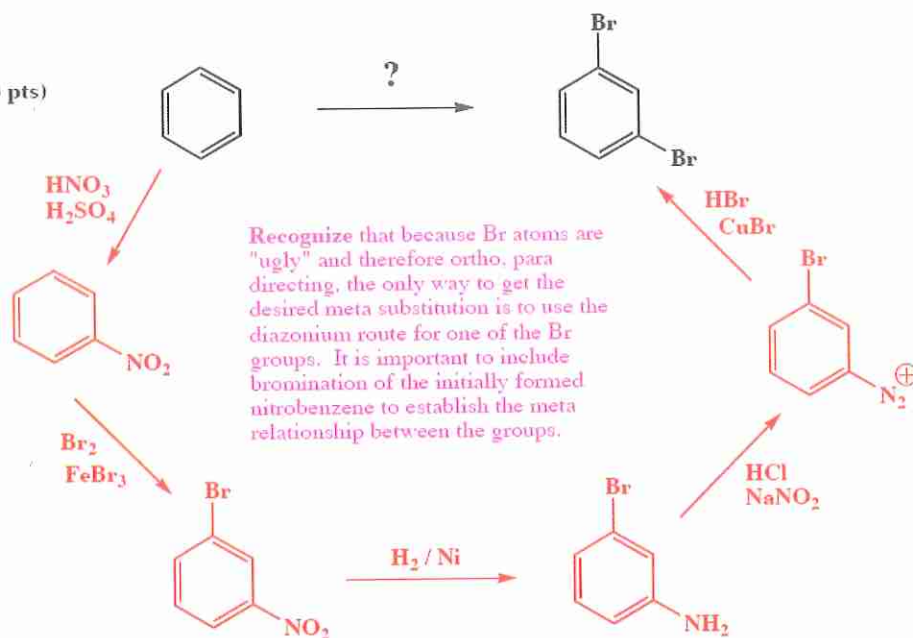
* can't use strong base because will deprotonate phenol

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 in 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.

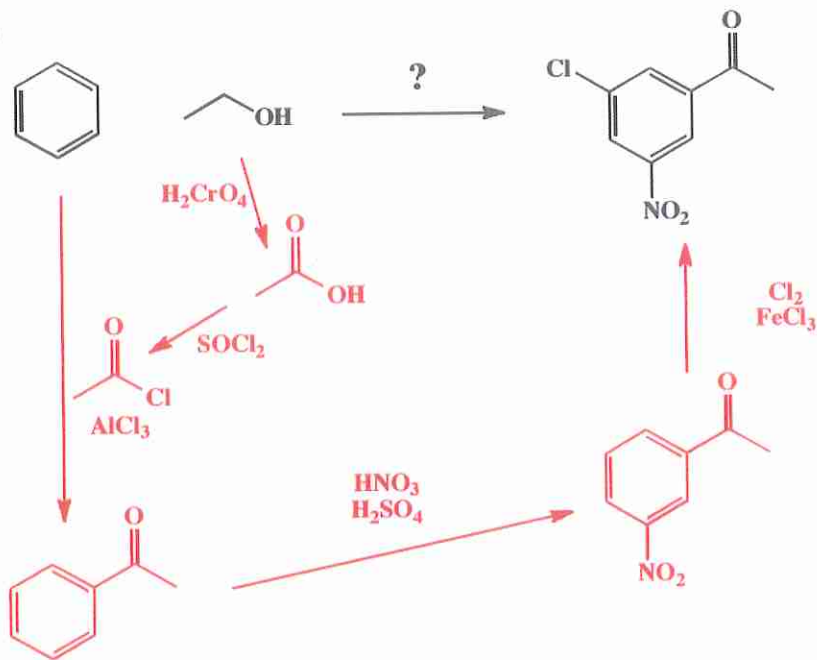
C) (16 pts)



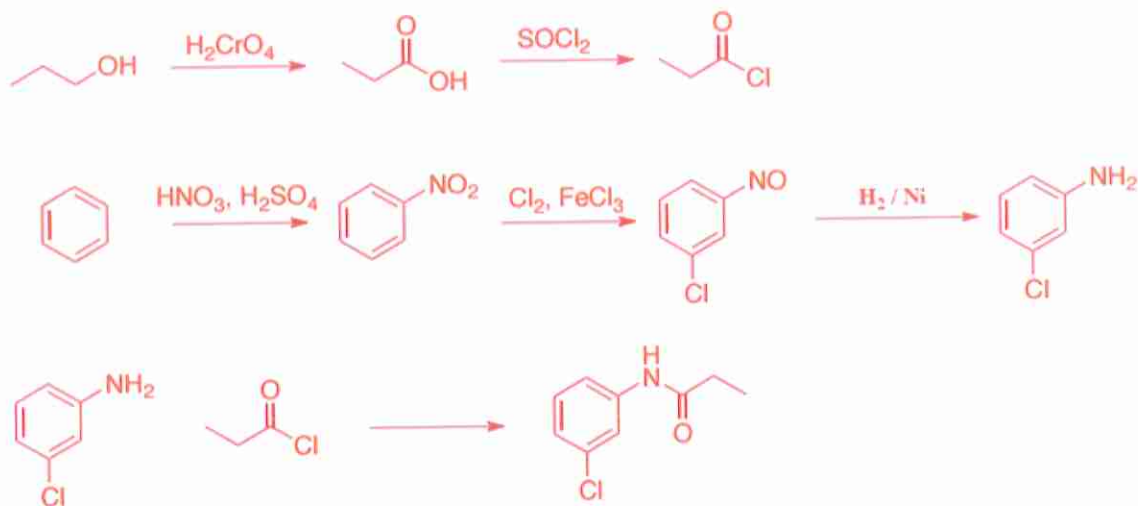
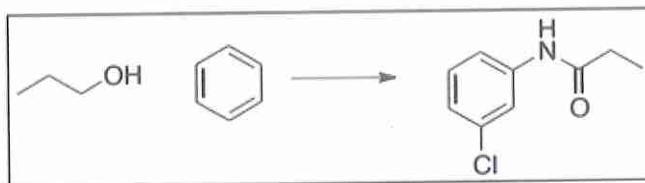
(13 pts)



(13 pts)



Recognize that this is the only sequence of reactions that will work. The Friedel-Crafts acylation must be done first, because it does not work with a nitro group on the ring. The Cl must be added last so that the meta orientation is present. Recognize that the acetyl chloride needed for the acylation can be made by H_2CrO_4 oxidation of ethanol followed by treatment with SOCl_2 .



22. Using any reagents turn the starting material into the indicated product. All carbon atoms in the product must come from the starting material. Draw all molecules synthesized along the way. When in doubt, draw the molecule! Label all chiral centers with an asterisk (*) and make sure to right "Racemic" where appropriate.

Remember, all of the carbons of the product must come from the given starting material.

(13 pts)

D)

