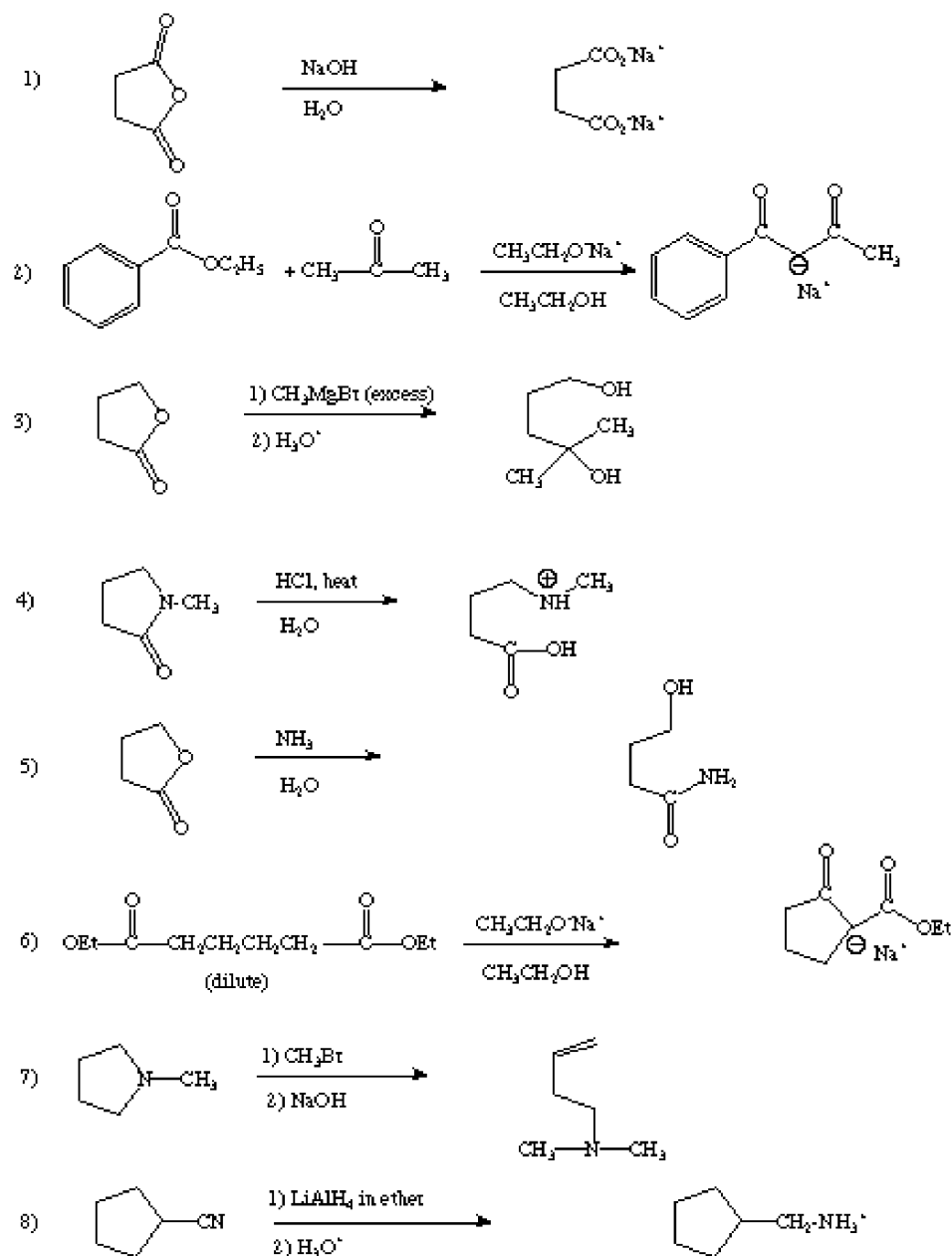
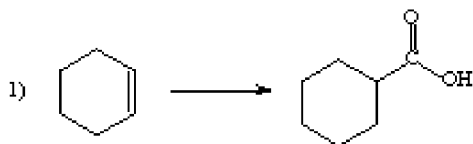


Midterm 3, version A, answer key

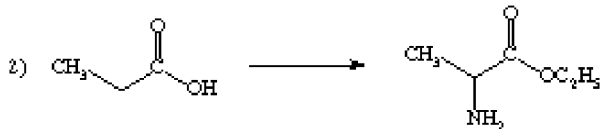
Problem 1.(25 points) Give the products for the following reactions. If there is more than 1 step, just give the final product. If no reactions occur, state so.



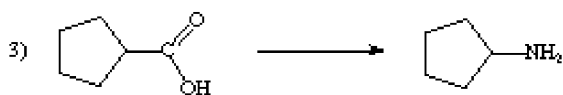
Problem 2. (15 points) What reagents would you use to carry out the following reactions. More than one step may be required but no more than 4 steps are required. If more than one step is required, number each step. Circle the reagents. Do not give intermediate products. Do not give the synthesis of the reagents.



1) HBr 2) Mg/ether 3) CO₂ 4) H₃O⁺



1) Br₂, PBr₃ 2) NH₃ 3) EtOH, H⁺

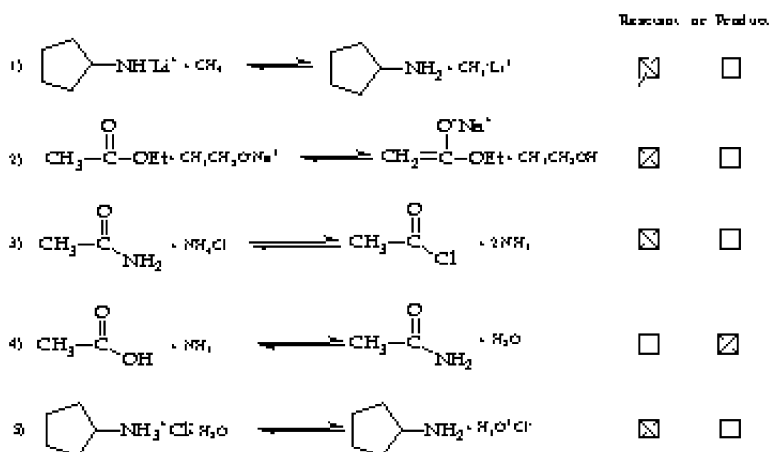


1) SOCl₂ 2) 2 NH₃ 3) Br₂, NaOH, heat

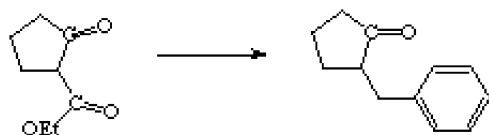
Problem 3. (10 points) The amino acid glycine, H₂NCH₂CO₂H, which was discussed in class, has two pK_a's (2.34 and 9.60). When the solution pH is adjusted to pH = 9.60, what major molecular specie (species) is (are) present in solution?



Problem 4. (20 points). For the following reactions, check the following box to indicate if the equilibrium position lies towards the reactants or the products.

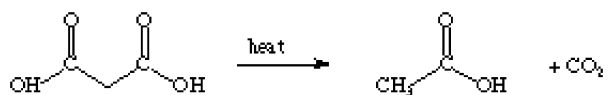


Problem 5. (15 points) Using the indicated starting material and any other organic molecules, how would you carry out the following transformation?



1) EtONa⁺ 2) C₆H₅CH₂Br 3) NaOH, heat 4) H₃O⁺ heat

Problem 6. (5 points) Give the mechanism for the following transformation.



****See page 792 in text

Problem 7. (10 points) How would you carry out the following transformation?

