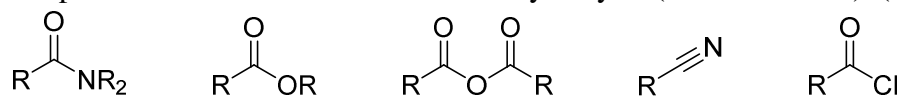
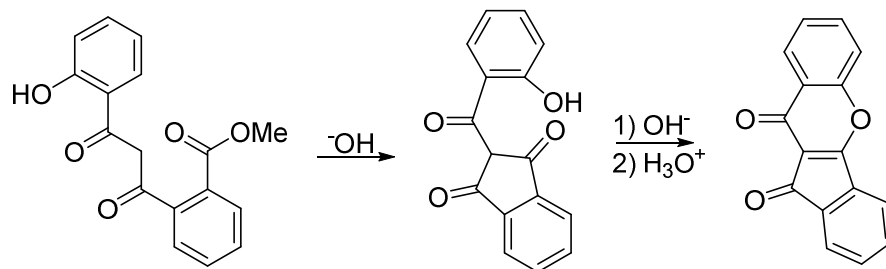




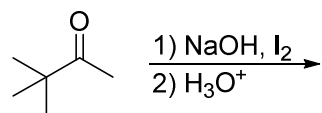
1) Rank these compounds in terms of relative rates of hydrolysis (1 = fastest rate). (10 pts)



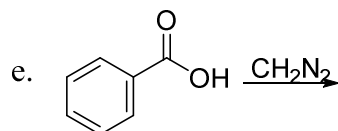
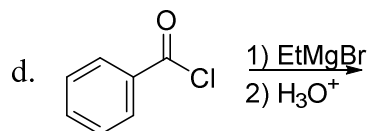
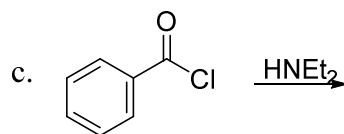
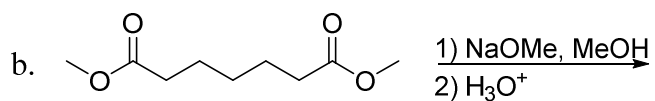
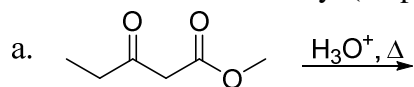
2) The product shown below is known to increase the body's production of erythropoietin (EPO), a protein which stimulates the production of red blood cells. The last few steps in the synthesis of this compound are shown below. Propose a reasonable mechanism for each of these steps. (20 pts)



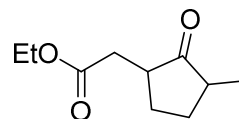
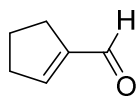
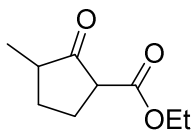
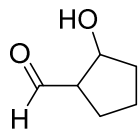
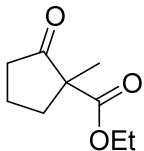
3) Predict all the products and show the mechanism for this reaction. (20 pts)



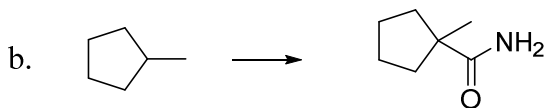
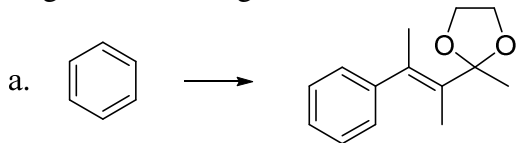
4) Predict the major product of the following reactions. If no reaction occurs, then write NR. Do not show stereochemistry. (15 pts; 3 pts each)



- 5) Out of the structures shown below, circle the only product that could be made from a Dieckmann condensation. Draw the mechanism for its formation. (15 pts)



- 6) Find a way to synthesize the desired product from the given starting material plus any other reagents containing at most six carbon atoms, or triphenylphosphine. (20 pts)



- 7) Extra credit! Circle every atom in this compound that could be favorably deprotonated by sodium acetylide,  $\text{NaC}\equiv\text{CH}$ . (10 pts e.c.)

