

2021 秋季有机化学第二次小测

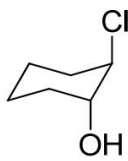
(卤代烃, 醇酚醚, 醛酮醌)

(满分 110 分, 超过 100 分记为 100 分)

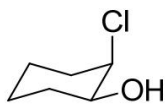
学院_____ 学号_____ 姓名_____

一、选择题 (每个 2 分, 共 20 分)

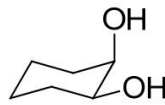
1. 下面哪个原料在 EtONa-EtOH 作用下易得到环己酮? (B)



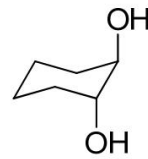
(A)



(B)

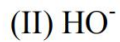
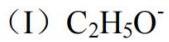


(C)



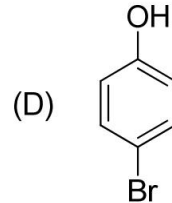
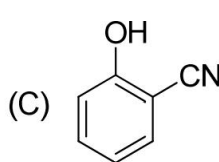
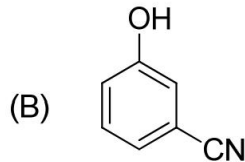
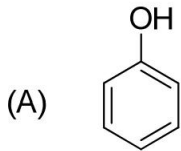
(D)

2. 把下列各组中的基团按亲核性从强至弱排序正确的是 (D)

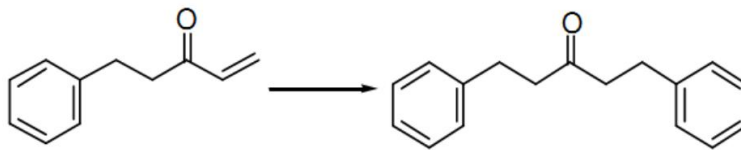


(A) I>II>IV>III; (B) I>III>II>IV; (C) III>I>II>IV (D) I>II>III>IV

3. 下列化合物共轭碱的碱性最强的是 (A)



4. 为实现下列反应, 最好选用 (D)



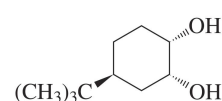
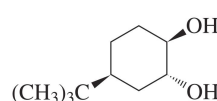
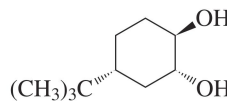
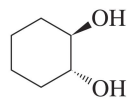
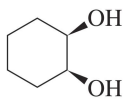
(A) 1. PhLi, 无水乙醚, 2. H_3O^+

(B) 1. PhCH₂MgBr, 无水乙醚, 2. H_3O^+

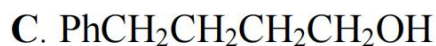
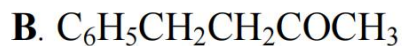
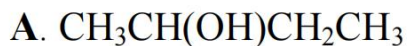
(C) $(\text{C}_6\text{H}_5)_3\text{P}=\text{CHC}_6\text{H}_5$, THF

(D) 1. $(\text{C}_6\text{H}_5)_2\text{CuLi}$, 无水乙醚, 2. H_3O^+

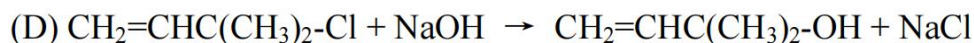
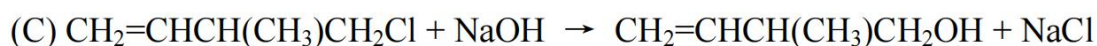
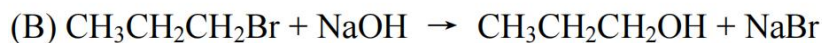
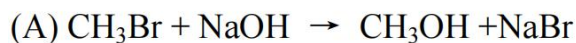
5. 下列邻二醇中, 哪一种不能 HIO₄ 被氧化 (D)



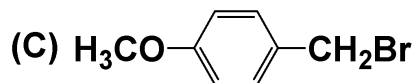
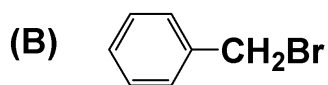
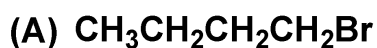
6. 下列哪个化合物不能起卤仿反应? (C)



7. 若以下反应成立, 改变氢氧化钠的浓度, 哪一个反应速率改变最小? (D)



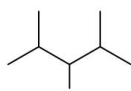
8. 下列化合物按 SN_1 历程反应速度最快的是 (C)



9. 下列化合物发生 SN_2 反应时速率最快的是 (D)



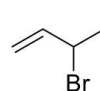
A



B



C

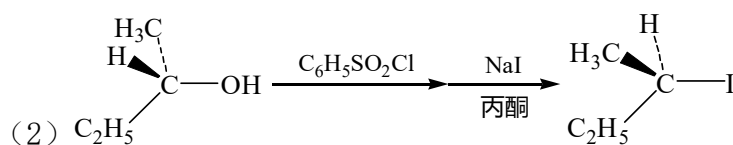
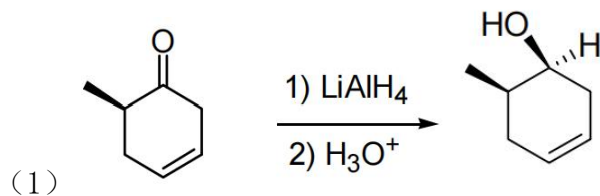


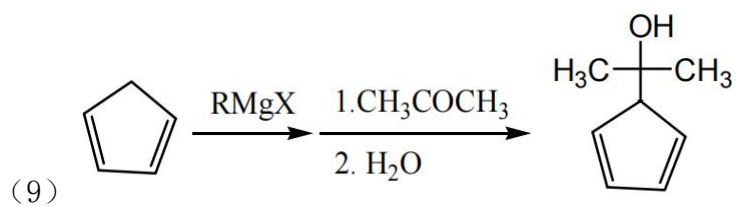
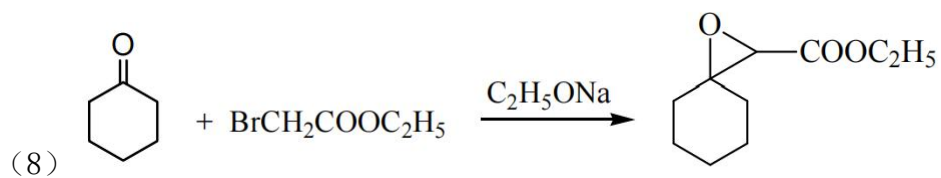
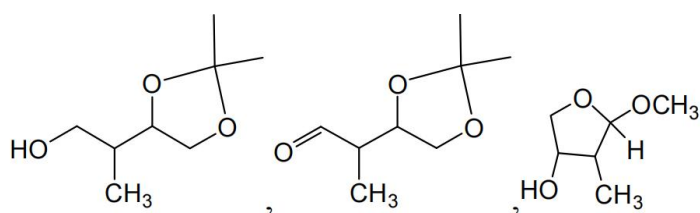
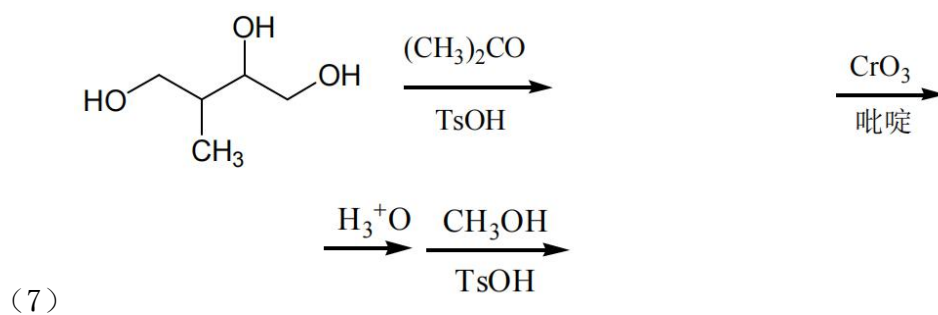
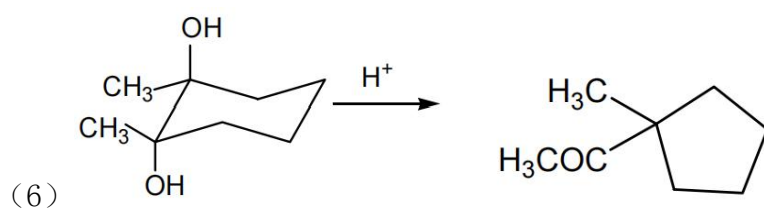
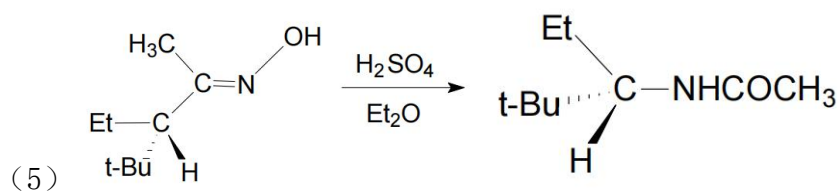
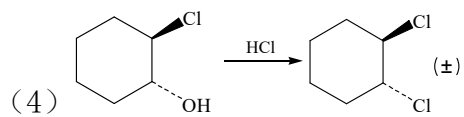
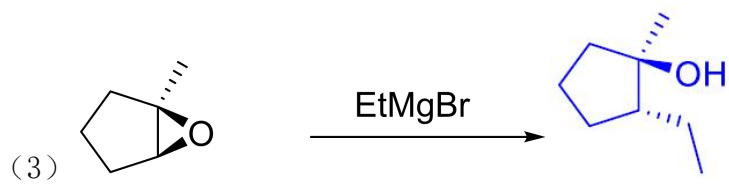
D

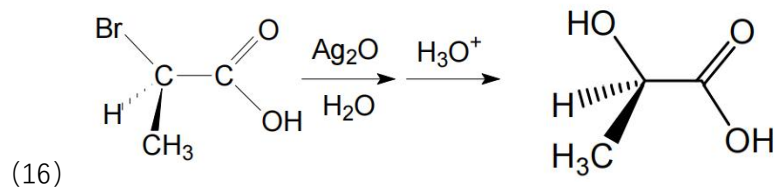
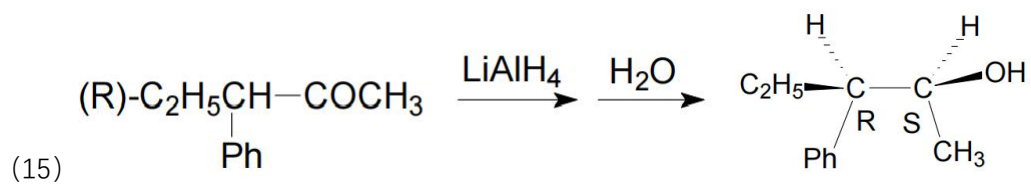
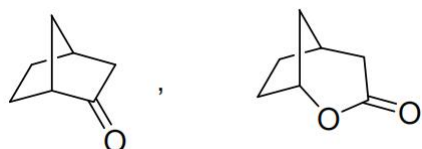
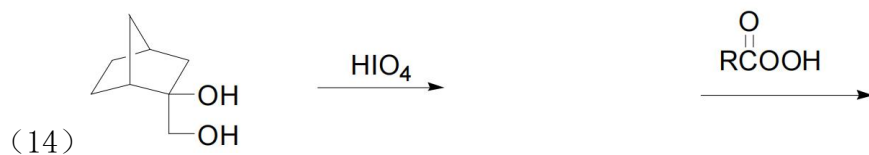
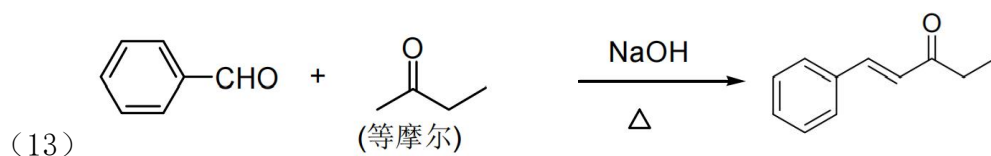
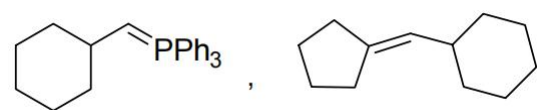
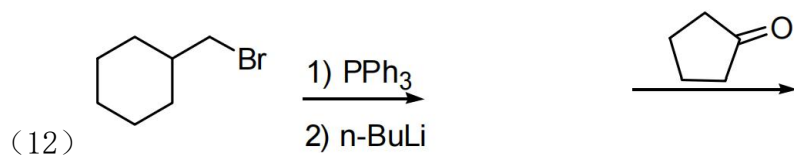
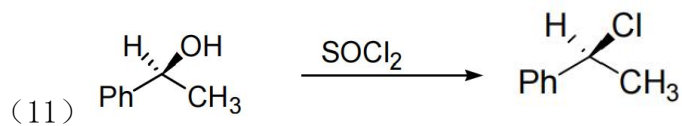
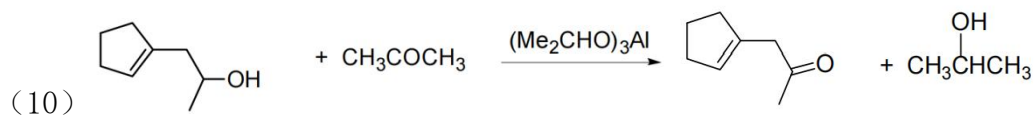
10. 下列化合物苯甲醇(I), 二苯甲醇(II), 三苯甲醇(III), 甲醇(IV)与 HBr 反应发生 SN_1 反应的活性顺序为: (A)

A. $\text{III} > \text{II} > \text{I} > \text{IV}$ B. $\text{IV} > \text{I} > \text{II} > \text{III}$ C. $\text{IV} > \text{III} > \text{II} > \text{I}$ D. $\text{I} > \text{II} > \text{III} > \text{IV}$

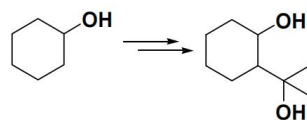
二、完成反应式, 必要时写出立体异构 (每个空 2 分, 共 40 分)



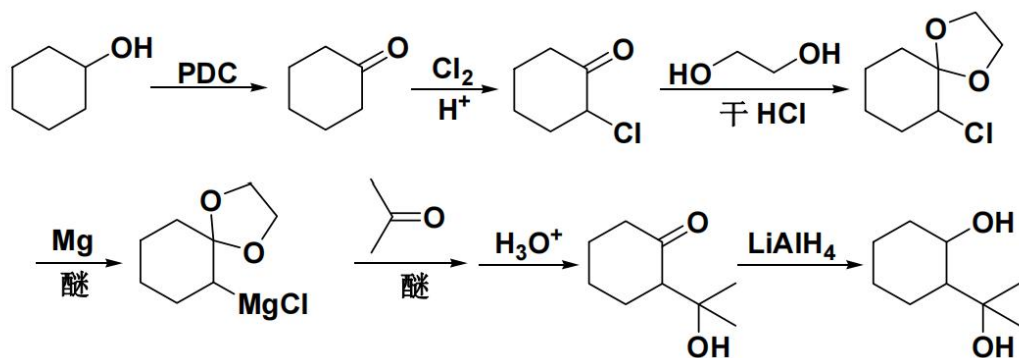




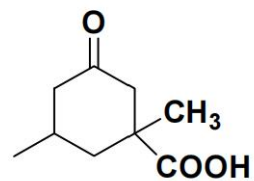
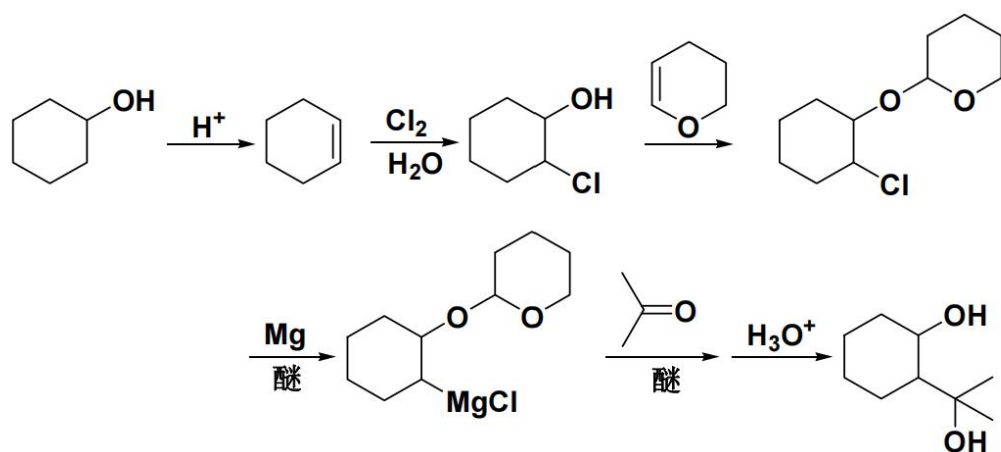
三、合成题 (20 分, 每个 5 分)



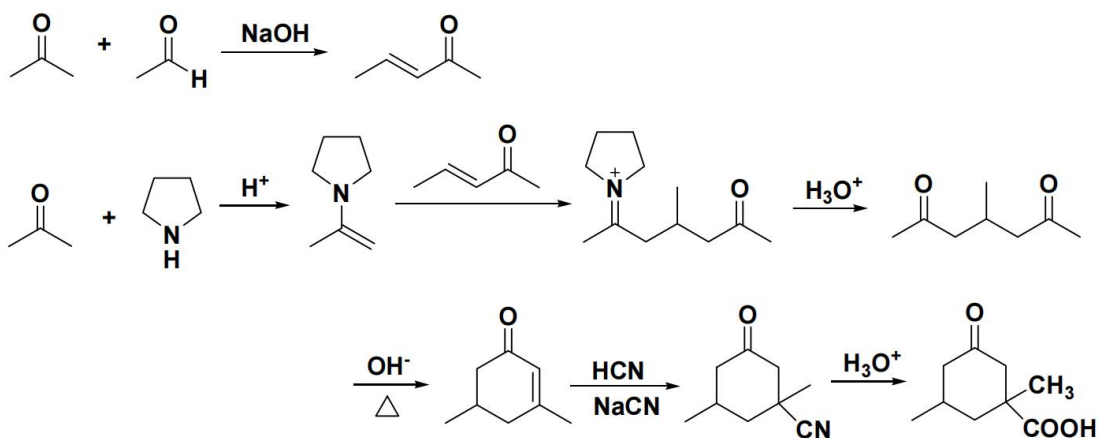
(1) 选择合适的试剂完成下列转变：



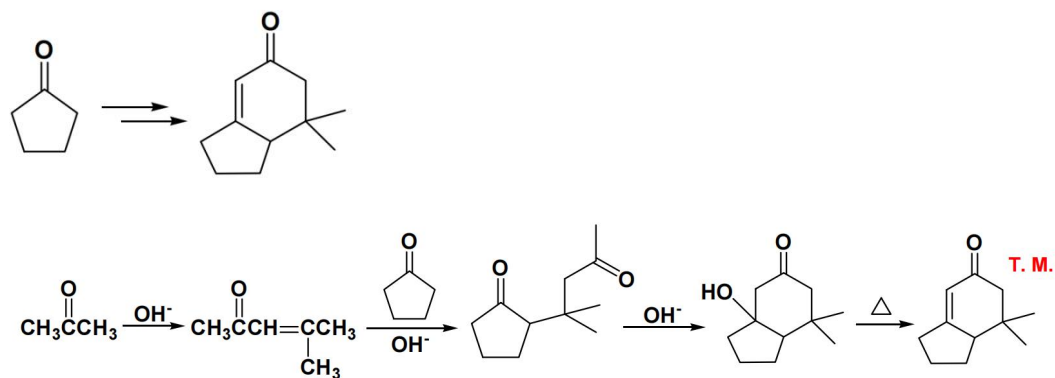
或



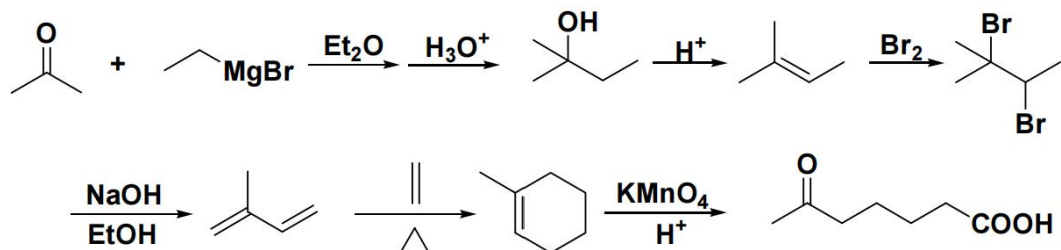
(2) 由不超过 4 个碳的有机物和必要的无机试剂合成：



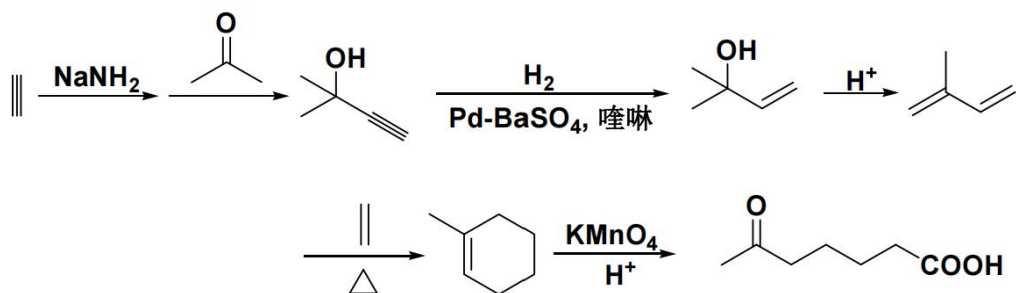
(3) 用给定的起始原料和不超过三个碳的有机物及必要的试剂合成：



(4) 由不超过 3 个碳的有机物和必要的无机试剂合成 $\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$



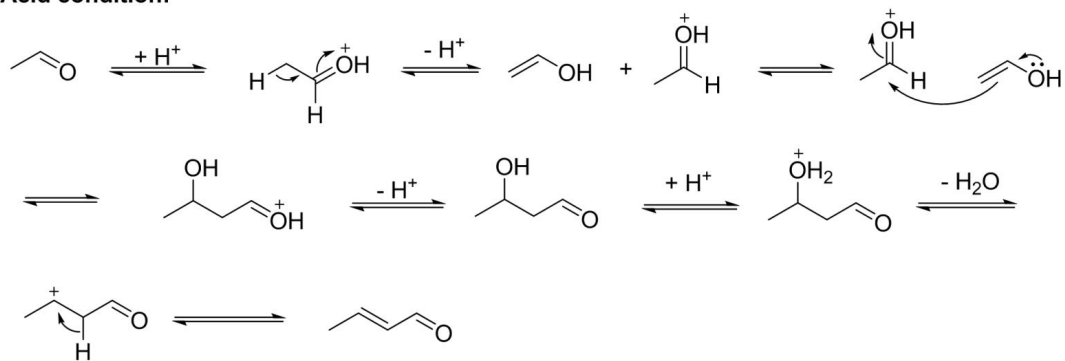
或:



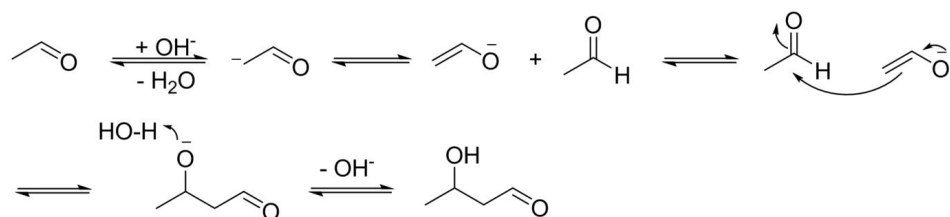
三、机理题，给出合理的分布反应机理，用弯箭头表示电子对转移，用鱼钩箭头表示单电子转移（20分，每个5分）

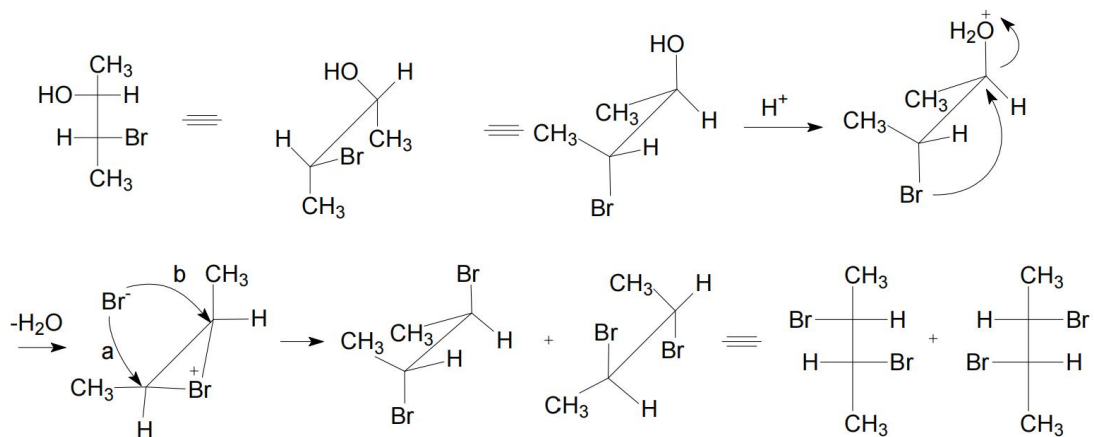
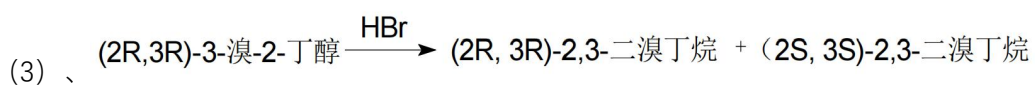
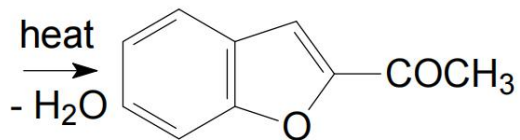
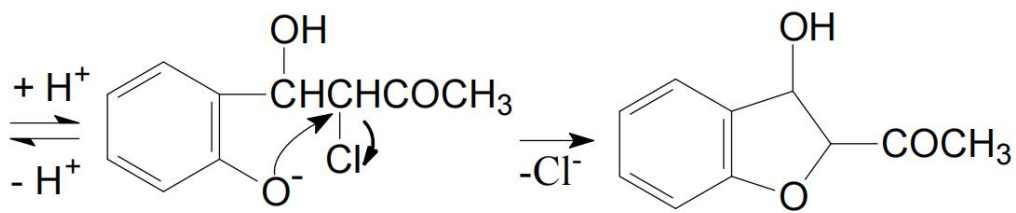
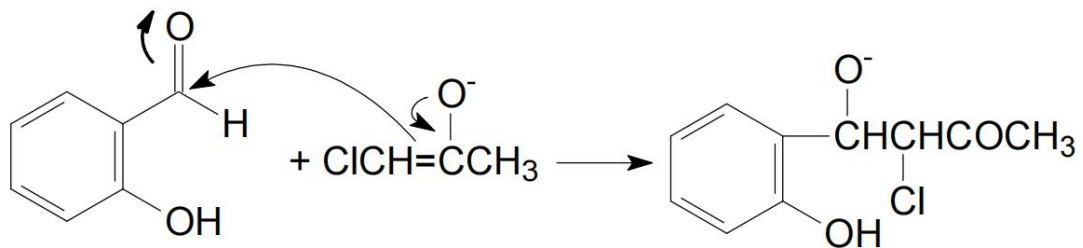
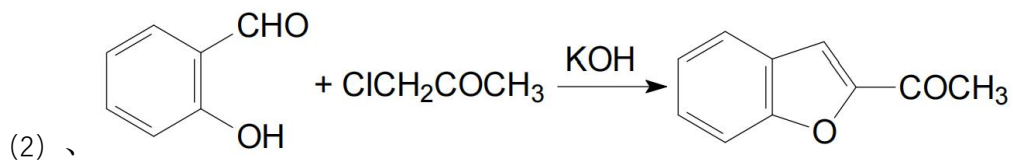
(1)、醇醛缩合（Aldol）反应既可被酸催化，亦可被碱催化。如乙醛在酸性条件下可以生成 α, β -不饱和醛，在碱性条件下则生成 β -羟基丁醛。请为上述实验结果写出合理的反应机理解释，并写出各步可能的中间体。

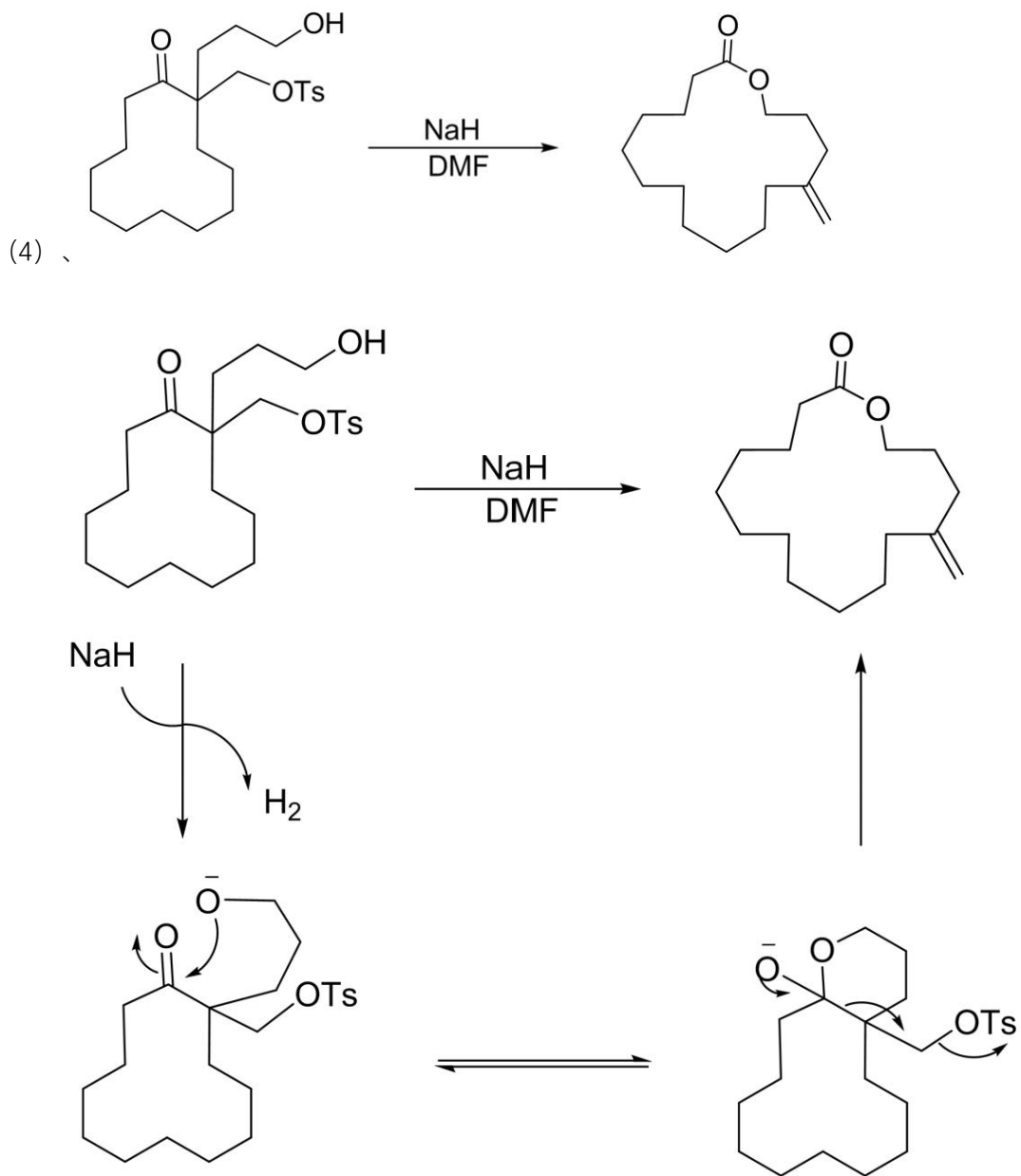
Acid condition:



Base condition:

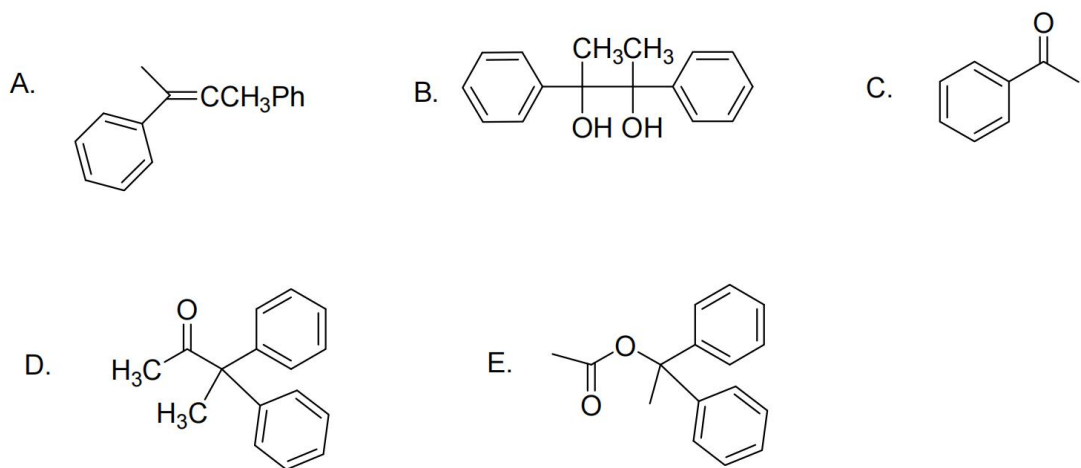






五、推断题（10分，每个5分）

(1)、某不饱和化合物 A ($C_{16}H_{16}$)，与 OsO_4 作用后用 Na_2SO_3 处理得到产物 B ($C_{16}H_{18}O_2$)；B 再用 $Pb(OAc)_4$ 处理只得一种产物 C (C_8H_8O)；C 能发生碘仿反应；B 用无机酸处理得到重排产物 D ($C_{16}H_{16}O$)；D 用 $PhCOOOH$ 氧化得到 E ($C_{16}H_{16}O_2$)。试推导 A-E 的结构，并写出相关反应式。



(2)、化合物 A(C₆H₁₀)在酸性水溶液中转变为 B(C₆H₁₂O), B 用 CrO₃ 吡啶处理后得 C(C₆H₁₀O), C 和羟胺反应得 D(C₆H₁₁NO), D 用多聚磷酸处理后得重排产物 E, E 是制备人造纤维尼龙 6 的单体。A 用冷的、稀的、中性的 KMnO₄ 溶液处理后得 F(C₆H₁₂O₂), F 用高碘酸氧化只得一种直链化合物 G(C₆H₁₀O₂), F 用浓硫酸处理得 H(C₆H₁₀O)。请写出 A-H 的结构以及各反应式。

