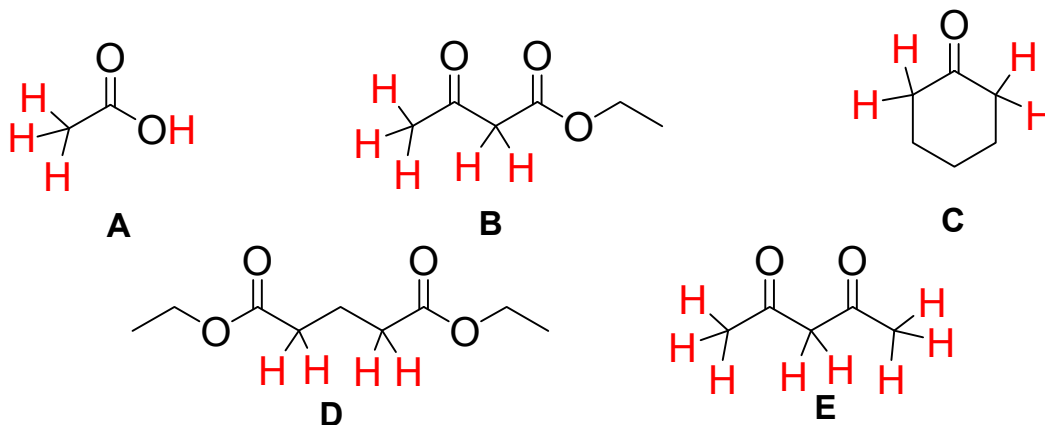


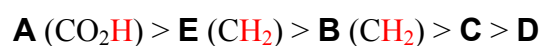
YOUR STUDENT NUMBER:

Year 2 Seminars, 06524, Semester 2, 2004  
Bifunctional Chemistry Test ANSWERS

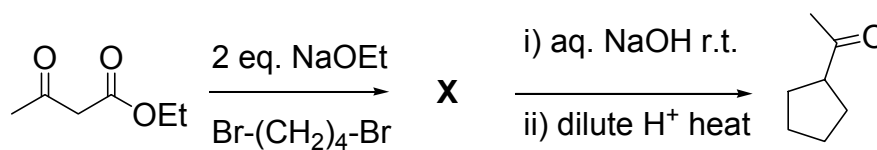
Q1 (a) Label all of the acidic hydrogen atoms on the molecules A - E shown.



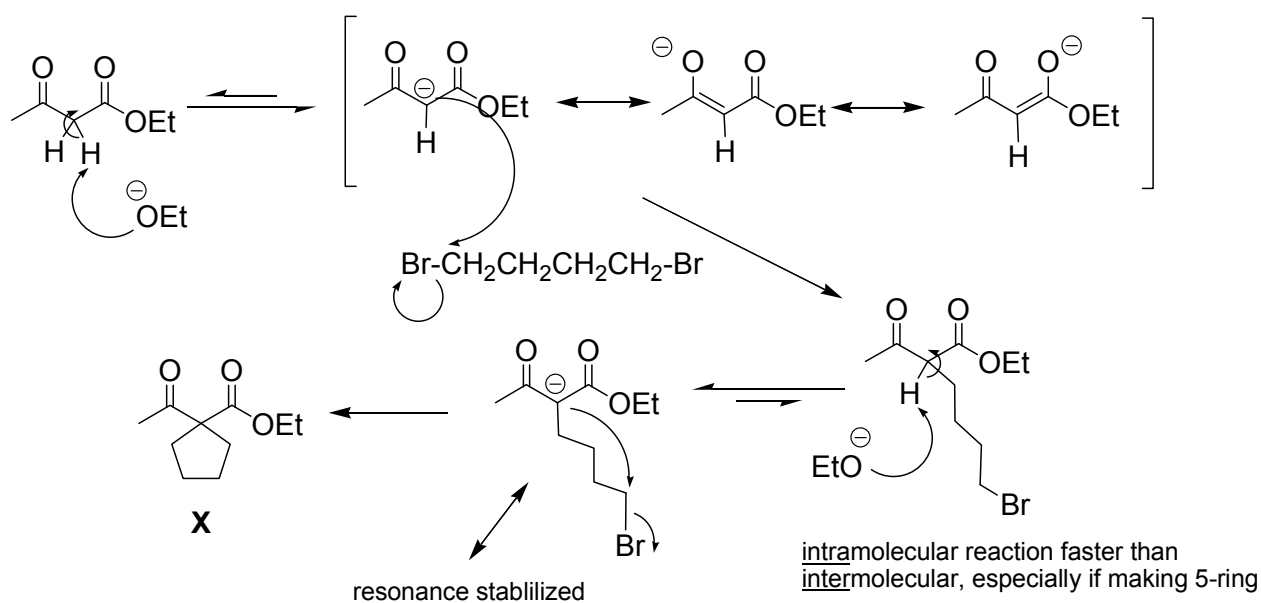
Q1 (b) Considering the most acidic hydrogen(s) of each molecule only, place the molecules in order of acidity starting with the most acidic.



Q2 Consider the scheme below then answer the questions:

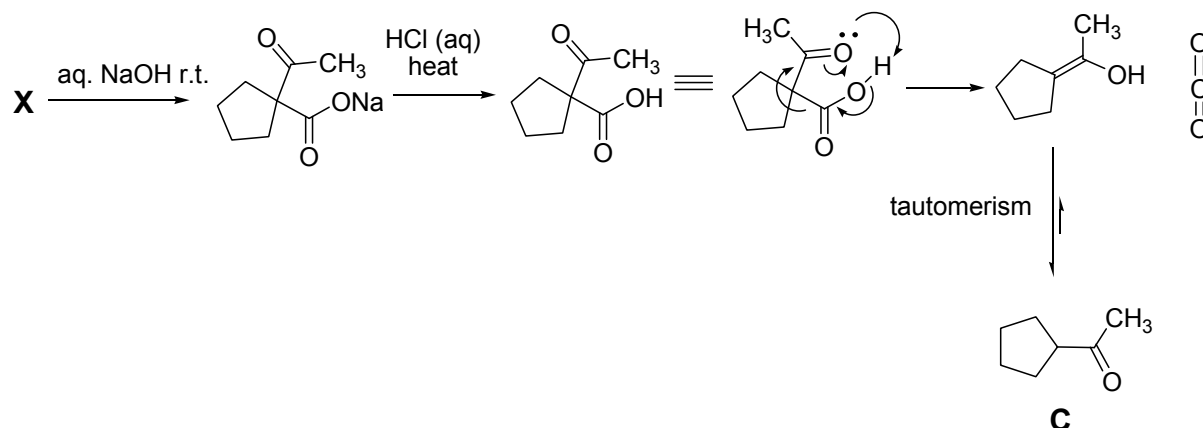


(a) Identify **X** and give a mechanism for its synthesis.



Q2 continued overleaf

- (b) Give a mechanism for conversion of **X** into acetylcyclopentane (methyl cyclopentyl ketone).



- (c) What would happen if acetone were allowed to react with 2 eq.  $\text{NaOEt}$  and 2 eq.  $\text{Br(CH}_2)_4\text{Br}$ ?

Acetone (propanone) has hydrogen atoms considerably less acidic than ethyl acetoacetate (see Q2a). Therefore, in reaction with  $\text{NaOEt}$  (weak base) there is always ketone present in the equilibrium mixture as well as enolate. An aldol reaction is therefore one possible side reaction. Also the second deprotonation could take place at the same carbon as the first, or on the other side of the  $\text{C=O}$ . Two moles of dibromide also complicates matters and so dimers/polymers and dialkylated / and or cyclic products can form. Overall a right old mixture would be produced!