

中国科学技术大学

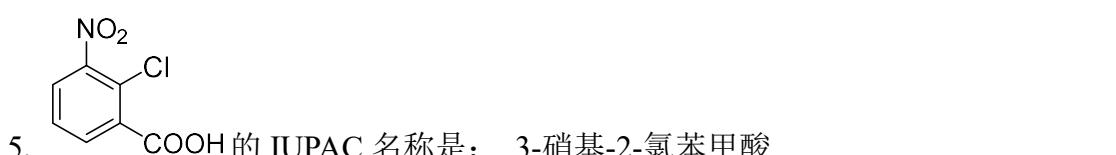
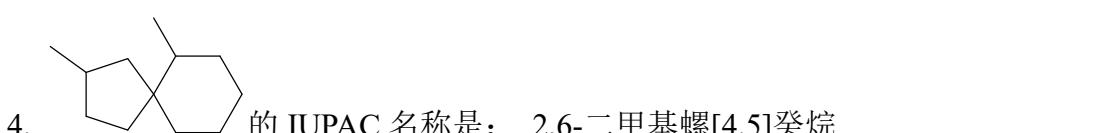
2021-2022 学年度第一学期期中考试试卷

考试科目：有机化学 B

得分 \_\_\_\_\_

学生所在系： \_\_\_\_\_ 姓名： \_\_\_\_\_ 学号： \_\_\_\_\_

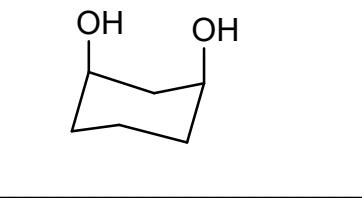
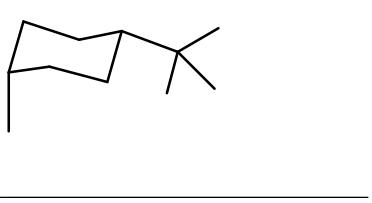
一、填空与选择题 (第 1-6 题每空 1 分, 第 7-20 题每空 2 分, 共 35 分)



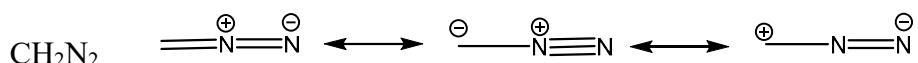
6. 画出下列化合物最稳定的构象 (优势构象)

(1) 顺-1-甲基-4-叔丁基环己烷

(2) 顺-1,3 环己二醇

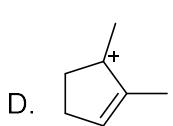
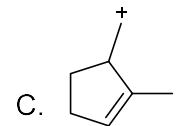
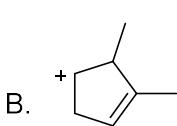
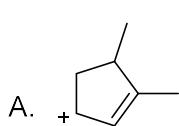


7. 写出下列结构可能的共振式

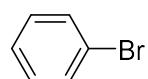
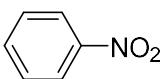
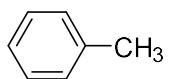
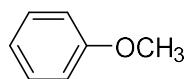


(只画出两个即可得分)

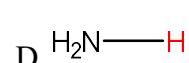
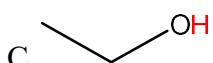
8. 下列碳正离子稳定性由大到小的顺序是: D>A>B>C



9. 下列化合物发生碘化反应速率从快到慢的顺序是: A>B>D>C



10. 下列化合物中标注的 H 的酸性从大到小的顺序是: C>B>D>A



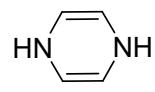
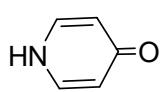
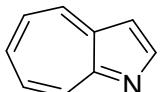
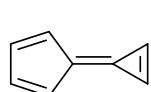
11. 二甲醚与乙醇是同分异构体, 其异构类型属于: ( C )

- A. 分子骨架异构      B. 位置异构  
C. 官能团异构      D. 互变异构

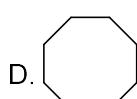
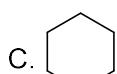
12. 下列关于链端炔烃性质描述, 不正确的是: ( C )

- A. 炔氢具有酸性, 可与格式试剂反应得到炔基格式试剂  
B. 经硼氢化-氧化可得到醛  
C. 用 Lindlar 催化剂催化氢化可得到顺式烯烃  
D. 可作为亲双烯体发生 Diels-alder 反应

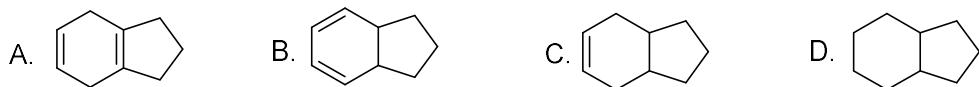
13. 下列结构中不具有芳香性的是: ( D )

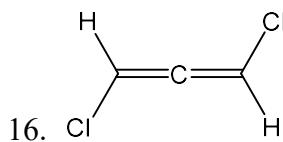


14. 下列环烷烃中单位  $\text{CH}_2$  燃烧热绝对值最小的是: ( C )



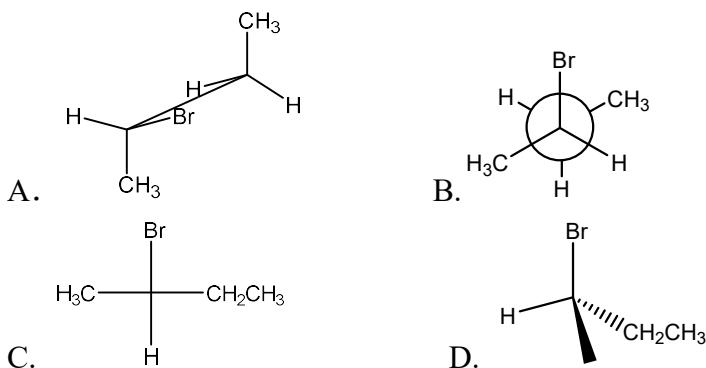
15. 下列化合物哪个可能是 Diels-Alder 反应的产物 ( C )



16.  的极性和旋光性是: ( A )

- A. 有极性, 有旋光性      B. 有极性, 无旋光性  
C. 无极性, 有旋光性      D. 无极性, 无旋光性

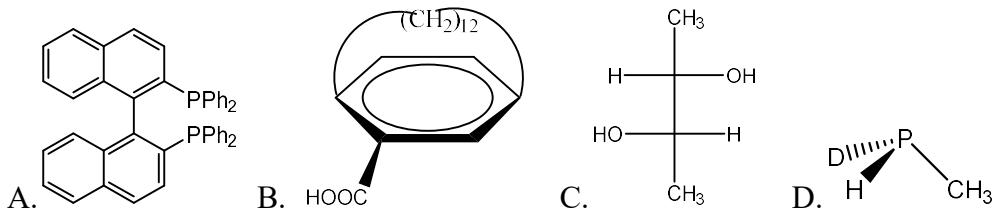
17. 下列哪个化合物是 (R)-2-溴丁烷的对映体 ( B )



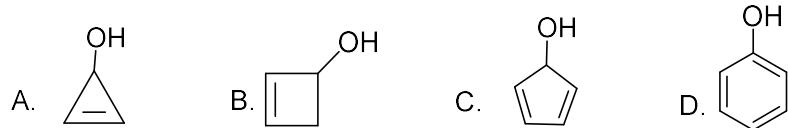
18. 一个化合物虽然含有手性碳原子, 但化合物自身可以与镜像重合, 这个化合物叫 ( A )

- A. 内消旋体      B. 外消旋体      C. 对映异构体      D. 低共熔化合物

19. 下列化合物没有对映异构体的是: ( B )

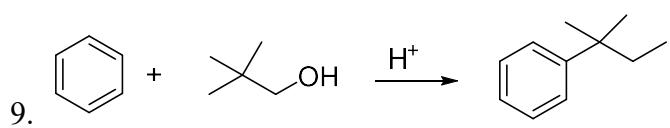
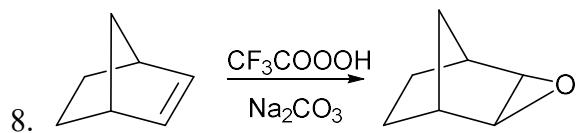
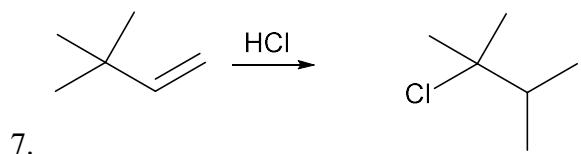
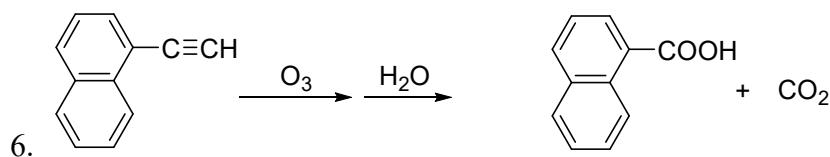
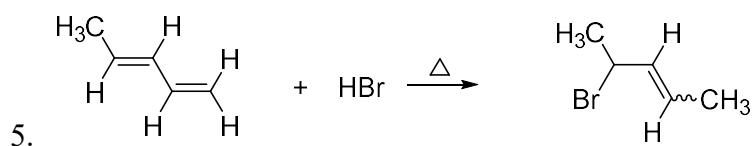
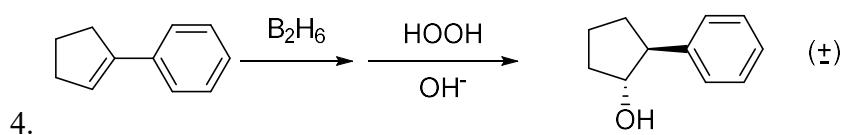
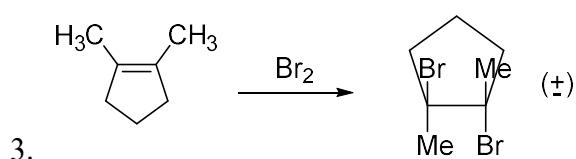
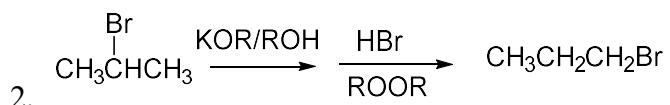
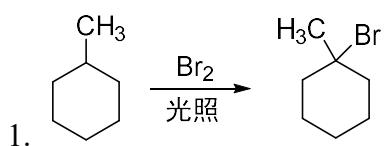


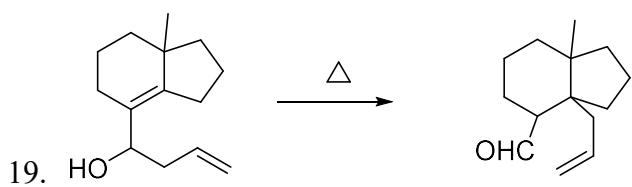
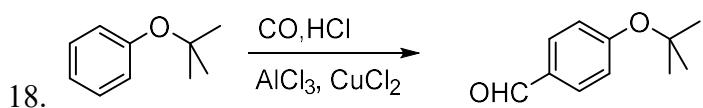
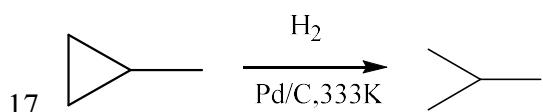
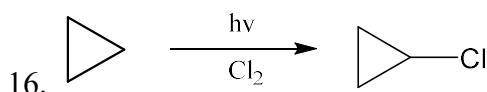
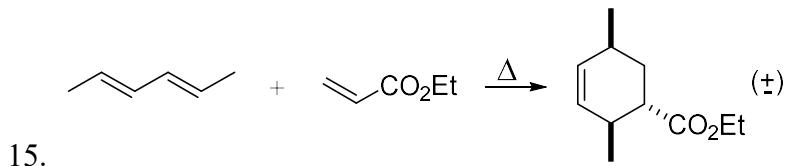
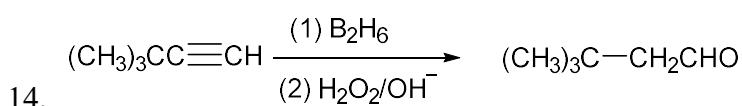
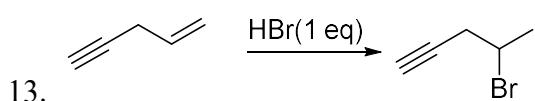
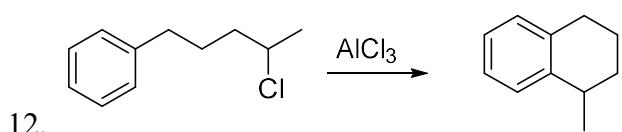
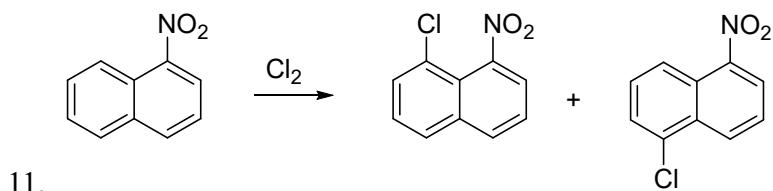
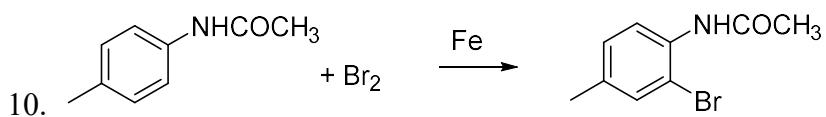
20. 当用 HCl 质子化时, 下列化合物哪个最容易失去水分子? ( A )

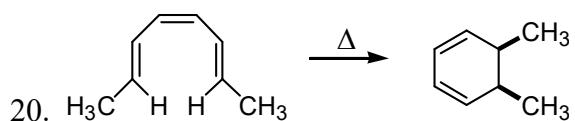


二. 完成下列反应, 写出主要产物, 注意立体化学信息 (每空 1.5 分, 共 30 分)

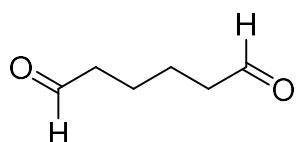
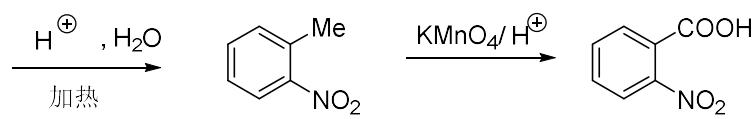
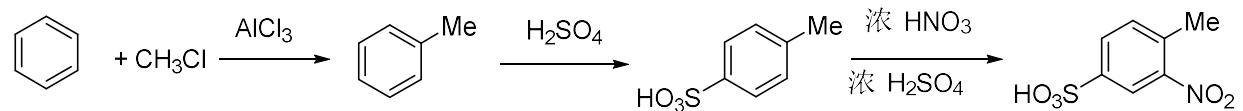
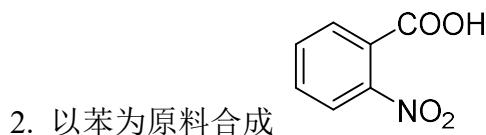
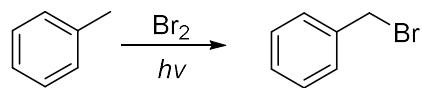
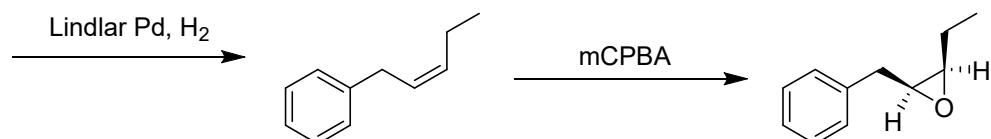
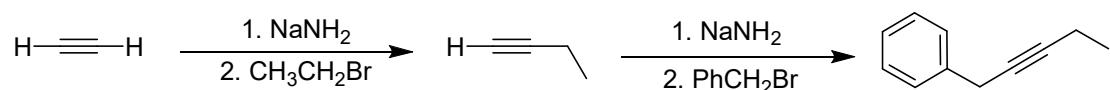
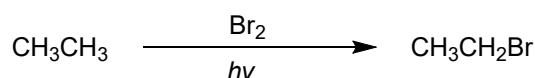
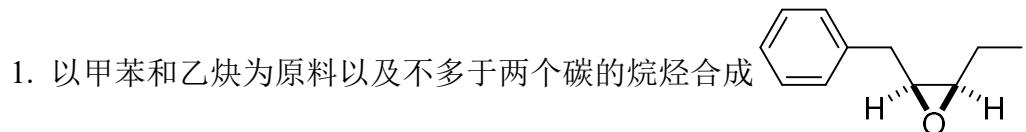
第 3 页, 共 9 页



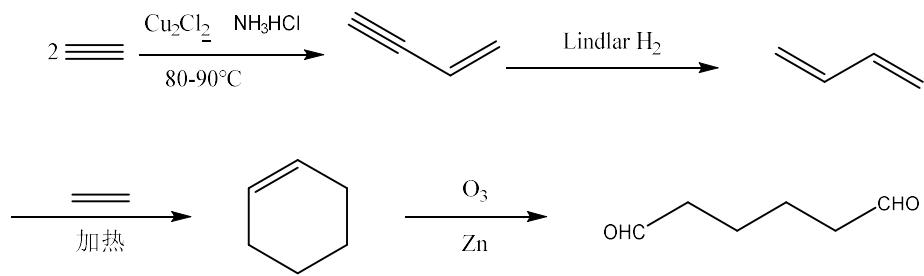




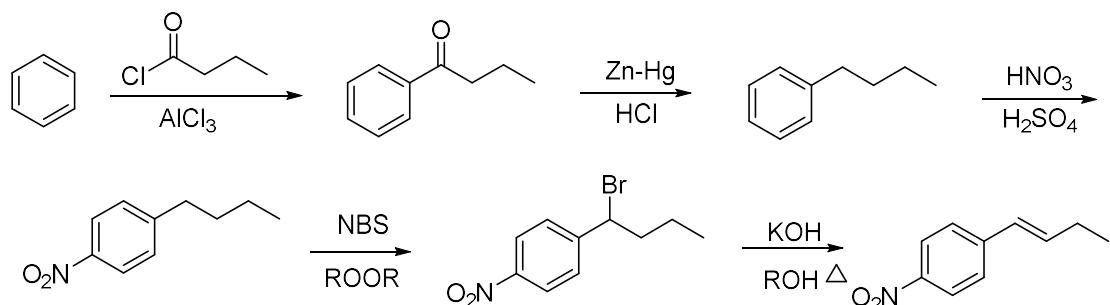
三. 合成题 (每小题 5 分, 共 20 分)



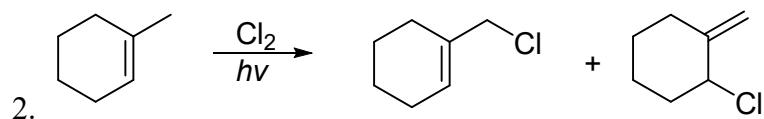
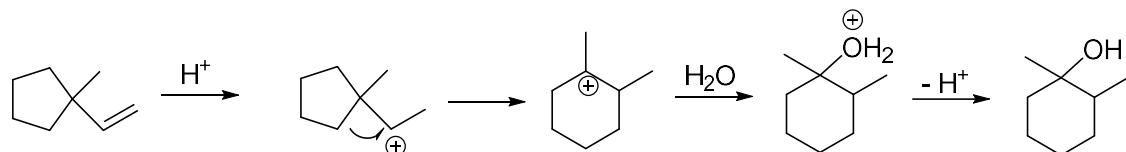
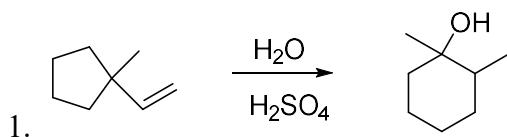
3. 以乙炔和不多于两个碳的烷烃为原料合成



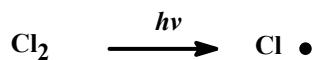
4. 以苯和不多于四个碳的化合物合成  $O_2N-C_6H_4-CH_2-CH=CH-CH_2-CH_2-CHO$



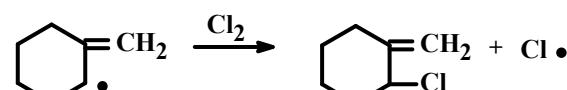
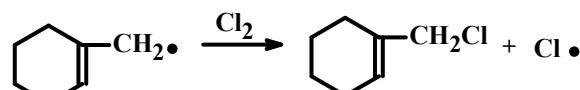
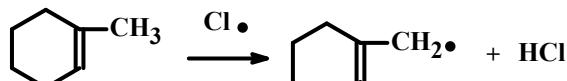
四. 机理题, 写出下列过程合理的机理 (每小题 5 分, 共 15 分)



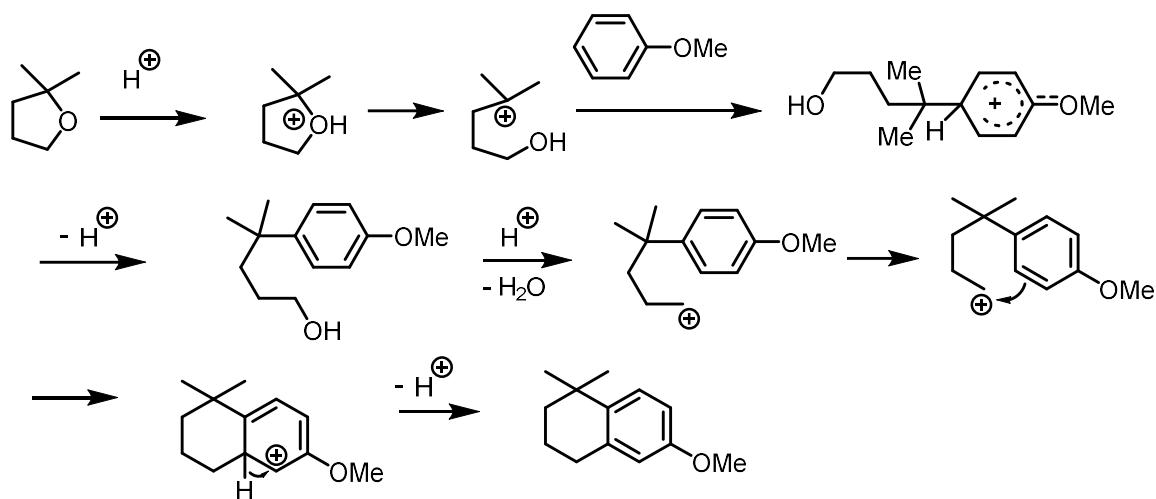
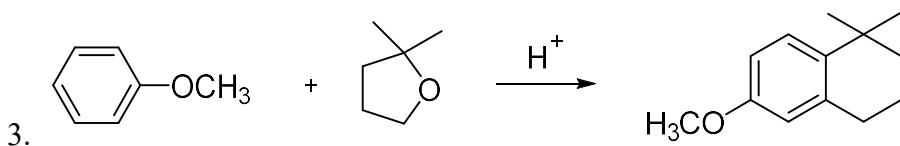
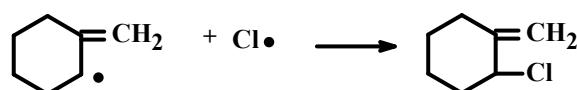
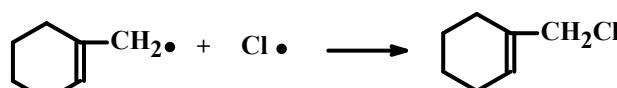
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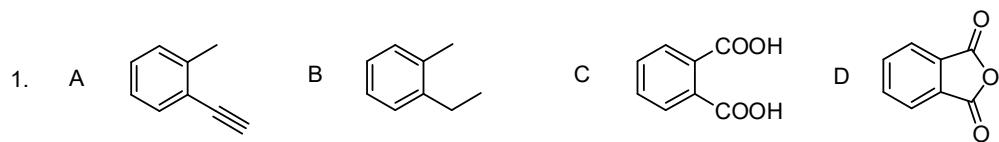


链终止



## 五. 结构解析 (每小题 5 分, 共 10 分)

1、某不饱和烃 A 的分子式为  $C_9H_8$ ，它能和氯化亚铜氨溶液反应生成红色沉淀。化合物催化氢化得到 B ( $C_9H_{12}$ )。将化合物 B 用酸性  $K_2Cr_2O_7$  氧化得到酸性化合物 C ( $C_8H_6O_4$ )。化合物 C 加热失水得到酸酐 D ( $C_8H_4O_3$ )。推测 A、B、C、D 的结构并给出相应的反应式。



2、化合物 A ( $C_7H_{12}$ ) 与冷的碱性  $KMnO_4$  水溶液反应生成化合物 B ( $C_7H_{14}O_2$ )。A 与  $C_6H_5CO_3H$  反应生成化合物 C ( $C_7H_{12}O$ )，C 与稀硫酸作用生成化合物 D ( $C_7H_{14}O_2$ )，D 与 B 是异构体。A 经臭氧化分解反应生成 2, 6-庚二酮。推测 A、B、C、D 的结构并给出相应的反应式。

