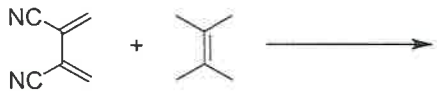
國立臺灣科技大學 109 學年度碩士班招生試題

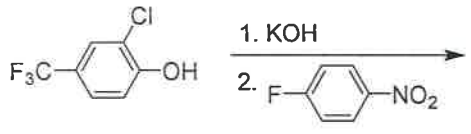
系所組別：材料科學與工程系碩士班甲組

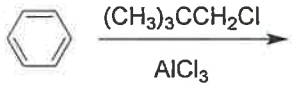
科　　目：有機化學

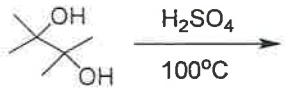
(總分為 100 分)

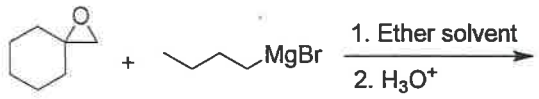
1. Predict the major products of the following reactions. (24%)

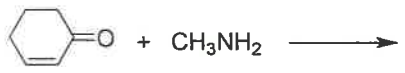
(1)  (3%)

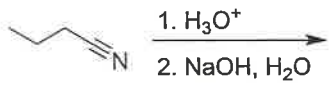
(2)  (3%)

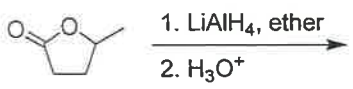
(3)  (3%)

(4)  (3%)

(5)  (3%)

(6)  (3%)

(7)  (3%)

(8)  (3%)

2. Draw the chemical structures of the following polymers. (10%)

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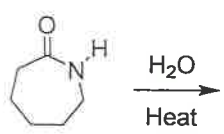
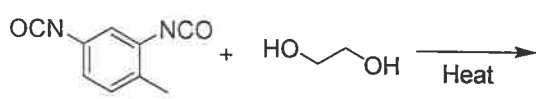
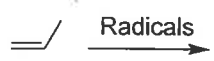
(總分為 100 分)

(1) 

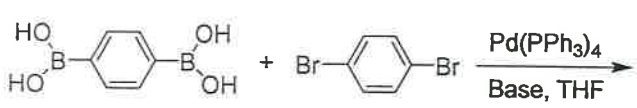
(2%)

(2) 

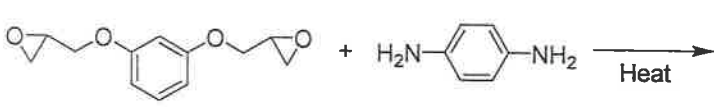
(2%)

(3) 

(2%)

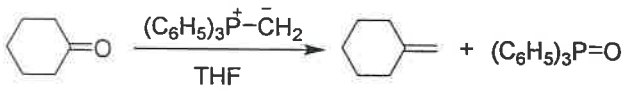
(4) 

(2%)

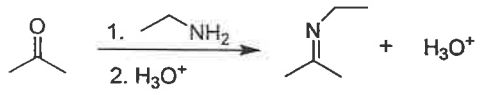
(5) 

(2%)

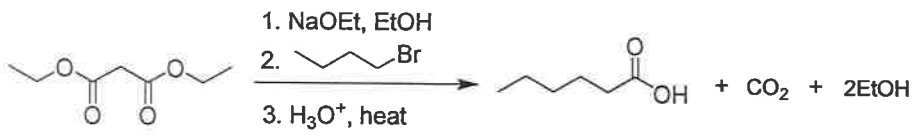
3. Propose the mechanism of the following reactions (16%)

(1) 

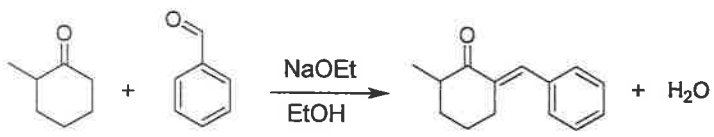
(4%)

(2) 

(4%)

(3) 

(4%)

(4) 

(4%)

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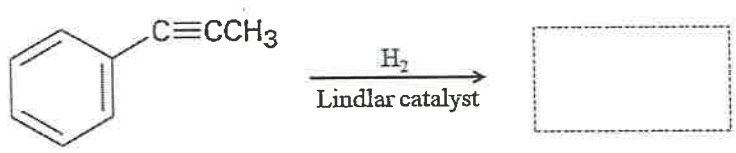
(總分為 100 分)

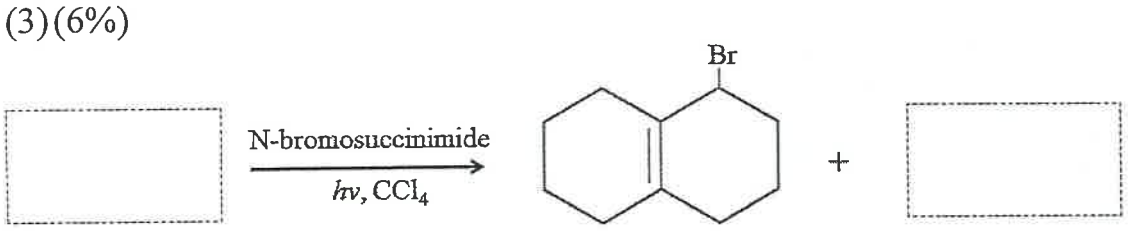
4. (Total 21%) Please predict the reactants, intermediates or products of the following reactions.

(1)(3%)

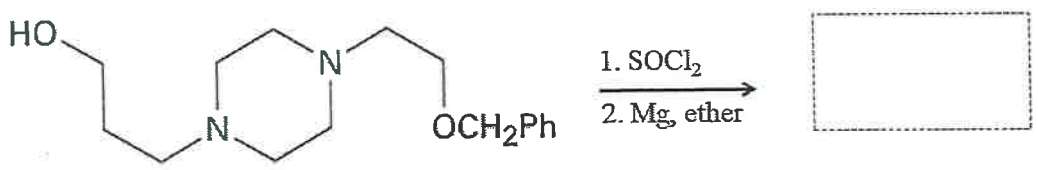


(2)(6%)

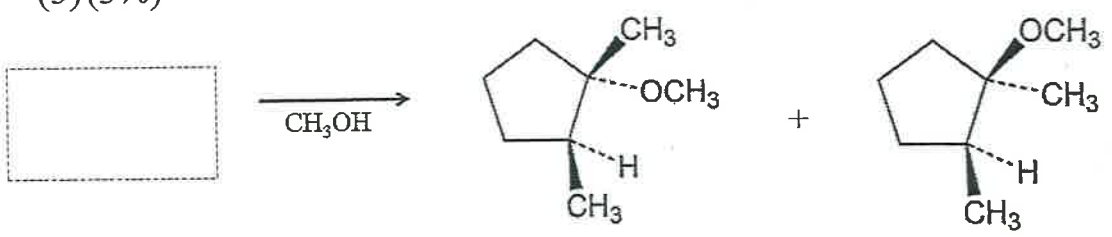
(3)(6%)



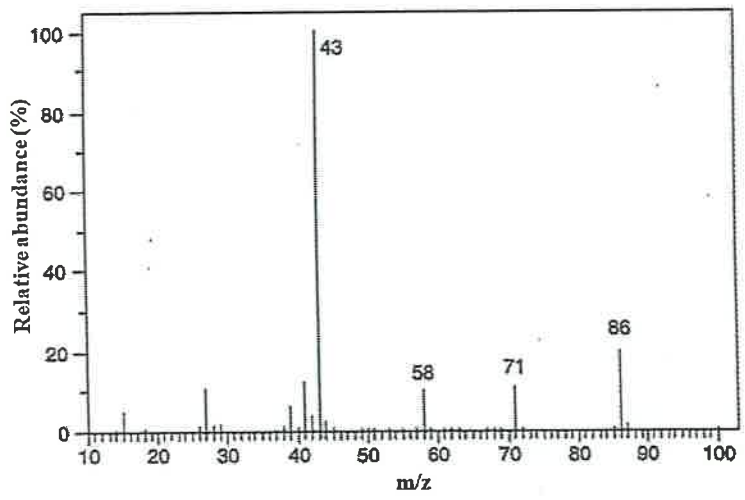
(4)(3%)



(5)(3%)



5. (Total 9%, each 3%) 2-pentanone has the mass spectrum shown. Please draw the fragments responsible for the peaks in the mass spectrum at m/z 71, 58, and 43.



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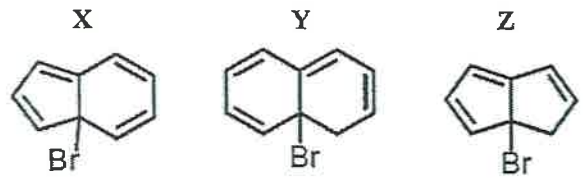
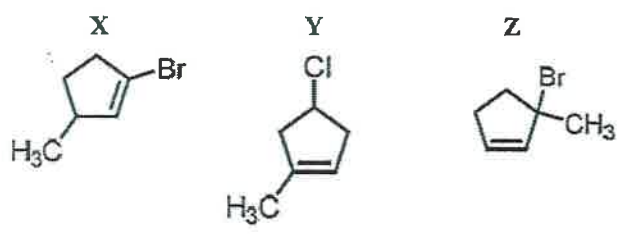
6. (Total 6%) Rank the following substrates in order of increasing reactivity in an S_N1 reaction

(1)(3%)



(2)(3%)



7. (Total 6%) Please draw the two chair conformations of cis-1,3-dimethylcyclohexane. (2%) Please predict which conformation is favored and explain the reason for your answer. (4%)

8. (8%) The Mark-Houwink equation is applicable to many polymers and is extensively used to determine molecular weight. Please describe and explain the Mark-Houwink equation.