

Please define each term and give an example (10 %, 2 % of each).

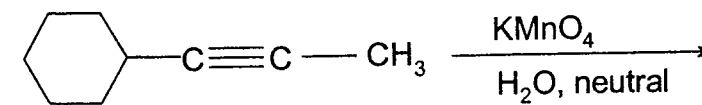
- (a) Michael addition (b) McLafferty rearrangement (c) Hückel's rule  
(d) HOMO (e) Clemmensen reduction

Please draw the structures of the following compounds (10 %, 2 % of each)

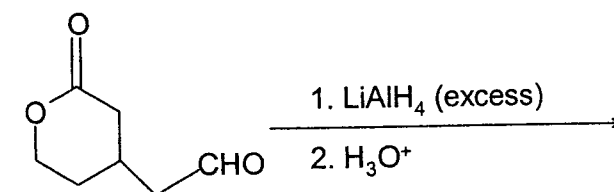
- (a) DDT (b) 2,3,7,8-tetrachlorodibenzodioxine (c) benzophenone  
(d) tosyl chloride (e) succinimide

Provide the structure of the major product for each of the following reactions, and include stereochemistry where appropriate. (20%, 2% of each)

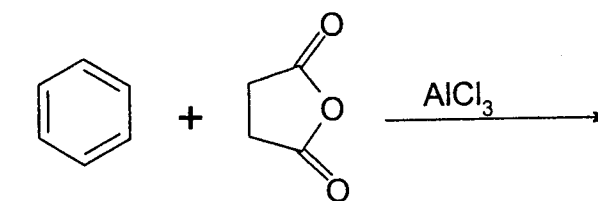
(a)



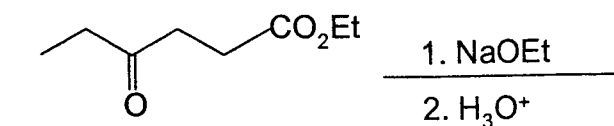
(b)



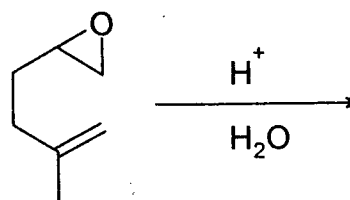
(c)



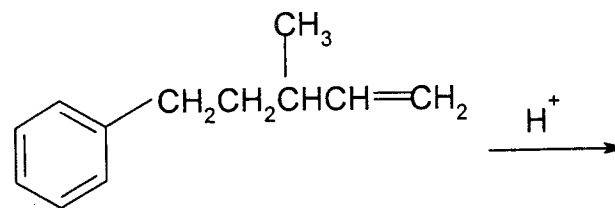
(d)



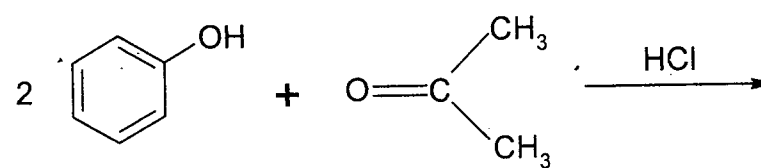
(e)



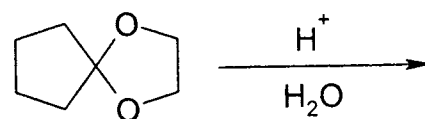
(f)



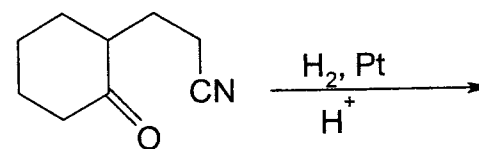
(g)



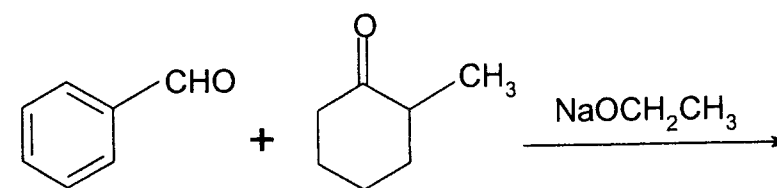
(h)



(i)



(j)

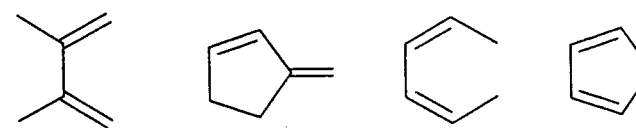


List the following compounds in order of increasing reactivity of a reaction (10 %).

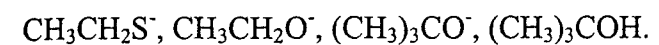
(a) in  $S_N1$  reaction (4 %)



(b) in a Diels-Alder reaction (3 %):

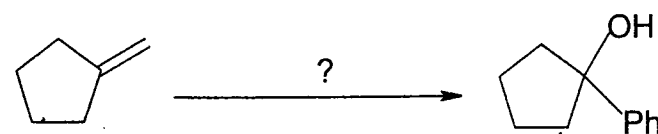


(c) in nucleophilicity (3 %)

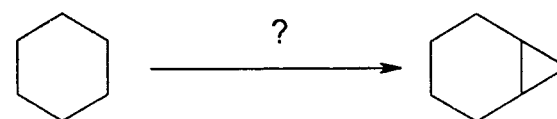


5. Provide the reagents necessary to accomplish to the following transformations (15 %, 3 % of each)

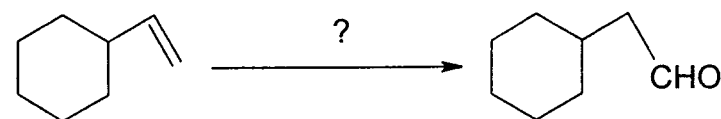
(a)



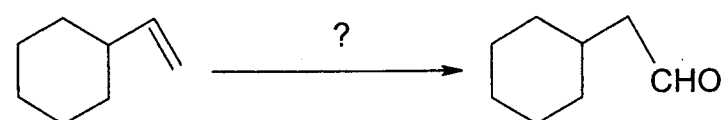
(b)



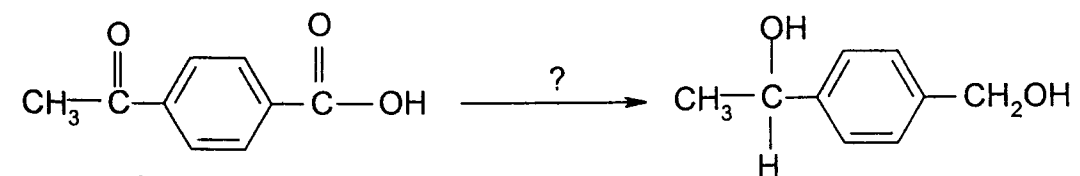
(c)



(d)

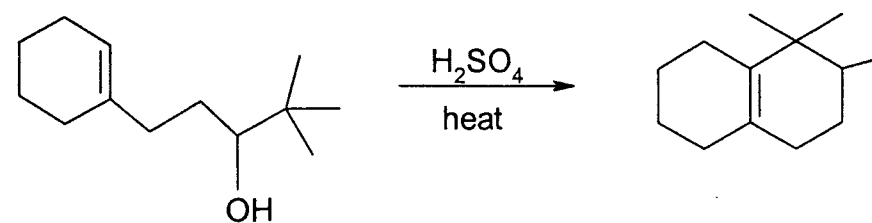


(e)



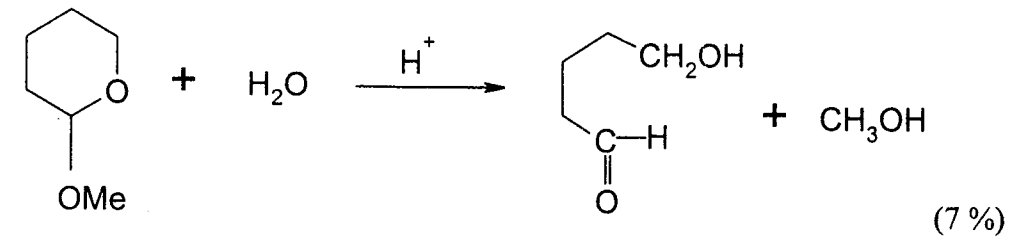
Please provide a detailed, step-by-step mechanism for the following reactions. (15 %)

(a)



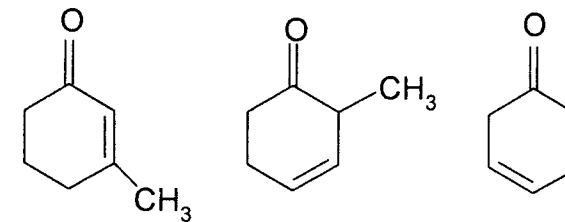
(8 %)

(b)

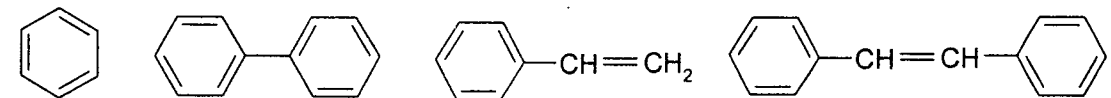


7. Rank the compounds in each group in order of decreasing  $\lambda_{\max}$  (10%)

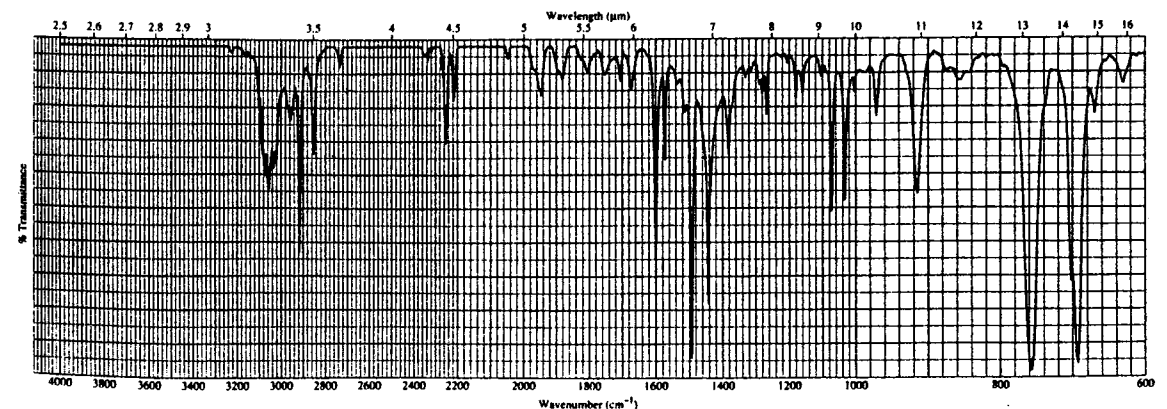
(a)



(b)



8. Catalytic hydrogenation of compound A formed compound B. The IR spectrum of compound A and the  $^1\text{H}$  NMR spectrum of compound B are shown below. Please identify the compounds and show the reaction. (10%)



九十二學年度 原子科學 系(所) 乙 組碩士班研究生招生考試

科目 有機化學 科號 3303 共 5 頁第 5 頁\*請在試卷【答案卷】內作答

