

四川大学

2002年攻读硕士学位研究生入学考试试题

考试科目: 有机化学

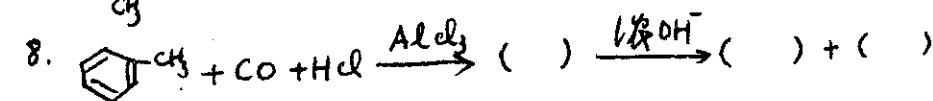
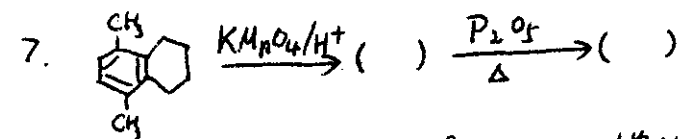
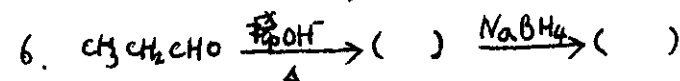
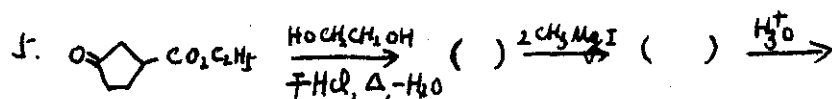
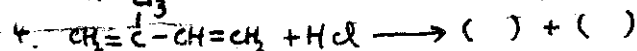
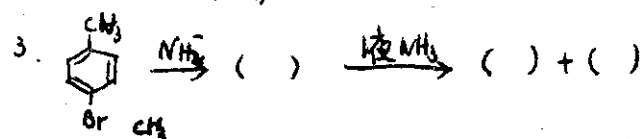
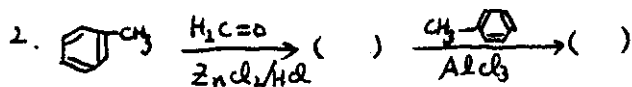
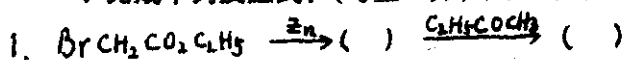
科目代号: 471#

适用专业: 材料学、化学工程、工业催化、应用化学
皮革化学与工程、生物医学工程、
纺织化学与染整工程

(试题共 6 页)

(答案必须写在试卷上, 写在试题上不给分)

一、完成下列反应式: (每空 1 分, 共 19 分)



二、按题意排顺序 (如: $\text{A} > \text{C} > \text{D} > \text{B}$) (每题 2 分, 共 18 分)

1. 下列碳正离子的稳定顺序为 ()

(A) 对甲氧基苯甲基正离子;

(B) 苯甲基正离子;

(C) 对硝基苯甲基正离子;

(D) 对甲基苯甲基正离子

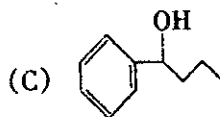
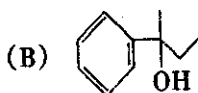
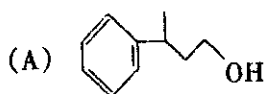
2. 下列化合物酸性由强到弱的顺序为 ()

(A) $\text{CH}_3\text{COCH}_2\text{CO}_2\text{C}_2\text{H}_5$

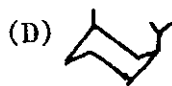
(B) $\text{CH}_2(\text{CO}_2\text{C}_2\text{H}_5)_2$

(C) $\text{CH}_3\text{COCH}_2\text{COCH}_3$

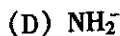
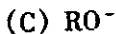
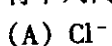
3. 下列化合物脱水反应速度由大到小 ()



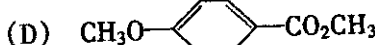
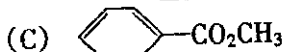
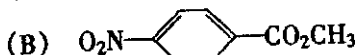
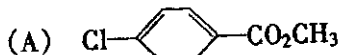
4. 比较下列化合物稳定性大小 ()



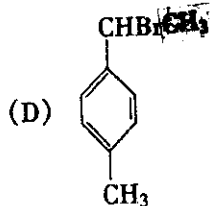
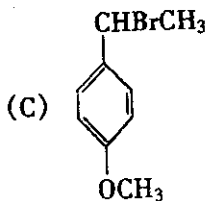
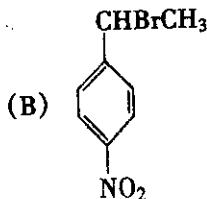
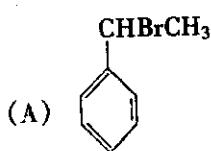
5. 将下列离子的亲核性由强到弱排列 ()



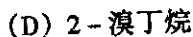
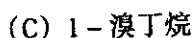
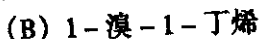
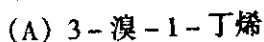
6. 下列化合物皂化反应速度由大到小排列 ()



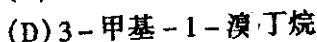
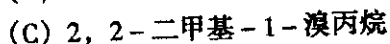
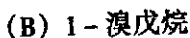
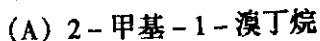
7. 下列化合物按 E1 历程的反应速率由大到小排列 ()



8. 下列化合物按 $\text{S}_{\text{N}}1$ 历程的反应速率由大到小排列 ()

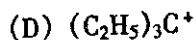
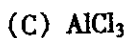
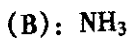
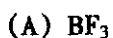


9. 下列化合物按 $\text{S}_{\text{N}}2$ 历程反应速率由大到小排列 ()

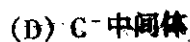
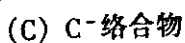
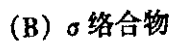


三、选择填空: (每空只填一个答案, 一个以上答案不给分, 每空 1 分, 共 20 分)

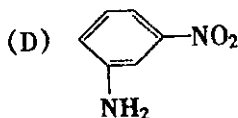
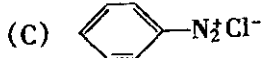
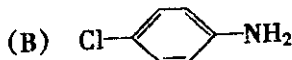
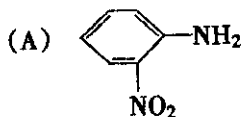
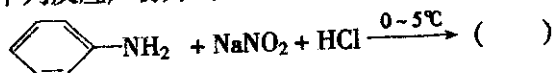
1. 下列化合物中 () 不是路易斯 (Lewis) 酸。



2. 苯环亲电取代历程中生成的中间体称为 ()



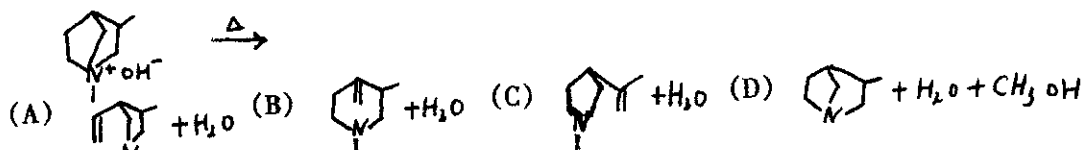
3. 下列反应产物为 ()



4. 红外光谱 (IR) 测量的是分子的 () 能级变化。

- (A) 电子 (B) 键能 (C) 分子构象 (D) 分子的振动和转动

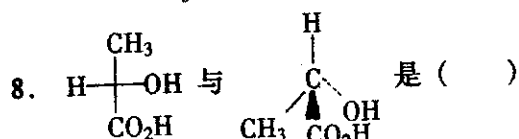
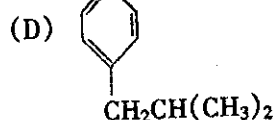
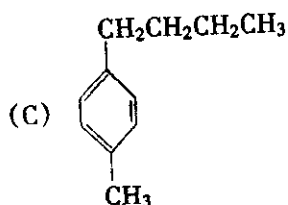
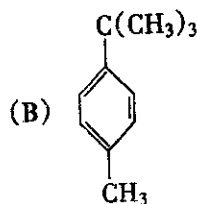
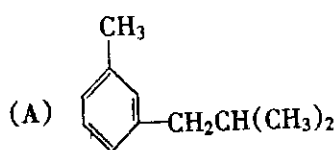
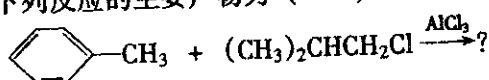
5. 下列反应中主要产物为下列四种化合物中的 ()



6. D-(-)-乳酸, 括号中的“-”表示 ()

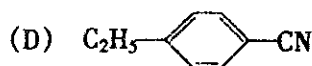
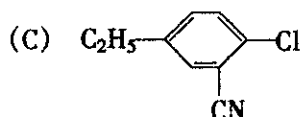
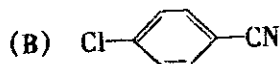
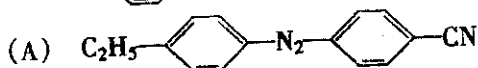
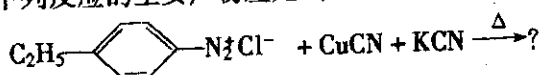
- (A) 负离子 (B) 左旋 (C) 右旋 (D) 外消旋

7. 下列反应的主要产物为 ()

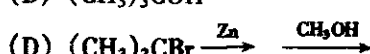
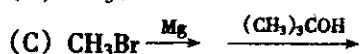
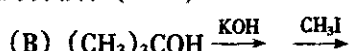


- (A) 相同分子 (B) 顺反异构体
(C) 对映异构体 (D) 互变异构体

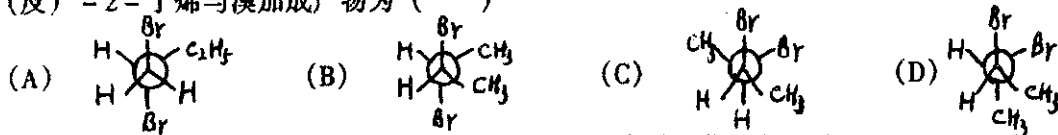
9. 下列反应的主要产物应是 ()



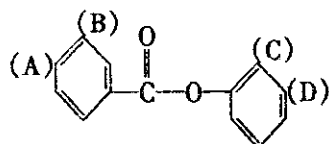
10. 下列反应中哪一个是制备甲基叔丁基醚的最好方法? ()



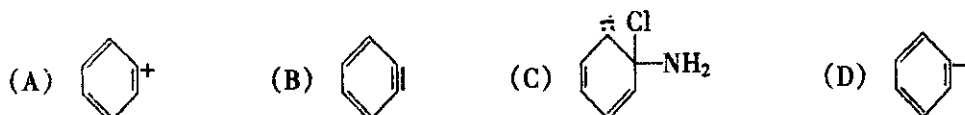
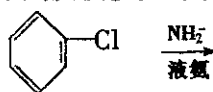
11. (反) - 2 - 丁烯与溴加成产物为 ()



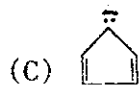
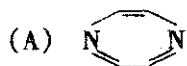
12. 下面化合物与 $\text{HNO}_3/\text{H}_2\text{SO}_4$ 反应时, 哪一个位置最容易硝化? ()



13. 下列反应涉及的中间体是 ()

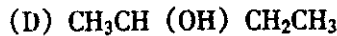
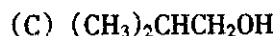
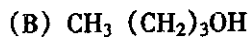


14. 下列化合物中无芳香性的是 ()

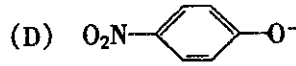
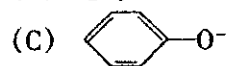
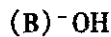
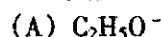


15. 某化合物的核磁共振氢谱数据如下:

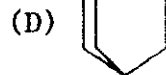
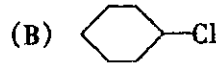
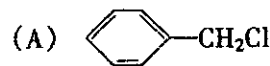
δ_{H} : 1.0 双峰; 1.8 多重峰; 3.3 双峰 4.4 单峰, 该化合物为 ()



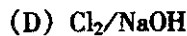
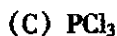
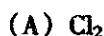
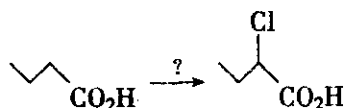
16. 下列负离子中亲核性最强的是 ()



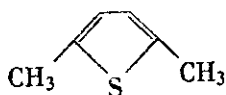
17. 下列化合物无论按 $\text{S}_{\text{N}}1$ 或 $\text{S}_{\text{N}}2$ 历程反应时, 其相对活性都是最小的为 ()



18. 下述反应须选择四种试剂中的 ()



19. 下述化合物的名称应为 ()



(A) 1, 4-二甲基噻吩

(B) 2, 5-二甲基噻吩

(C) 1, 4-二甲基呋喃

(D) 2, 5-二甲基呋喃

20. 下列化合物能发生碘仿反应的为 ()

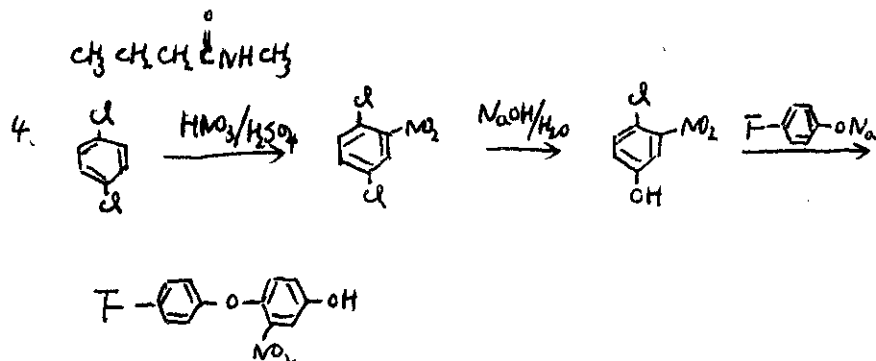
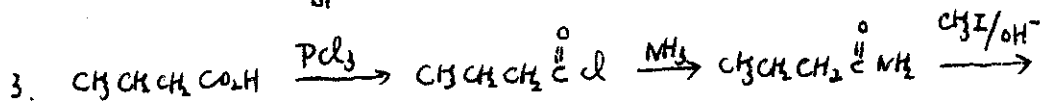
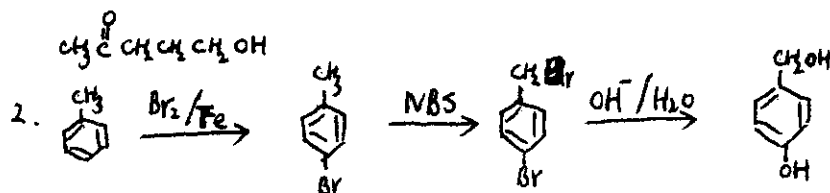
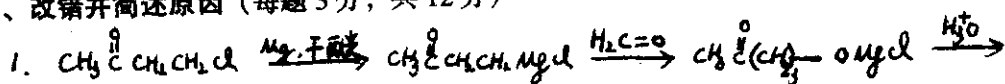
(A) $\text{CH}_3\text{CH}_2\text{CHO}$

(B) $\text{C}_6\text{H}_5\text{COC}_2\text{H}_5$

(C) $\text{CH}_3\text{CH}_2\text{OH}$

(D) $\text{C}_6\text{H}_5\text{CHO}$

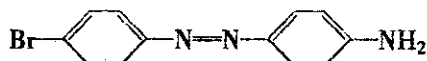
四、改错并简述原因 (每题 3 分, 共 12 分)



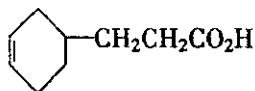
五、用指定原料合成下列化合物 (其它有机原料及无机原料任选) (每题 8 分, 共 24 分)

注: 未用指定原料不给分。

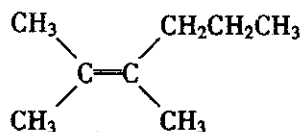
1. 用苯合成



2. 用 1, 3-丁二烯; 丙二酸二乙酯及三个或三个碳以下的化合物合成



3. 用 $(\text{CH}_3)_2\text{CHBr}$ 通过格氏 (Grignard) 试剂合成



六、推导结构 (7 分)

某化合物 A ($C_5H_{13}N$) 有旋光性。当把 A 溶于稀盐酸后再加入 $NaNO_2/H_2O$ 处理则生成无旋光性的 B ($C_5H_{12}O$)。B 可拆分成一对对映异构体。B 可以发生碘仿反应, B 用浓 H_2SO_4 处理后可得到 C (C_5H_{10}), 当 C 被 $KMnO_4/H^+$ 氧化时可生成一分子酮 D 及一分子有机酸 E。试推导 A ~ E 所有化合物的构造式, 并写出相关反应式。(注: 拆分的两种对映异构体应分别以透视式表示并给以 R, S 标记)。