

# 数学辅导材料

(80-22 号)

(化 7 号)

中央广播电视大学教务处编印

1981 年 6 月

# 有机化学习题解答

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(中央广播电视大学)

## 前 言

解答习题对于学好有机化学来说是一个必不可少的组成部分。通过解答习题可以把你学习引入一个正确的方向,同时,在你学了某一章以后,可通过解题来检查你是否已学会了,该掌握的知识,是否达到了预期的学习目的。

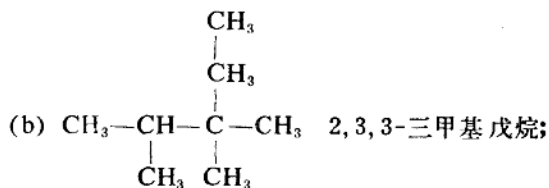
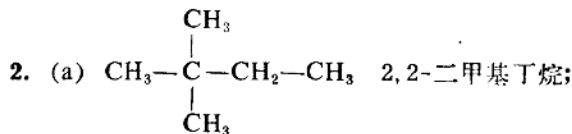
你应当尽量独立地解出你所能解的所有习题。特别是主要参考书汪小兰编《有机化学》的习题。这些习题虽然多数是比较容易的,但都是很重要的。它提供了书写结构式,命名化合物,认识分子结构,运用化学反应,比较化合物间内在联系等方面的基本训练,认真完成这些题,甚至对于学习基础较好的学生来说也是必要的。“补充习题”当然也是为了同一目的而选的,它的深度广度和课堂上讲授的某些补充知识的联系更为密切。一般说来这些习题较杂一些,但这对于评定你运用所学知识的能力来说,也许更好一些。希望你根据自己的实际情况尽力选做。

列在本辅导资料末尾的答案,均系参考答案,仅供你核对自己的答案时参考之用,其中的不一定是唯一最佳的答案。在你解题过程中,未经充分地思考之前,不要急于翻阅它,更不能抄录。

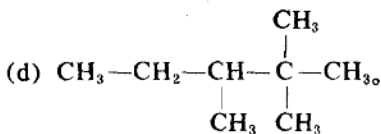
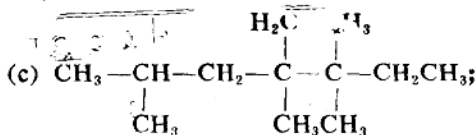
## 汪小兰“有机化学”习题解答

汪书第二章习题(P. 245-254)解答:

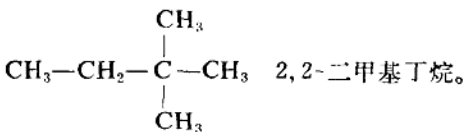
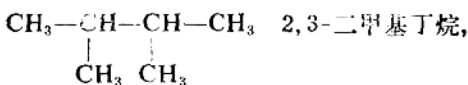
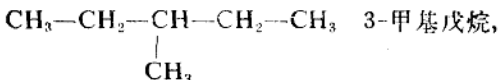
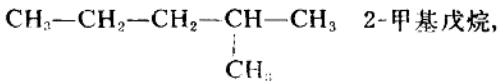
1. (a) 2-甲基丙烷; (b) 2,4,4-三甲基-5-丁基壬烷;  
(c) 己烷; (d) 3-乙基戊烷;  
(e) 3-甲基-5-异丙基辛烷; (f) 2-甲基-5-乙基庚烷。



4. 3

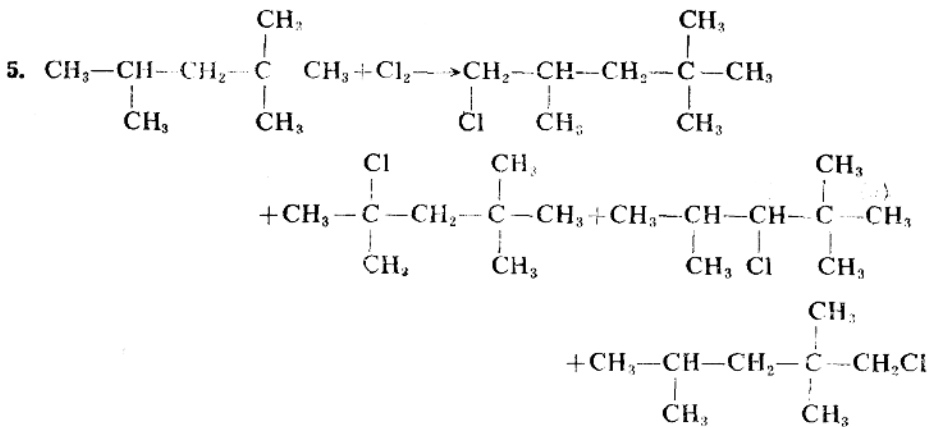


3.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$  己烷,



4. 沸点次序(由高→低)为:

- 2-甲基庚烷、庚烷、2-甲基己烷、3,3-二甲基戊烷、戊烷。



5. (a) 3-丙基庚烯-2;

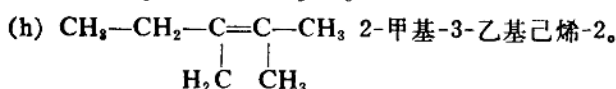
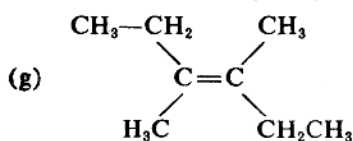
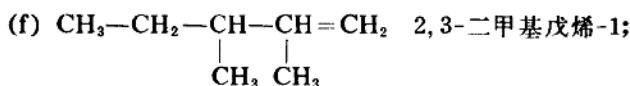
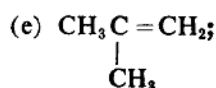
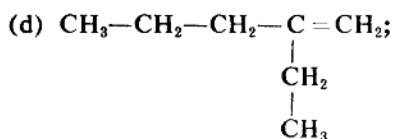
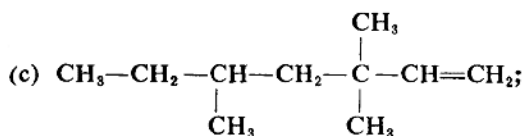
- (c) 2-乙基丁烯-1;

- (b) 3,3-二甲基丁烯-1;

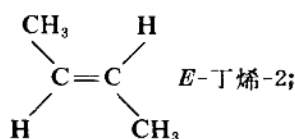
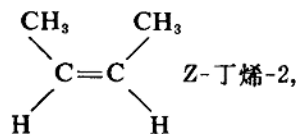
- (d) 2,5-二甲基己烯-2。

7. (a)  $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\underset{\text{CH}_3}{\text{CH}}=\text{C}-\text{CH}_3$ ;

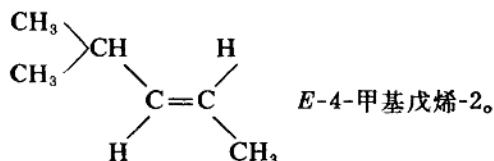
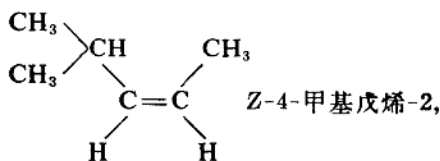
- (b)  $\text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}_2$  丁烯-1;



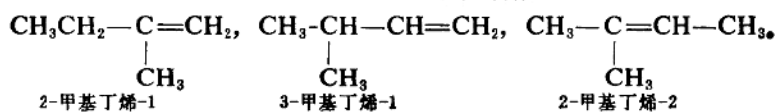
8. (a) 无; (b) 有,



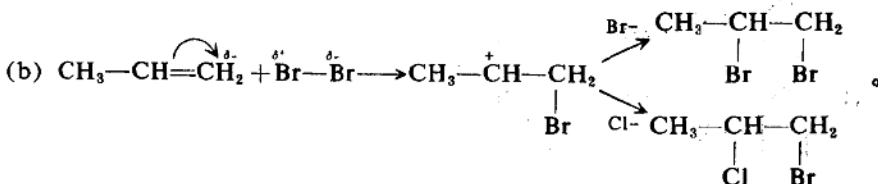
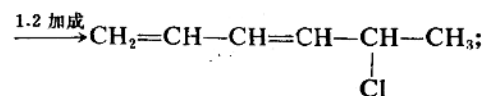
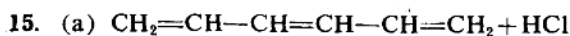
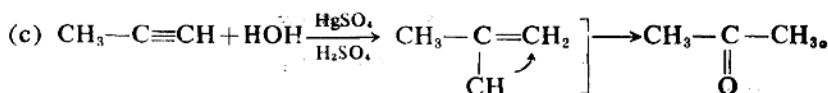
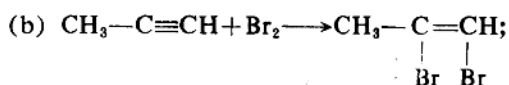
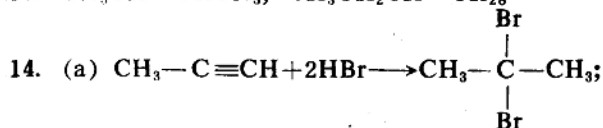
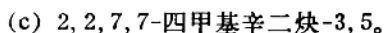
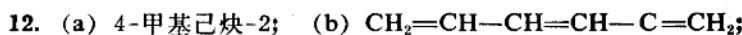
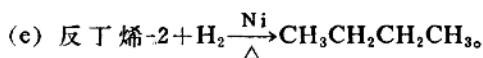
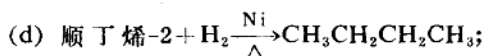
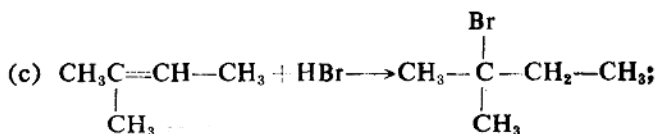
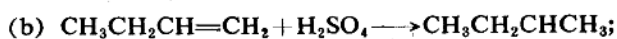
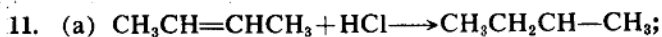
(c) 无; (d) 有,



9.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}=\text{CH}_2$ ,  $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}-\text{CH}_3$ ,  
戊烯-1 戊烯-2  
(Z, E 两种)



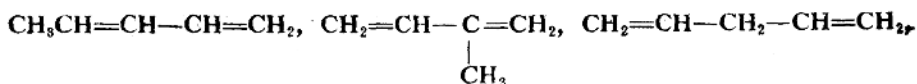
10. 能使  $\text{Br}_2$  水或  $\text{KMnO}_4$  溶液褪色者为己烯-1; 不能使之褪色者为正己烷。



戊炔-1

戊炔-2

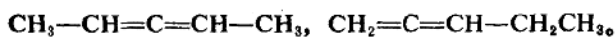
3-甲基丁炔-1



戊二烯-1,3

2-甲基丁烯-1,3

戊二烯-1,4



戊二烯-2,3

戊二烯-1,2

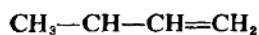
### 汪书第三章(P. 247 至 248 页)习题解答:



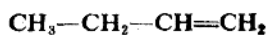
戊烯-1



戊烯-2  
(Z, E 两种)



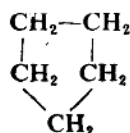
3-甲基丁烯-1



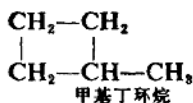
2-甲基丁烯-1



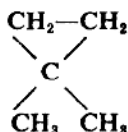
2-甲基丁烯-2



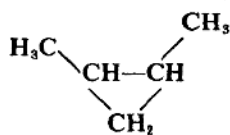
环戊烷



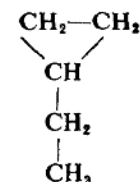
甲基丁环烷



1,1-二甲基环丙烷

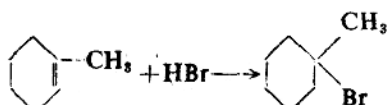


1,2-二甲基环丙烷

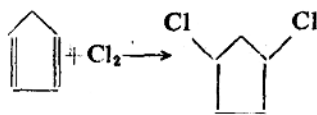


乙基环丙烷

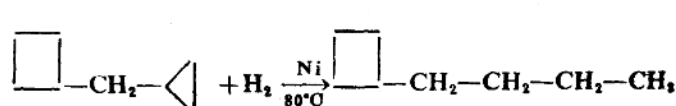
2. (a)

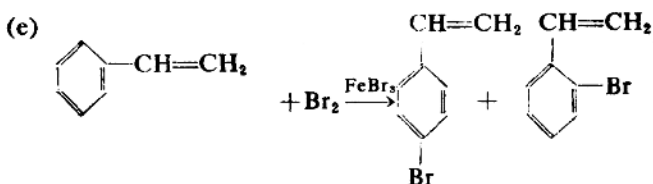
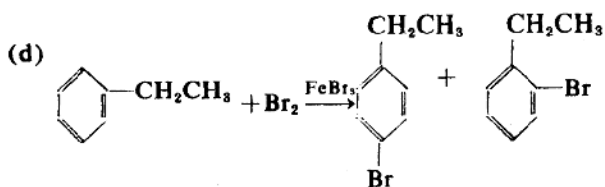


(b)



(c)

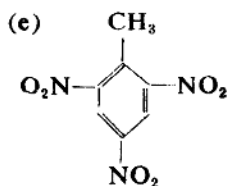
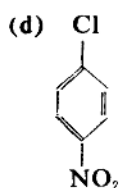




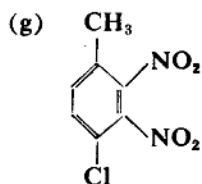
3. (a) 1,1-二氯环庚烷

(b)  $\beta$ -甲基萘

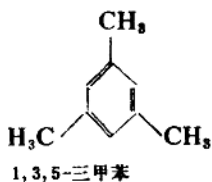
(c) 异丙苯



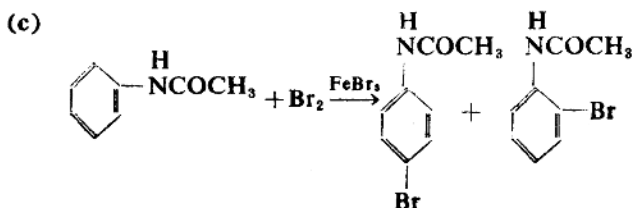
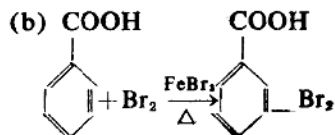
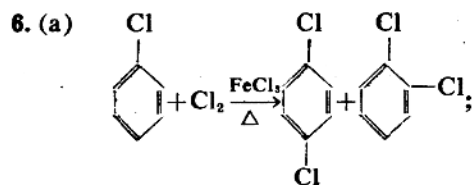
(f) 2-氯苯磺酸(或邻氯苯磺酸)

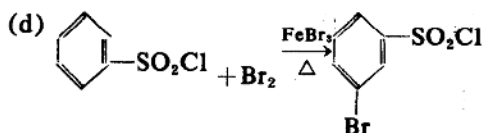


4.

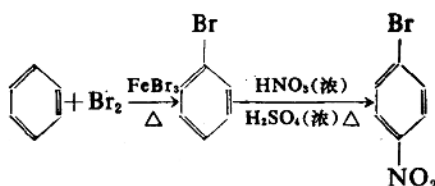


5. (a) 无芳香性; (b) 有芳香性。

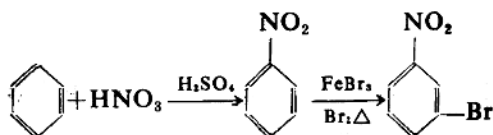




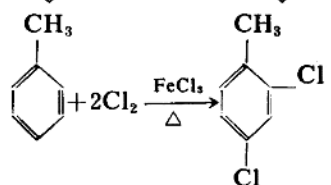
7. (a)



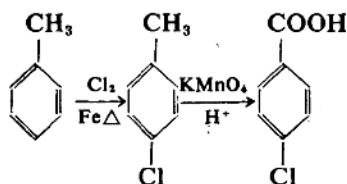
(b)



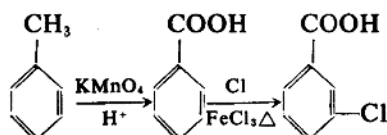
(c)



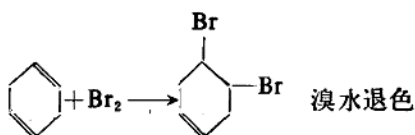
(d)



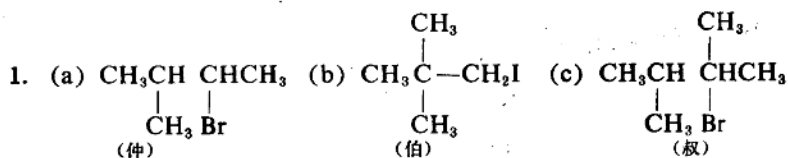
(e)

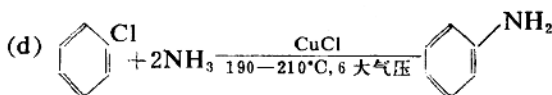
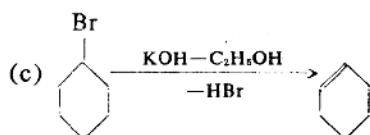
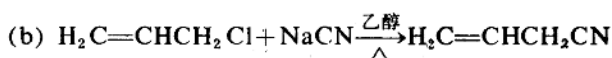
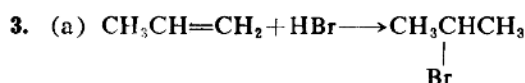
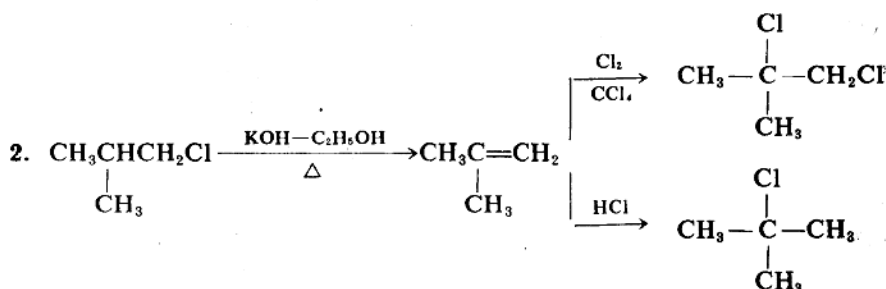
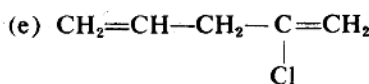
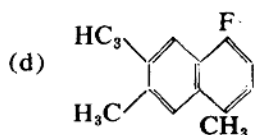


8.



汪书第四章习题(P. 248—249)解答:





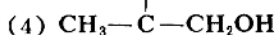
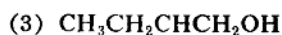
4. (a) 用  $\text{AgNO}_3$  乙醇溶液; (b) 同(a); (c) 同(a)。

汪书第五章习题(P. 249—250)解答:



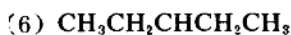
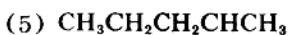
戊醇-1(伯)

3-甲基丁醇-1(伯)



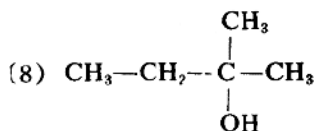
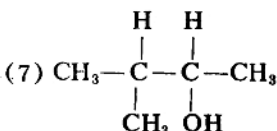
2-甲基丁醇-1(伯)

2,2-二甲基丙醇-1(伯)



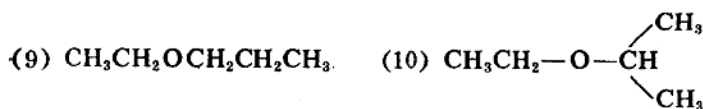
戊醇-2(仲)

戊醇-3(仲)



3-甲基丁醇-2(仲)

2-甲基丁醇-2(叔)



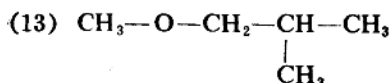
乙丙醚

乙基异丙(基)醚

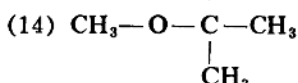


甲丁醚

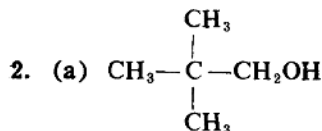
2-甲氧基丁烷(甲基仲丁基醚)



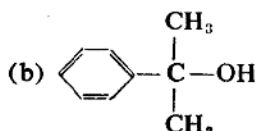
1-甲氧基-2-甲基丙烷  
(甲基异丁基醚)



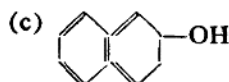
2-甲氧基-2-甲基丙烷  
(甲基叔丁基醚)



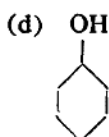
伯醇



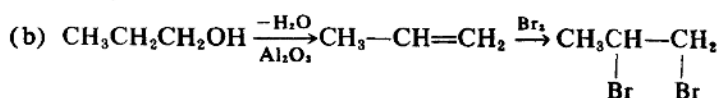
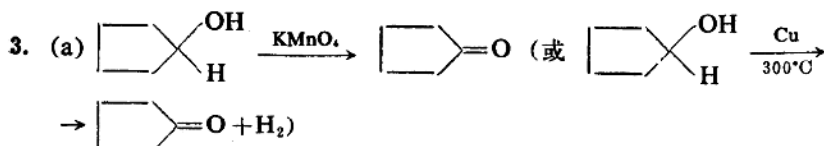
叔醇



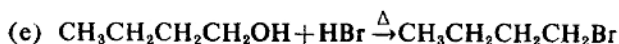
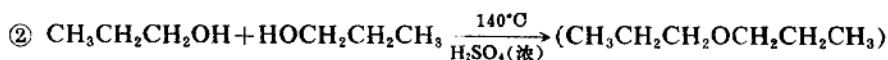
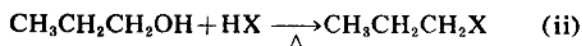
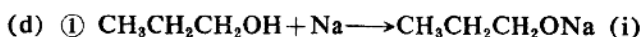
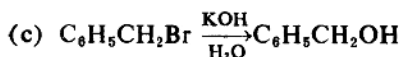
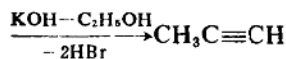
$\beta$ -萘酚

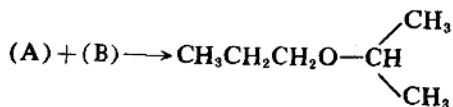
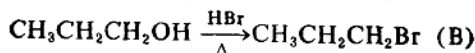
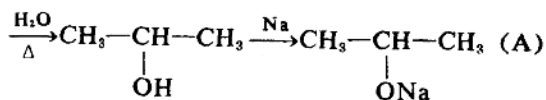
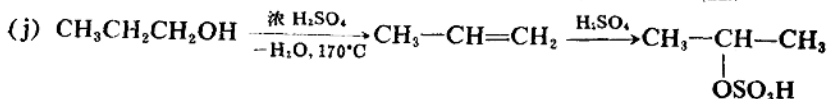
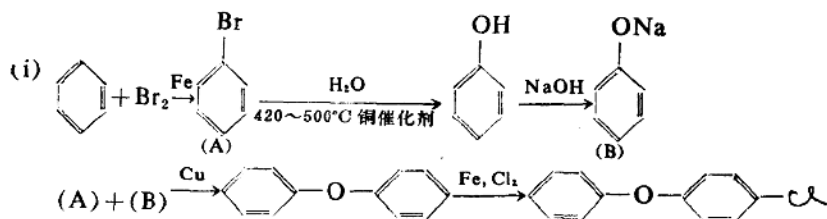
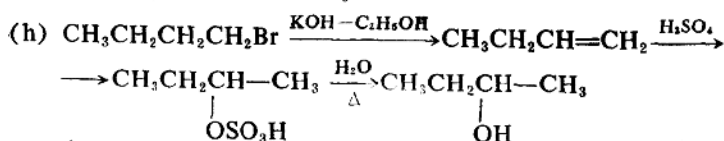
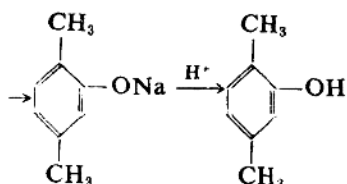
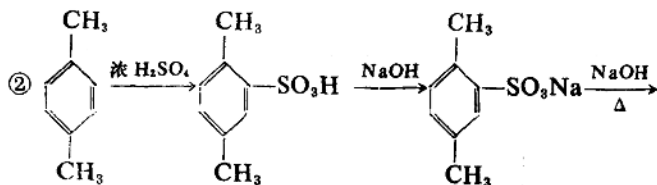
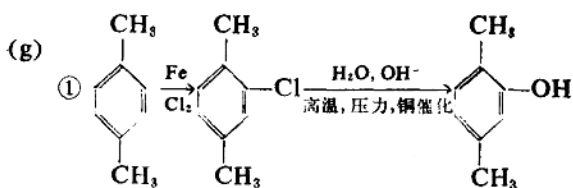
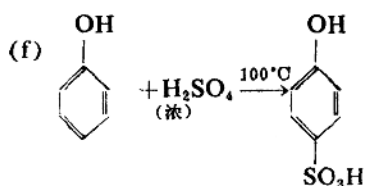


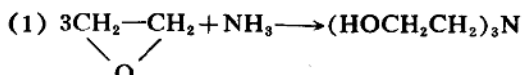
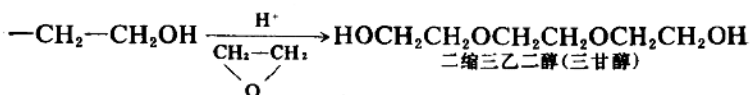
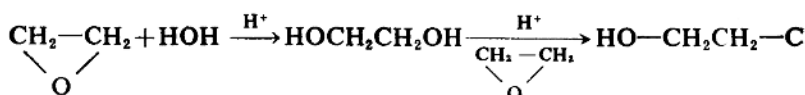
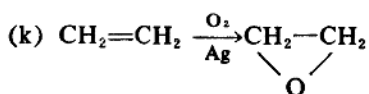
仲醇



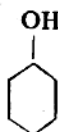
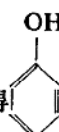
(或用  $\text{H}_2\text{SO}_4$  在  $170^\circ\text{C}$  脱水)

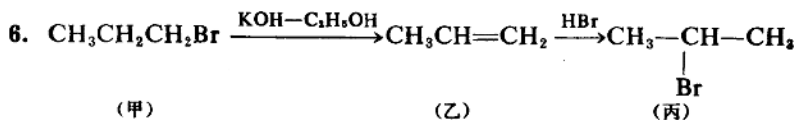




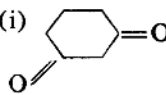


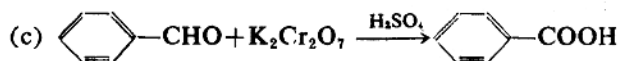
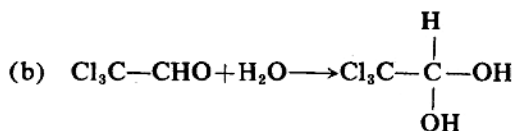
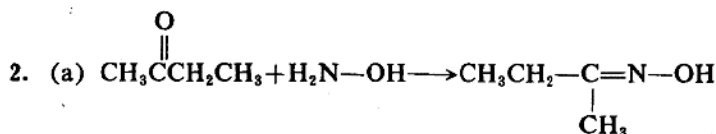
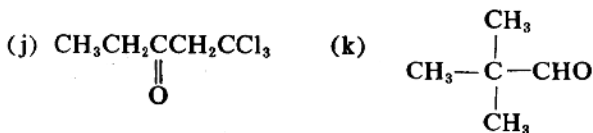
4. (a)  $\text{Ag}(\text{NH}_3)_2\text{NO}_3$  溶液; (b)  $\text{FeCl}_3$ ; (c) 金属钠; (d)  $\text{FeCl}_3$ 。

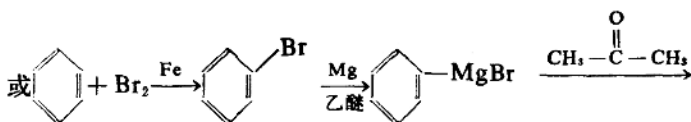
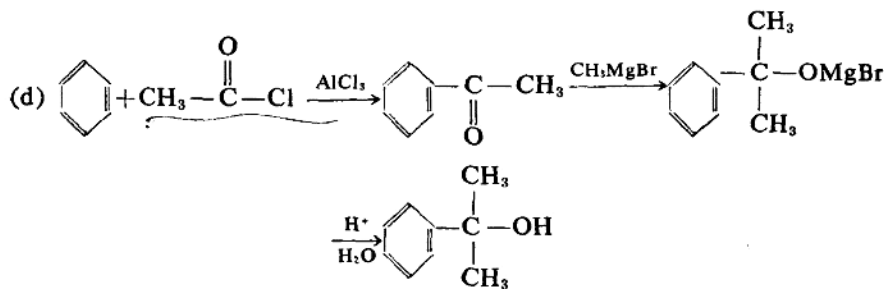
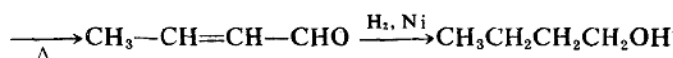
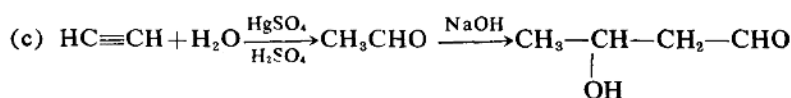
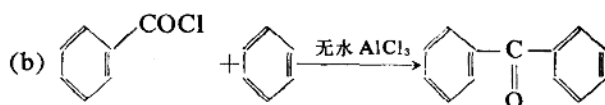
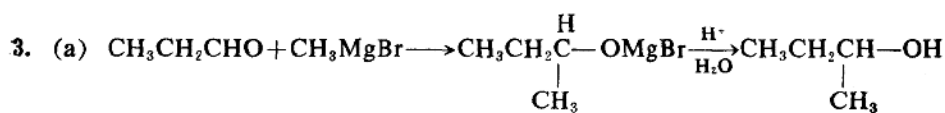
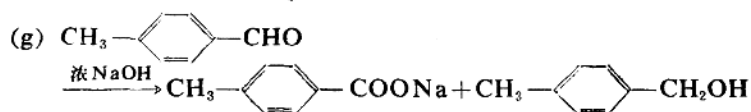
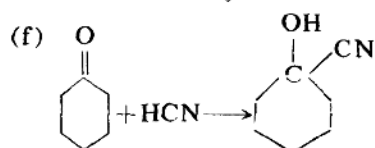
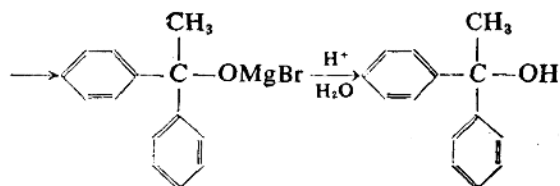
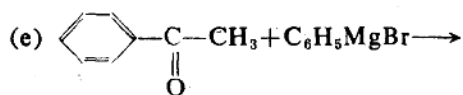
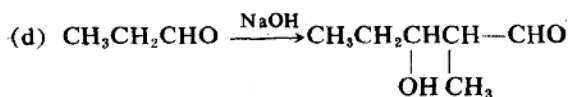
5.  溶于  $\text{NaOH}$  溶液,  不溶, 分离后酸化碱溶液得 。

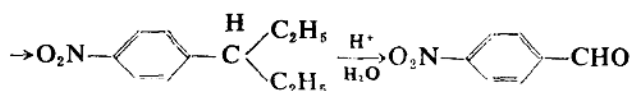
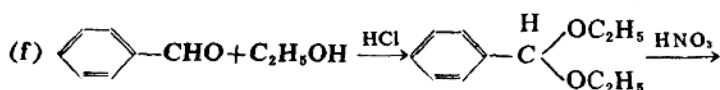
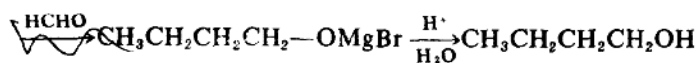
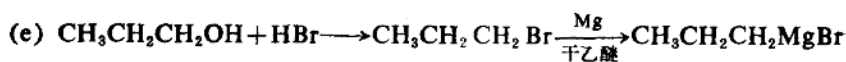
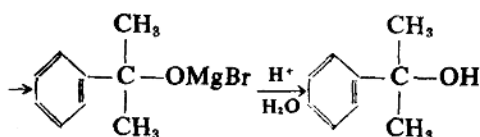


### 汪书第六章习题(P. 250~251)解答:

1. (a) 2-甲基丙醛(异丁醛) (b)  $\alpha$ -苯基乙醛 (c) 对甲基苯甲醛  
 (d) 3-甲基丁酮-2 (e) 2,4-二甲基戊酮 (f) 3-甲氧基苯甲醛  
 (g) 3-甲基丙醛 (h)  $\text{CH}_3-\underset{\text{Br}}{\text{CH}}-\text{CHO}$  (i) 







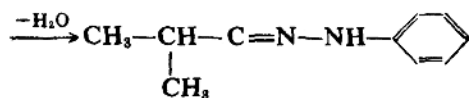
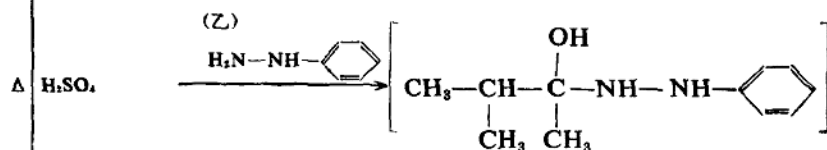
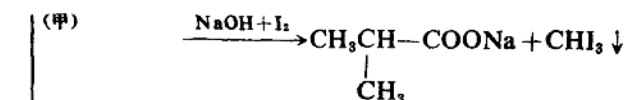
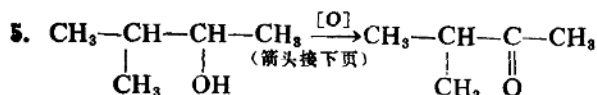
4. (a)

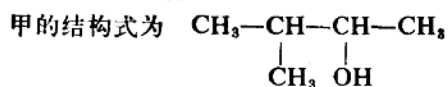
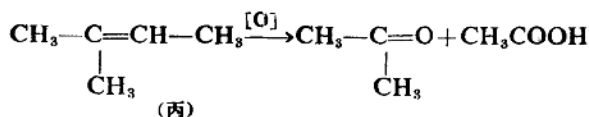
| 现象 \ 加试剂顺序                     | 被检物 | 丙 醛 | 丙 酮 | 异 丙 醇 | 丙 醇 |
|--------------------------------|-----|-----|-----|-------|-----|
| ① 托伦试剂                         |     | +   | -   | -     | -   |
| ② NaHSO <sub>3</sub>           |     |     | +   | -     | -   |
| ③ NaOH + I <sub>2</sub> (碘仿反应) |     |     |     | +     | -   |

(b)

| 现象 \ 加试剂顺序              | 被检物 | 戊 醛 | 苯 甲 醛 | 戊 酮-2 | 环 戊 酮 |
|-------------------------|-----|-----|-------|-------|-------|
| ① 斐林试剂                  |     | +   | -     | -     | -     |
| ② 托伦试剂                  |     |     | +     | -     | -     |
| ③ I <sub>2</sub> + NaOH |     |     |       | +     | -     |

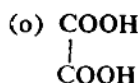
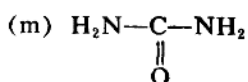
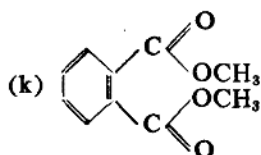
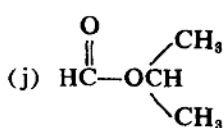
注意加试剂顺序



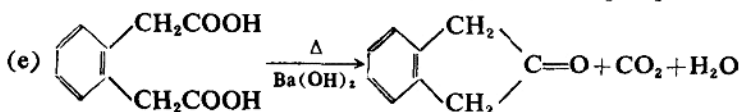
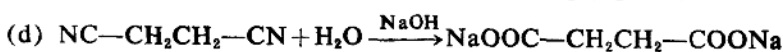
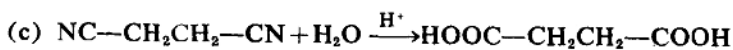
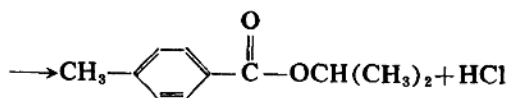
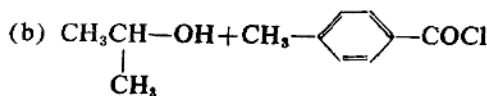
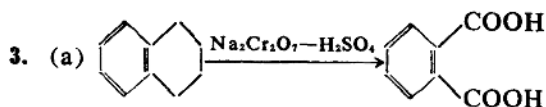
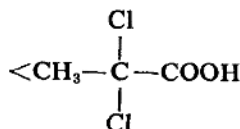
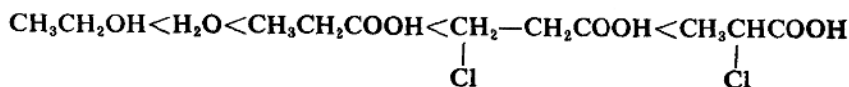


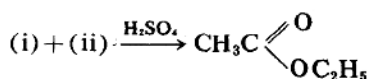
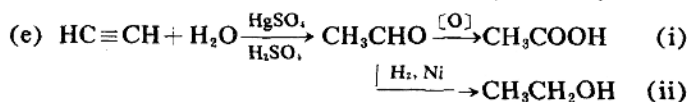
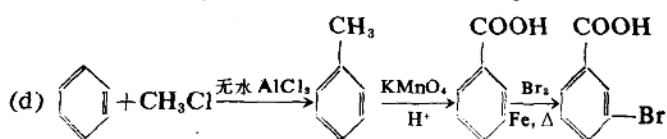
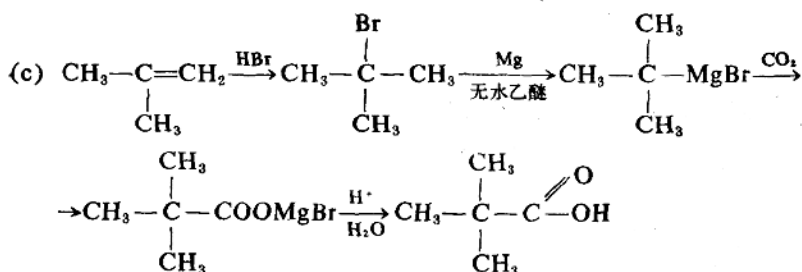
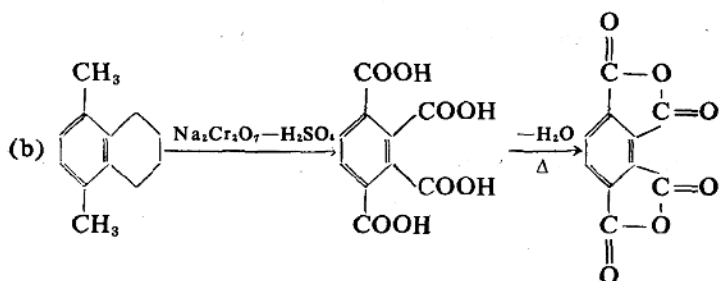
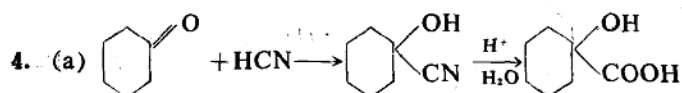
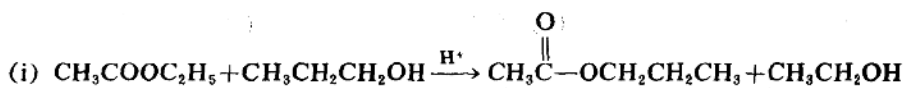
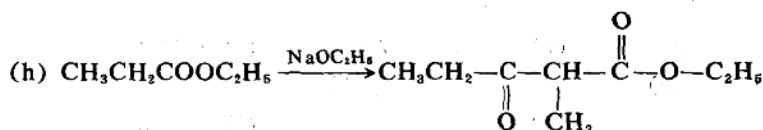
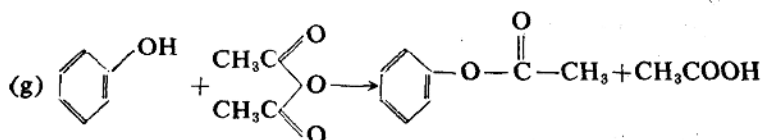
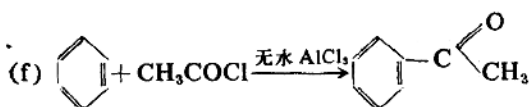
汪书第七章习题(P. 251—253)解答:

1. (a) 2-甲基丙酸 (α-甲基丙酸) (b) 2-羟基苯甲酸 (邻羟基苯甲酸) (c) 戊烯-3-酸  
(d) β-溴丁酸 (e) 丁酰氯 (f) 丁酸酐  
(g) 丙酸乙酯 (h) 乙酸丙酯 (i) 苯甲酰胺

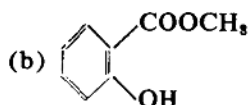
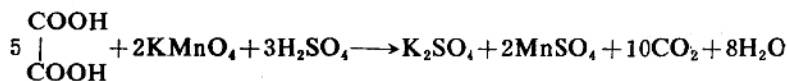


2. 酸性增强次序

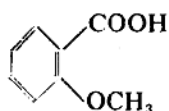




5. (a) 草酸使高锰酸钾酸性溶液退色, 丁二酸无此反应。

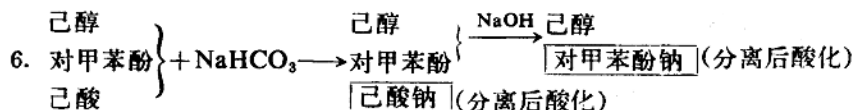


与  $\text{FeCl}_3$  水溶液显颜色反应。

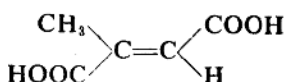
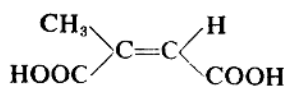
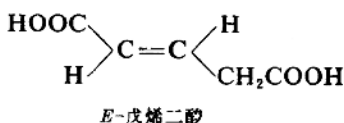
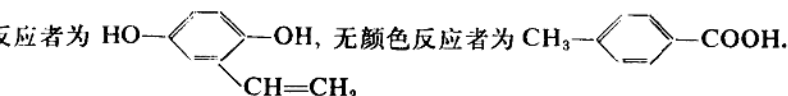


无此反应。

(c) 用  $\text{Br}_2$  水鉴别。

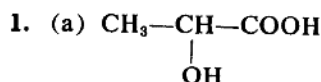


7. 先加 2,4-二硝基苯肼生成黄色沉淀者为  $\text{HO}-\text{C}_6\text{H}_4-\text{C}(=\text{O})\text{CH}_3$ ; 再加  $\text{FeCl}_3$ , 有颜色反应者为  $\text{HO}-\text{C}_6\text{H}_3(\text{OH})-\text{CH}=\text{CH}_2$ , 无颜色反应者为  $\text{CH}_3-\text{C}_6\text{H}_4-\text{COOH}$ 。



Z-戊烯二酸及 Z-甲基丁烯二酸易形成酸酐

汪书第八章习题(P. 253—254)解答:



(b) 丙酮酸

