

扬州大学

2020 年硕士研究生招生考试初试试题 (A 卷)

科目代码 **632** 科目名称 **有机化学**

满分 **150**

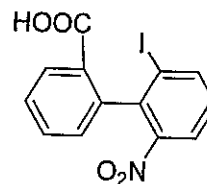
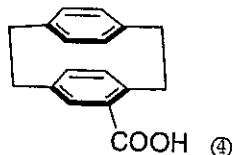
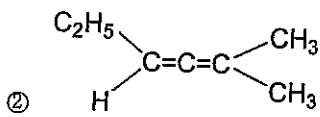
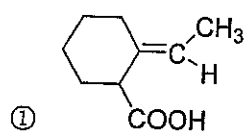
注意：①认真阅读答题纸上的注意事项；②所有答案必须写在答题纸上，写在本试题纸或草稿纸上均无效；③本试题纸须随答题纸一起装入试题袋中交回！

一、按指定要求回答下列问题（共 20 题，每题 1 分，共 20 分）

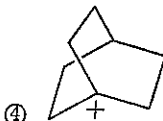
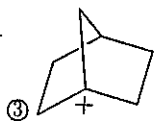
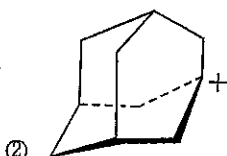
1. 分子式为 C_5H_{10} 的有机化合物可以形成的构造异构体数目是：

① 8 ② 9 ③ 10 ④ 11

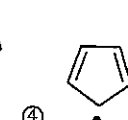
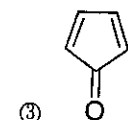
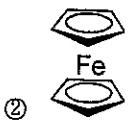
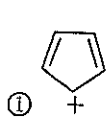
2. 下列化合物不能拆分为手性对映体的是：



3. 下列碳正离子最稳定的是：



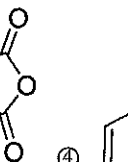
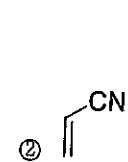
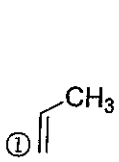
4. 下列分子具有芳香性的是：



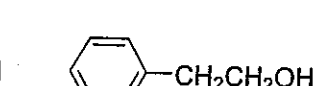
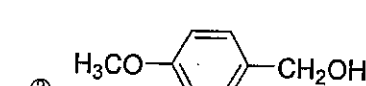
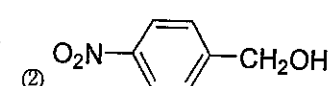
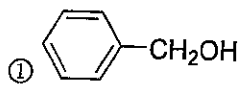
5. 下列化合物和亚硫酸氢钠反应最快的是：

① 苯丁酮 ② 环戊酮 ③ 二苯酮 ④ 丙醛

6. 下列烯烃最容易发生 Diels-Alder 反应的是：



7. 下列醇与氢溴酸进行 S_N1 反应最慢的是：



8. 下列化合物中酸性最强的是：

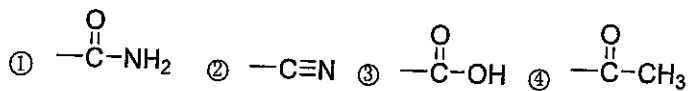
① $NCCOOH$

② CH_3CH_2COOH

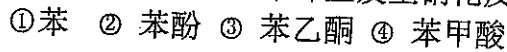
③ $CH_2=CHCOOH$

④ $HC\equiv CCOOH$

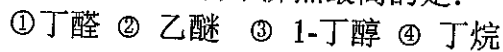
9. 按照次序规则, 下列基团排序最优先的是:



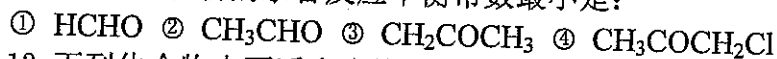
10. 下列化合物在苯环上发生硝化反应的速度最快的是:



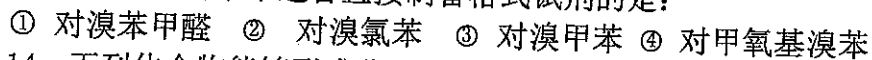
11. 下列化合物中沸点最高的是:



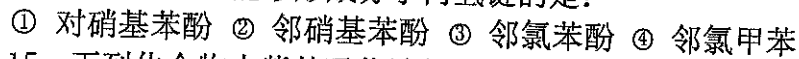
12. 下列化合物的水合反应平衡常数最小是:



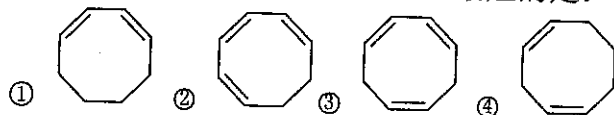
13. 下列化合物中不适合直接制备格式试剂的是:



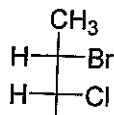
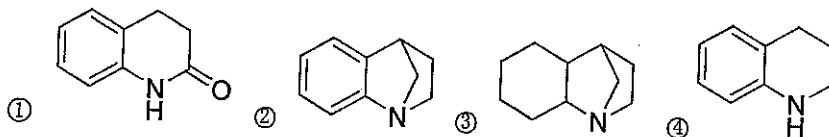
14. 下列化合物能够形成分子内氢键的是:



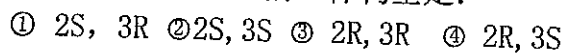
15. 下列化合物中紫外吸收波长最短的是:



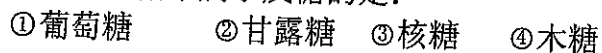
16. 下列化合物的碱性最强的是:



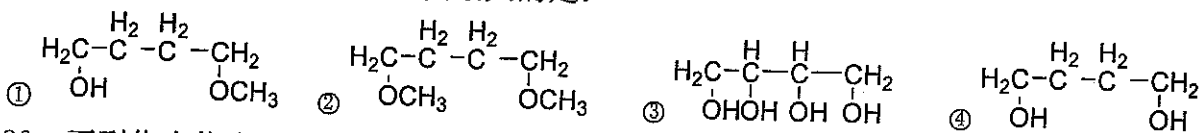
17. 化合物 CH_3 的立体构型是:



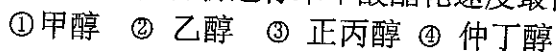
18. 下列糖中属于戊糖的是:



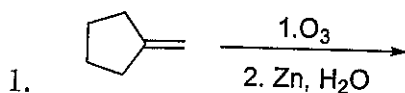
19. 下列化合物在水中的溶解度最大的是:

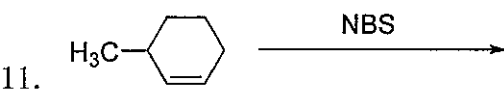
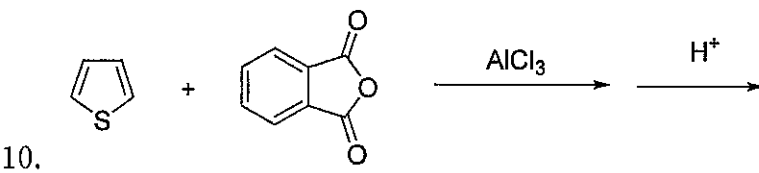
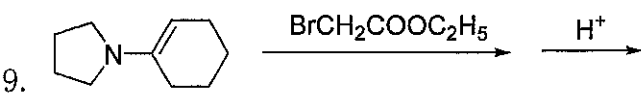
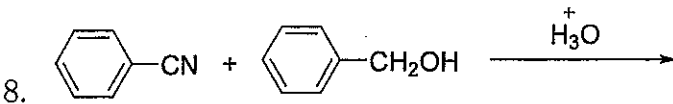
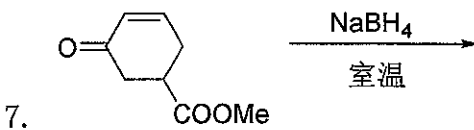
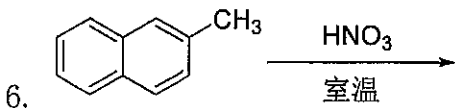
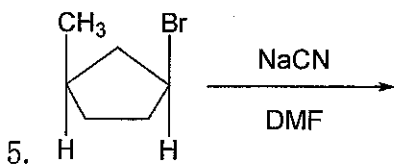
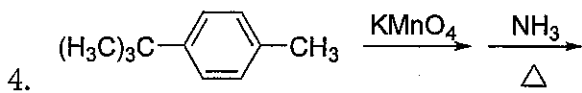
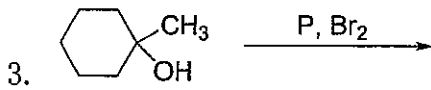
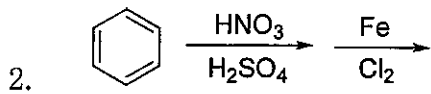


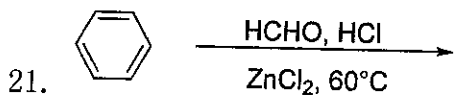
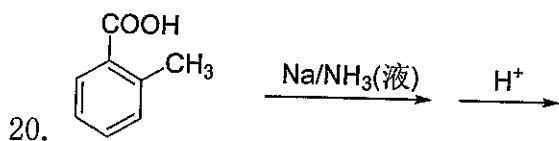
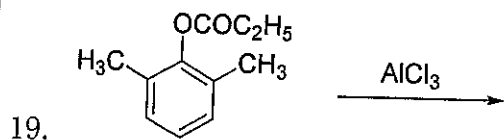
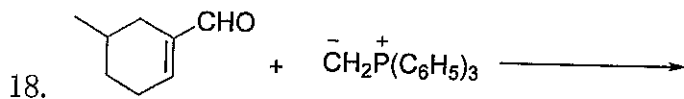
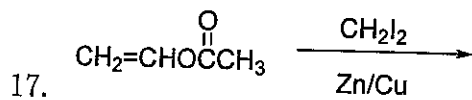
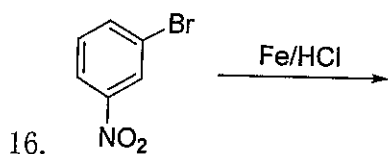
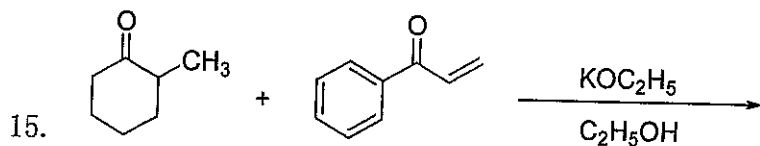
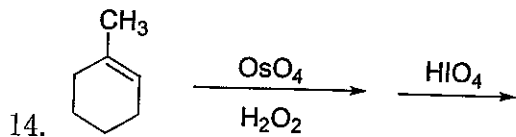
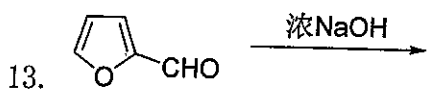
20. 下列化合物进行苯甲酸酯化速度最快的是:

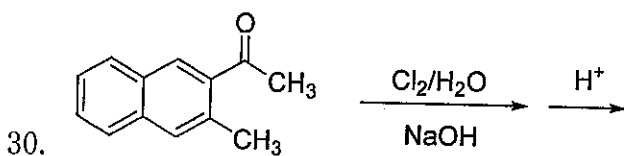
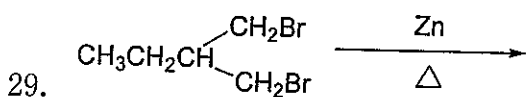
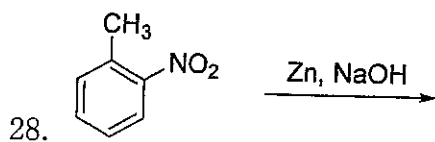
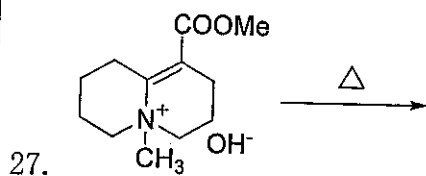
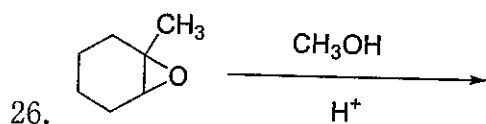
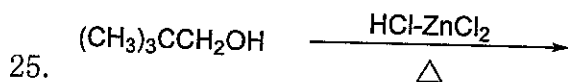
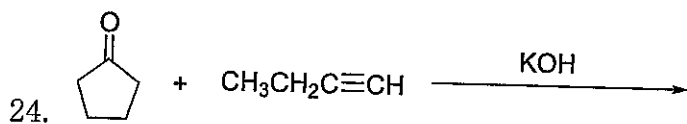
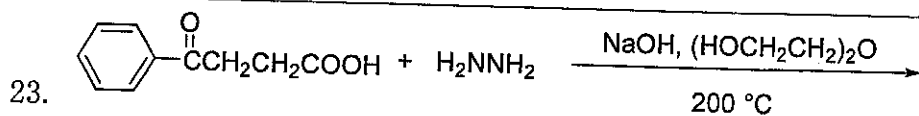


二、完成下列反应 (共 30 题, 每题 2 分, 共 60 分)



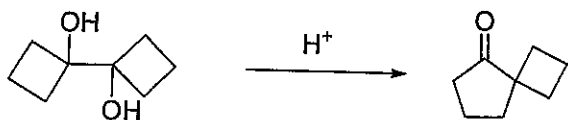




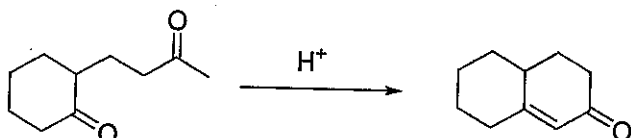


三、写出下列反应的反应历程（共二题，每题 8 分，共 16 分）

1.



2.



四、由指定原料和不超过 3 个碳原子的实际合成（共 6 题，每题 7 分，共 42 分）

1. 由乙醇合成正丁酸乙酯

2. 由乙酰乙酸乙酯和环氧乙烷 $\text{CH}_3\overset{\text{O}}{\parallel}\text{CCH}_2\text{CH}_2\text{CH}_2\text{Br}$

3. 由甲苯合成

4.

5. 由溴苯合成

6.

五、结构推导（共 2 题，每题 6 分，共 12 分）

1. 化合物 A ($C_4H_8O_2$)，其 IR 的特征吸收峰 (cm^{-1}) 为 1735, 1260, 1060，其在 1H NMR 谱为 δ 1.2 (t, 3H), 2.0 (s, 3H), 4.1 (q, 2H)，A 在 EtONa 催化下发生缩合反应生成 B ($C_6H_{10}O_3$)，B 能发生碘仿反应。B 在 EtONa 作用下与 CH_3I 反应生成 C ($C_7H_{12}O_3$)，C 在 EtOH 中用 EtONa 处理后加入环氧乙烷，得到一个化合物 D ($C_7H_{10}O_3$)，此化合物的 IR 特征吸收峰 (cm^{-1}) 为 1745, 1715，其 1H NMR 谱为 δ 1.3 (s, 3H), 1.7 (t, 2H), 2.1 (s, 3H), 3.9 (t, 2H)。请推出化合物 A、B、C、D 的结构。

2. 有一化合物 A ($C_6H_{12}O$)，与 2, 4-二硝基苯肼反应，但与 $NaHSO_3$ 不生成加成物。A 催化氢化的 B ($C_6H_{14}O$)；B 与浓硫酸加热得 C (C_6H_{12})；C 与 O_3 反应后用 Zn 和水处理，得到两个化合物 D 和 E，化学式均为 C_3H_6O ，D 可以使铬酸变绿，而 E 不能。请写出 A、B、C、D、E 的结构。

