

同步训练 六

芳烃、 ^1H NMR、IR、MS

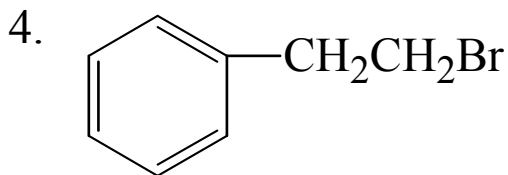
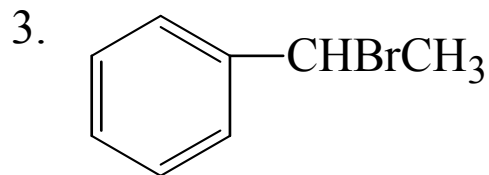
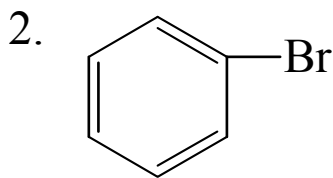
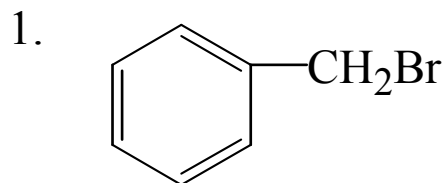
一. 选择题:

1.按SN1反应,下列化合物的反应活性顺序是:(A)

(1)苄溴 (2)溴苯 (3)1-苯基-1-溴乙烷 (4)1-溴-2-苯基乙烷

A) (3) > (1) > (4) > (2) B) (1) > (2) > (3) > (4)

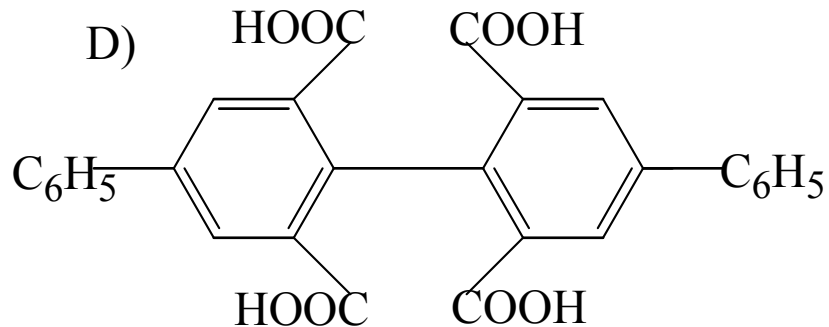
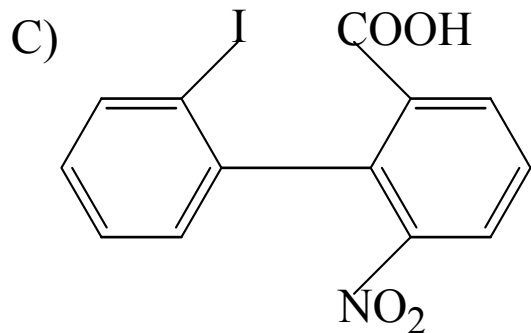
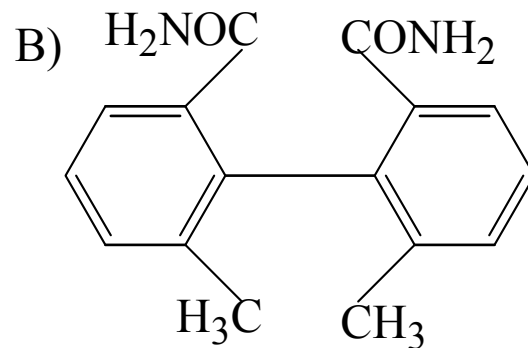
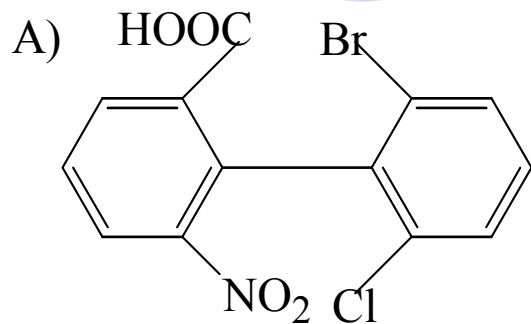
C) (3) > (1) > (2) > (4) D) (1) > (3) > (4) > (2)



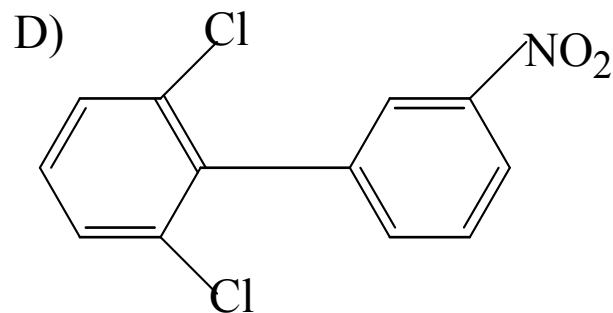
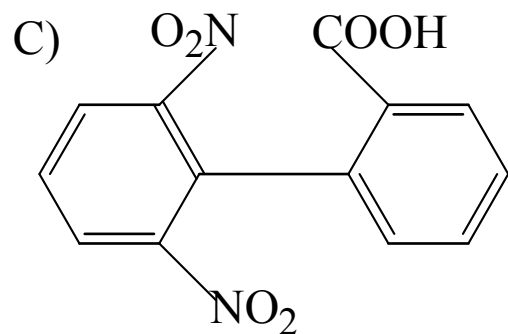
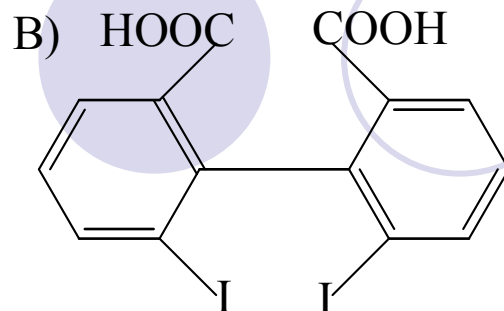
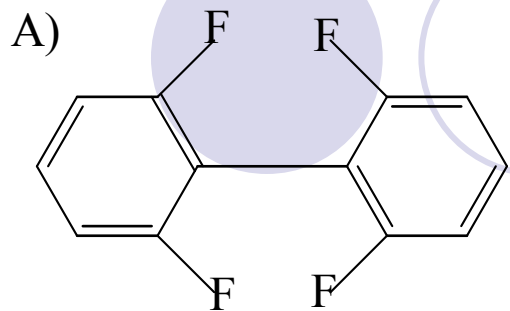
2.煤焦油的主要成分(约占70%)是:(A)

A)芳香烃 B)烯烃 C)环烷烃 D)杂环化合物

3. 下列联苯衍生物哪一个不具有旋光活性? (D)

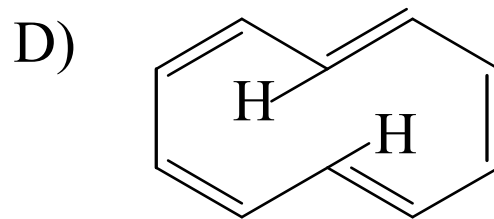
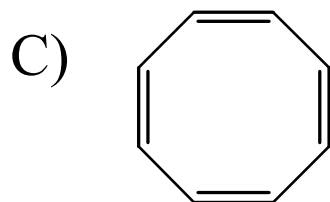
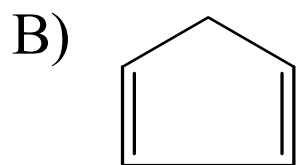
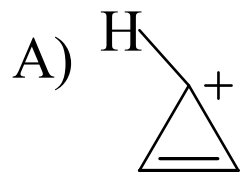


4. 下列化合物哪一个能拆分出对映异构体? (**B**)

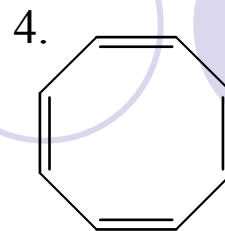
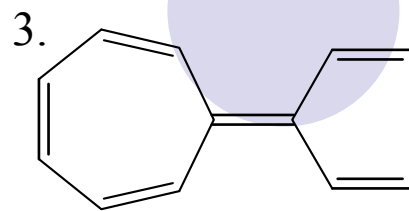
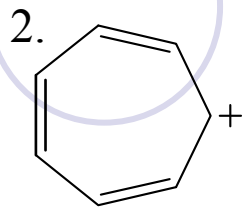
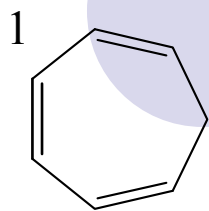


5. 下列哪个化合物具有芳香性? (**A**)

A) 环丙烯正碳离子 B) 环戊二烯 C) 环辛四烯 D) 〔10〕轮烯



6. 下列化合物有芳香性的是: (A)

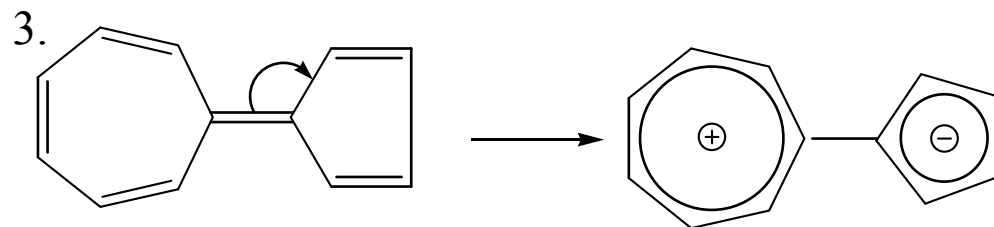


A) 2,3

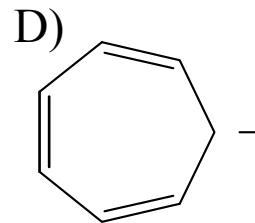
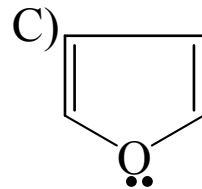
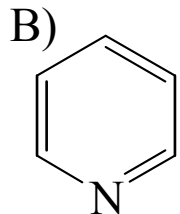
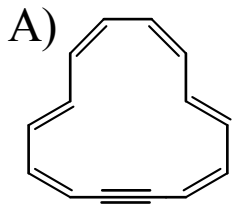
B) 1,2

C) 1,4

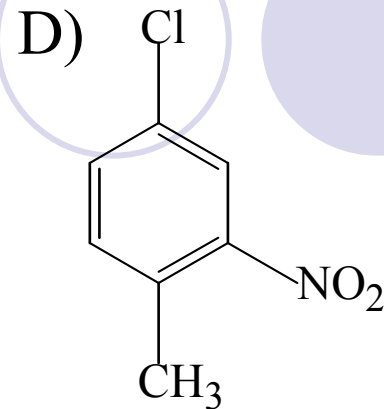
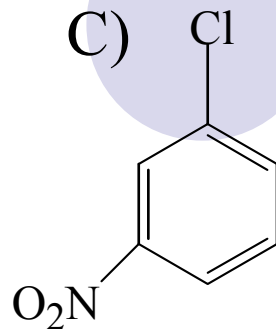
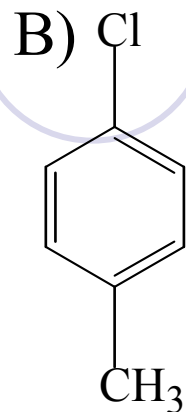
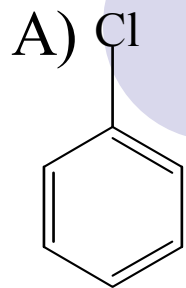
D) 1,3



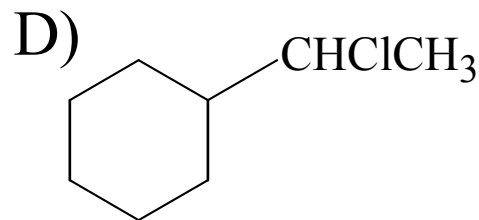
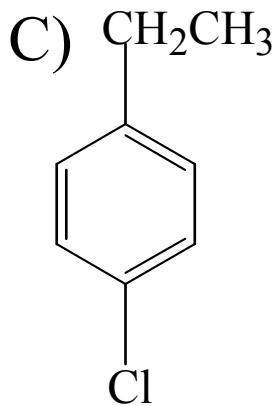
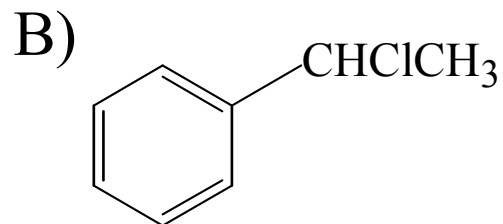
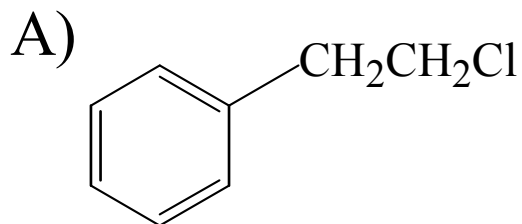
7. 下列化合物, 哪一个不具有芳香性: (D)



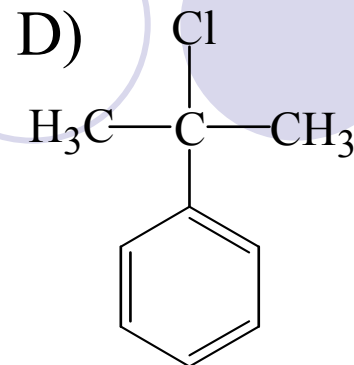
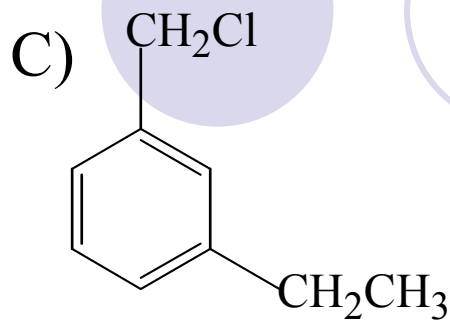
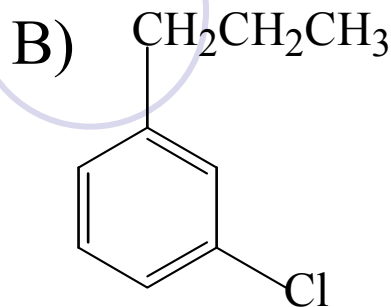
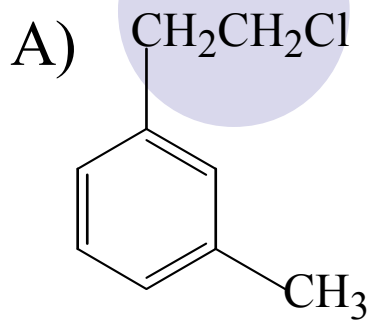
8. 下列各化合物中与 $\text{CH}_3\text{ONa}/\text{CH}_3\text{OH}$ 反应速度最快的是: (C)



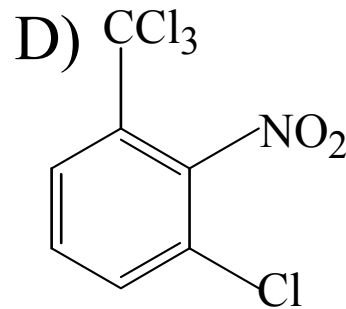
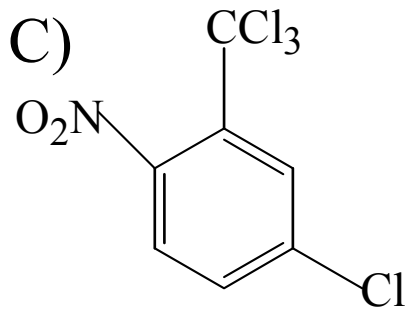
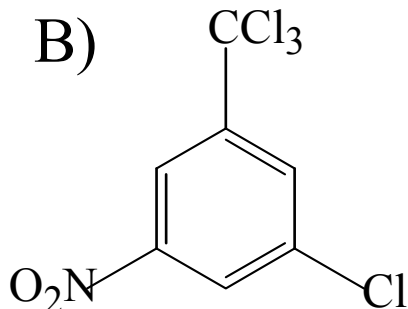
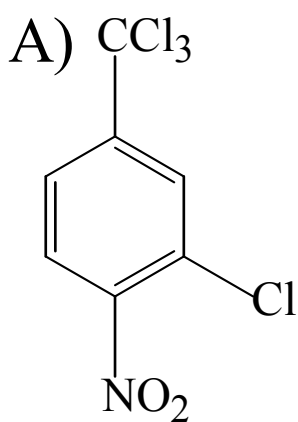
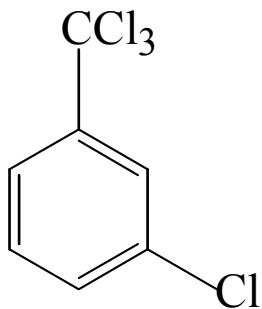
9. 哪一个卤代烃和 $\text{AgNO}_3/\text{EtOH}$ 反应最快: (B)



10. 下列各异构体中, 不与醋酸银醇溶液反应的是: (**B**)

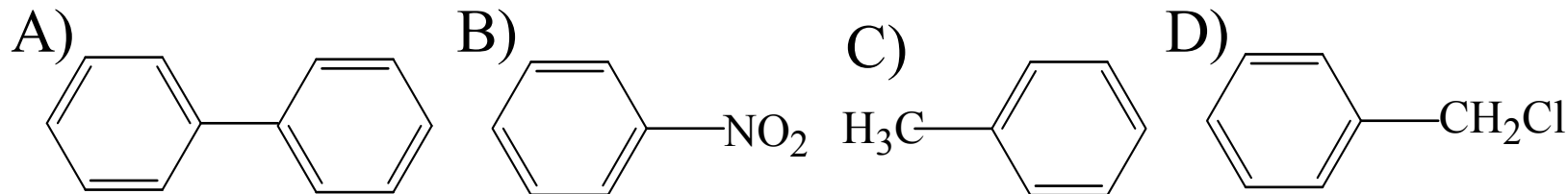


11. 硝化的主要产物是: (**A**)

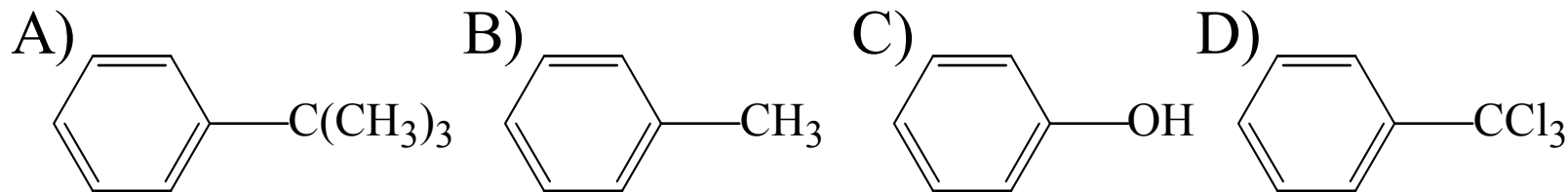


12. 下面的取代基中,属于钝化的邻对位定位基是: (**B**)
A) $-\text{CH}_3$ B) $-\text{CH}_2\text{Cl}$ C) $-\text{CF}_3$ D) $-\text{CCl}_3$

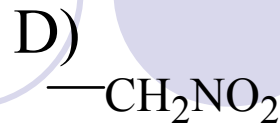
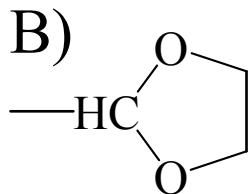
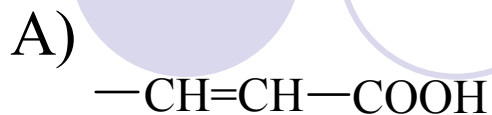
13. 下列化合物中,不能发生付克反应的是: (**B**)



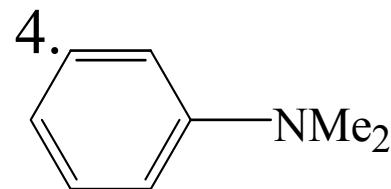
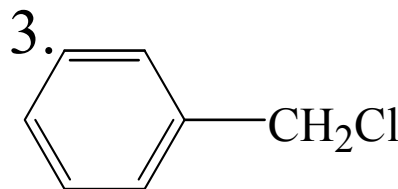
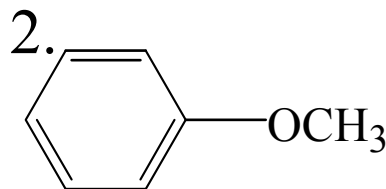
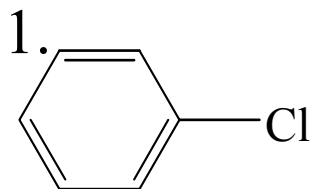
14. 下列化合物中,不能发生付克反应的是: (**D**)



15. 下列取代基中,属于邻对位定位基的是: (A)



16. 下面具有邻对位定位基,又有被钝化的苯环的是: (B)



A) 1, 2

B) 1, 3

C) 2, 3

D) 1, 4

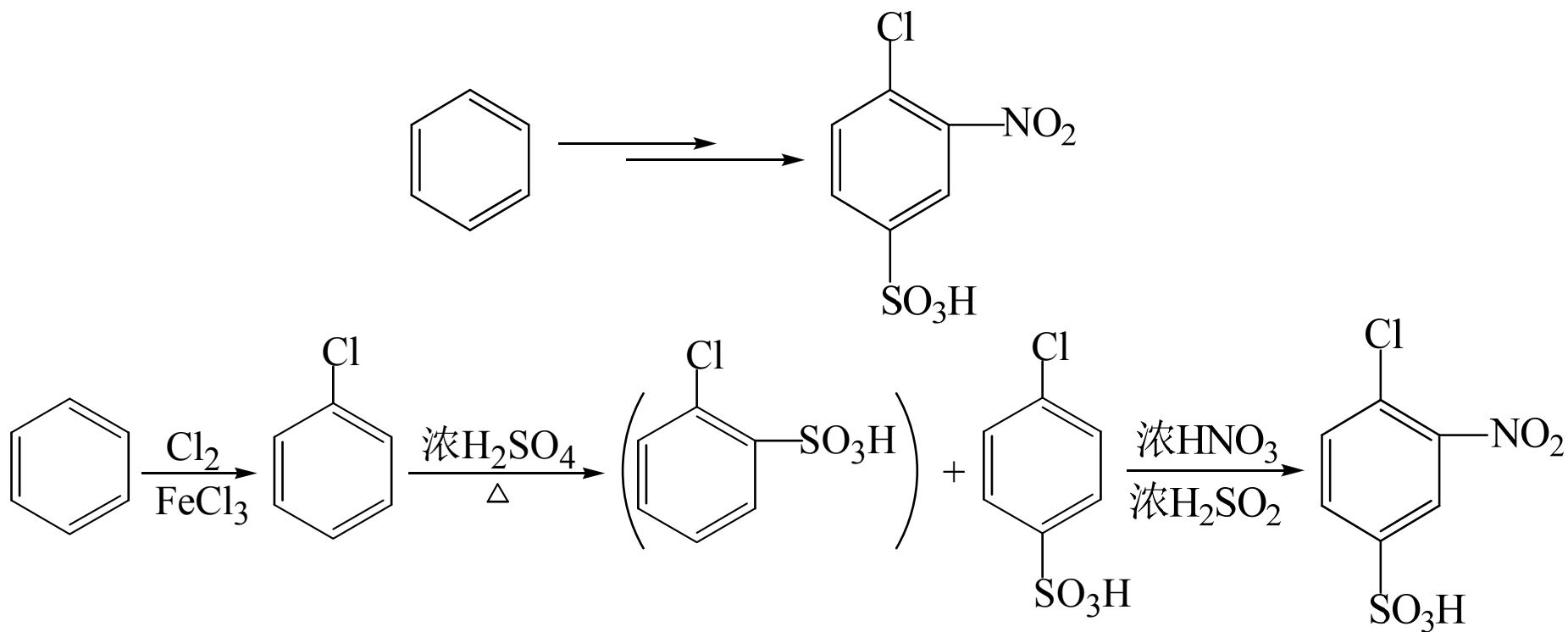
17.由苯合成对氯间硝基苯磺酸可由二步反应完成,下列哪一个反应顺序较好: (B)

A) (1)磺化(2)硝化(3)氯化

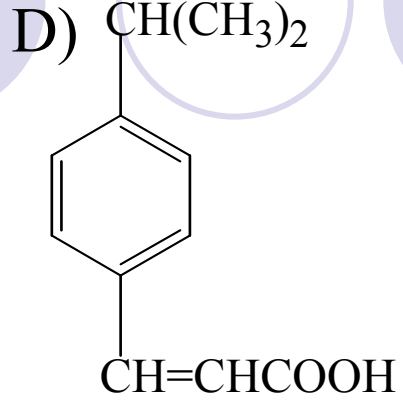
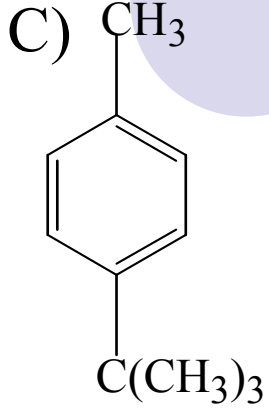
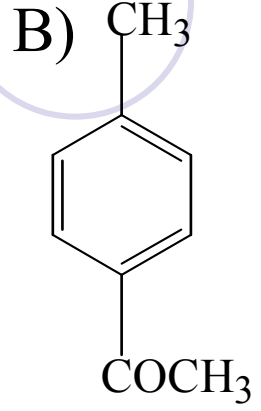
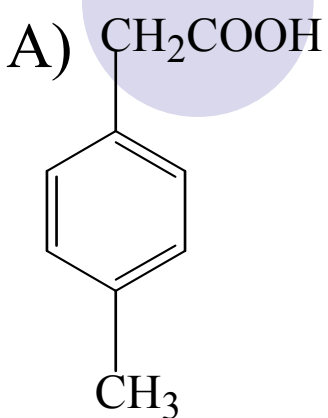
B) (1)氯化(2)磺化(3)硝化

C) (1)硝化(2)磺化(3)氯化

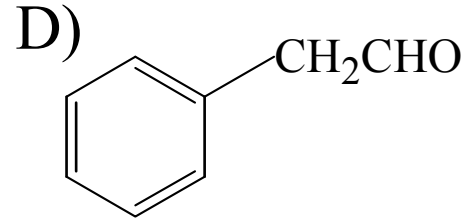
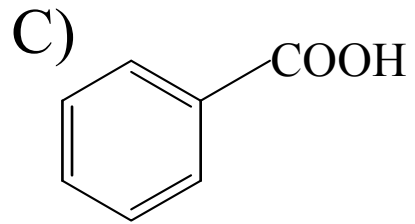
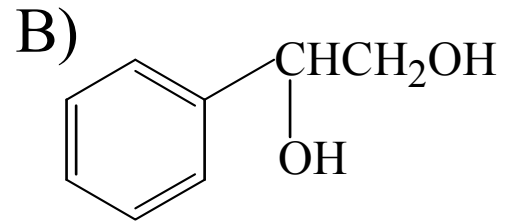
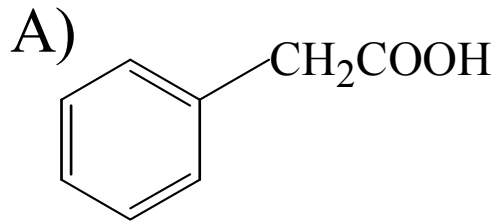
D) (1)氯化(2)硝化(3)磺化



18. 下列4个取代苯都被强烈氧化, 不能得到对苯二甲酸的是: (C)

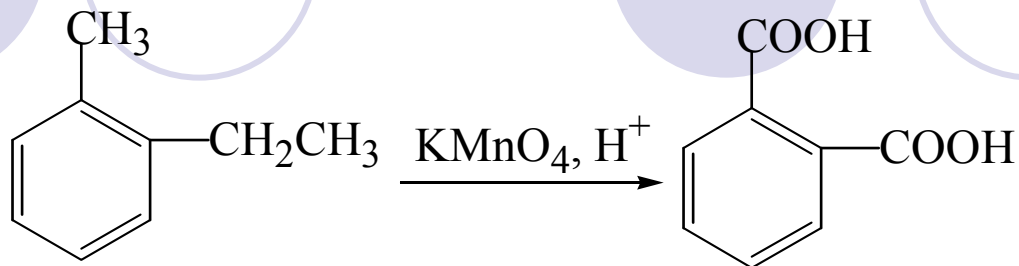


19. 苯乙烯用热 KMnO_4 氧化, 得到什么产物? (C)

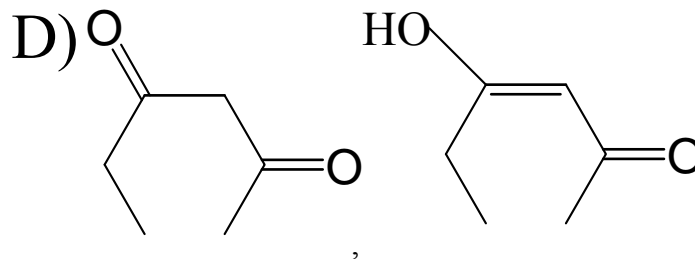
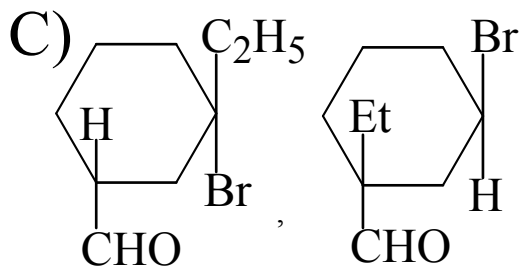
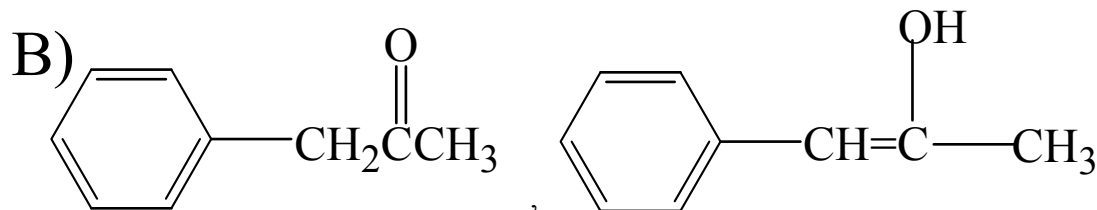
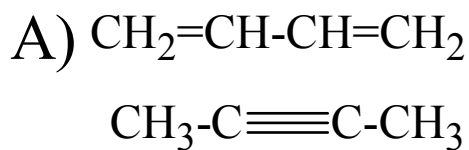


20. 邻甲乙苯在 $\text{KMnO}_4, \text{H}^+$ 作用下, 主要产物是: (B)

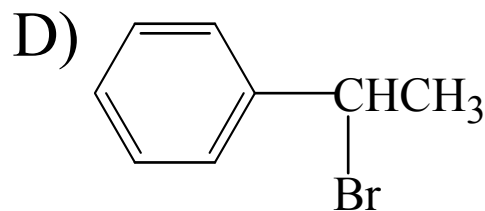
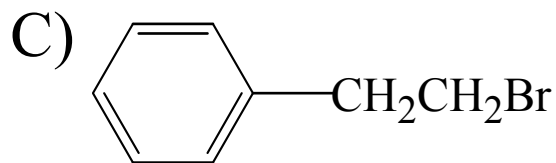
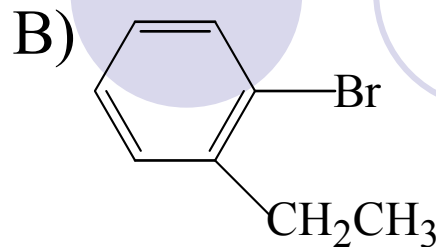
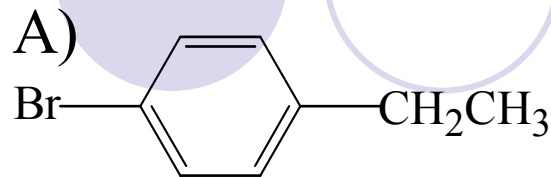
A) 邻甲基苯甲酸 B) 邻苯二甲酸 C) 邻甲基苯乙酸 D) 邻乙基苯甲酸



21. 在下列各对化合物中, 互为官能团异构体的是: (A)



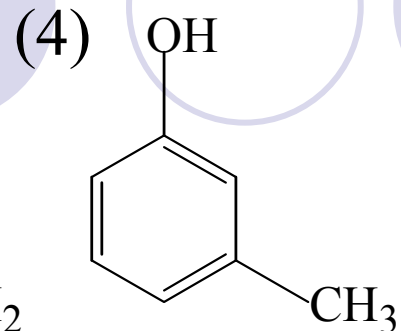
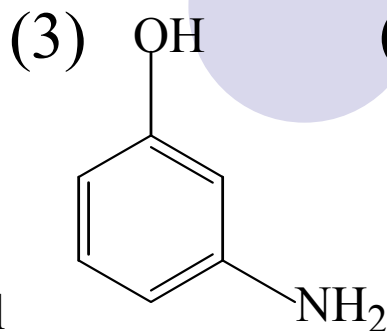
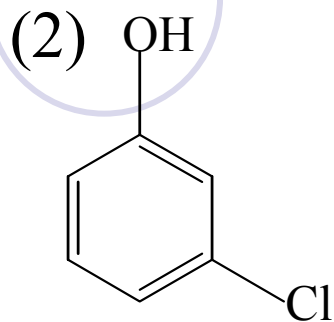
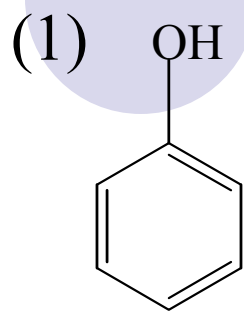
22. 乙苯在光照下,一元溴化的主要产物是: (**D**)



23. 下列4个试剂中,亲核性最强的是: (**A**)

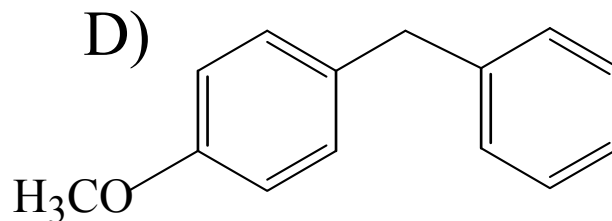
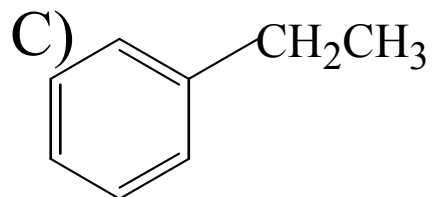
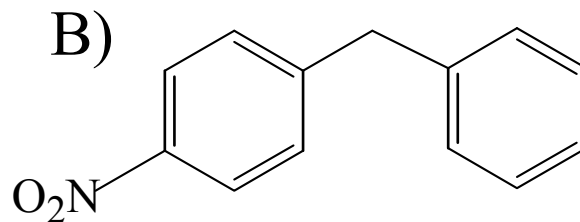
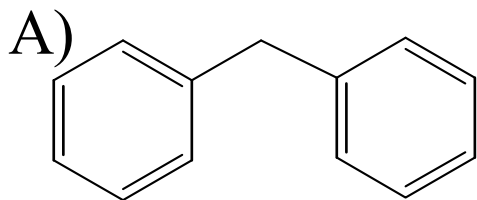
A) $p\text{-CH}_3\text{C}_6\text{H}_4\text{-O}^-$ B) $p\text{-NO}_2\text{C}_6\text{H}_4\text{-O}^-$ C) $p\text{-ClC}_6\text{H}_4\text{-O}^-$ D) $p\text{-CH}_3\text{OC}_6\text{H}_4\text{-O}^-$

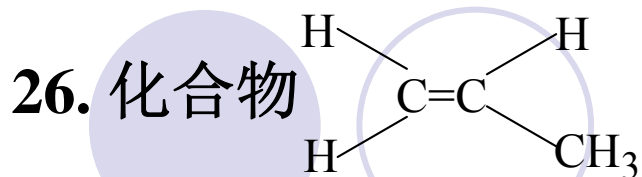
24. 排列下列各化合物的酸性顺序: (C)



- A) (1) > (4) > (2) > (3) B) (3) > (2) > (1) > (4)
C) (2) > (3) > (4) > (1) D) (4) > (1) > (2) > (3)

25. 下列化合物中酸性最强的是: (B)





在 ^1H NMR 谱图中产生几组信号? (C)

A) 2

B) 3

C) 4

D) 5

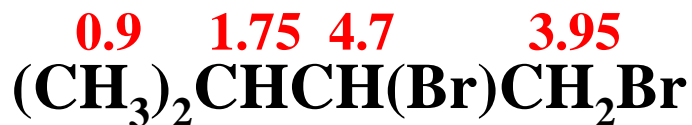
27. 下面哪一组核磁共振数据符合化合物 $(\text{CH}_3)_2\text{CHCH}(\text{Br})\text{CH}_2\text{Br}$ 的结构? (C)

A) δ (ppm): 1.0(单峰,6H),3.4(单峰,4H)

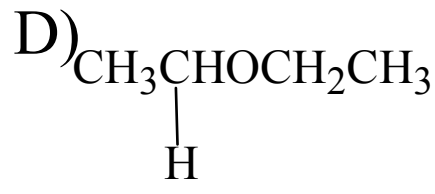
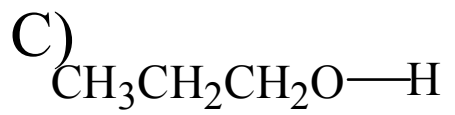
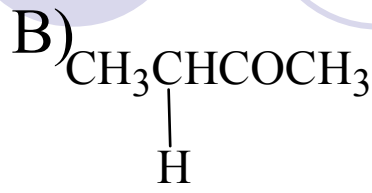
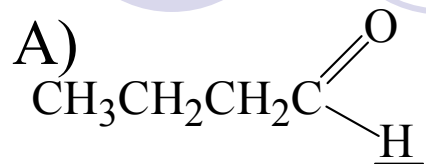
B) δ (ppm): 1.0(三重峰,6H),2.4(四重峰,4H)

C) δ (ppm): 0.9(双峰,6H),1.75(多重峰,1H),3.95(双峰,2H),
4.7(多重峰,1H)

D) δ (ppm): 0.9(双峰,6H),1.5(多重峰,1H),1.85(多重峰,2H),
5.3(三重峰,1H)



28. 下列分子式中,画有下加横线的 ^1H NMR 化学位移值最大的是: (A)



29. 在IR谱中醛酮C=O的伸缩振动应在的波数范围是: (D)

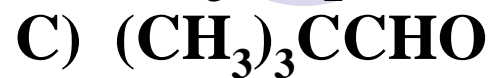
A) $1400\sim 1600\text{cm}^{-1}$

B) $1300\sim 1500\text{cm}^{-1}$

C) $1800\sim 1900\text{cm}^{-1}$

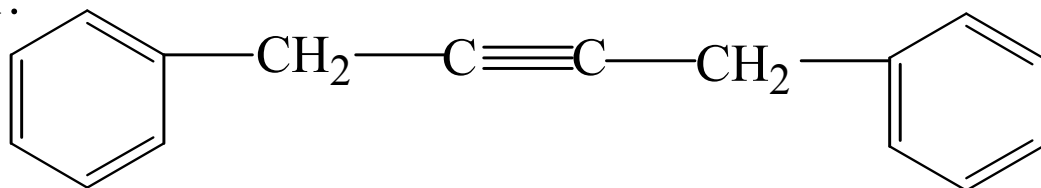
D) $1600\sim 1700\text{cm}^{-1}$

30. 有一羰基化合物, 分子式为 $C_5H_{10}O$, 1H NMR 只有2个单峰, 其结构式为: (C)



二、命名或写出结构:

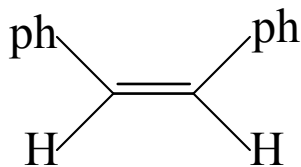
1.



1, 4-二苯基-2-丁炔

1, 4-Diphenyl-2-butyne

2.

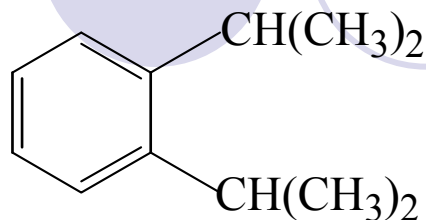


(Z)-1, 2-二苯基乙烯

(Z)-1, 2-Diphenylethene

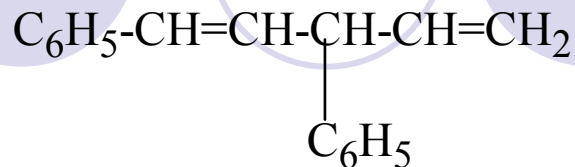
3. 邻二异丙苯

o-Diisopropylbenzene



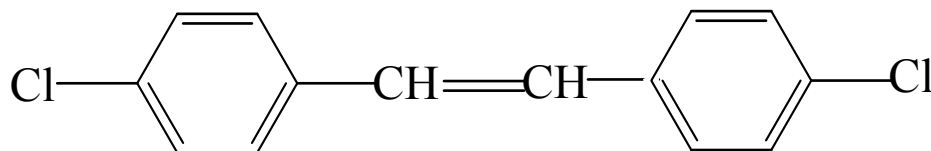
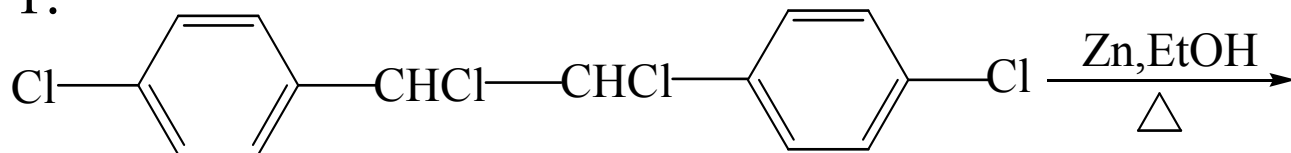
4. 1, 3-二苯基-1, 4-戊二烯

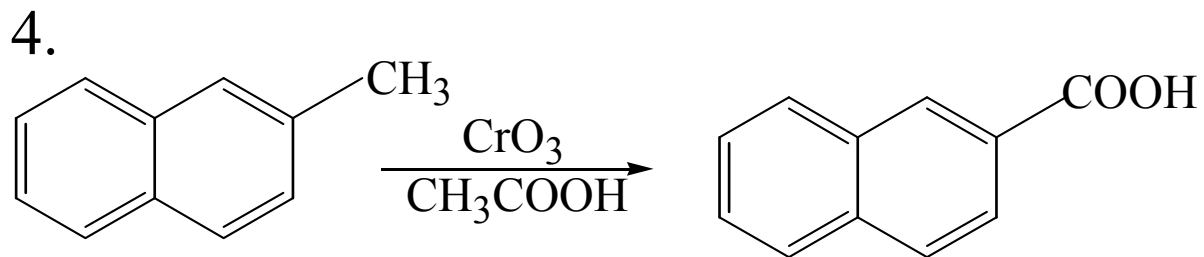
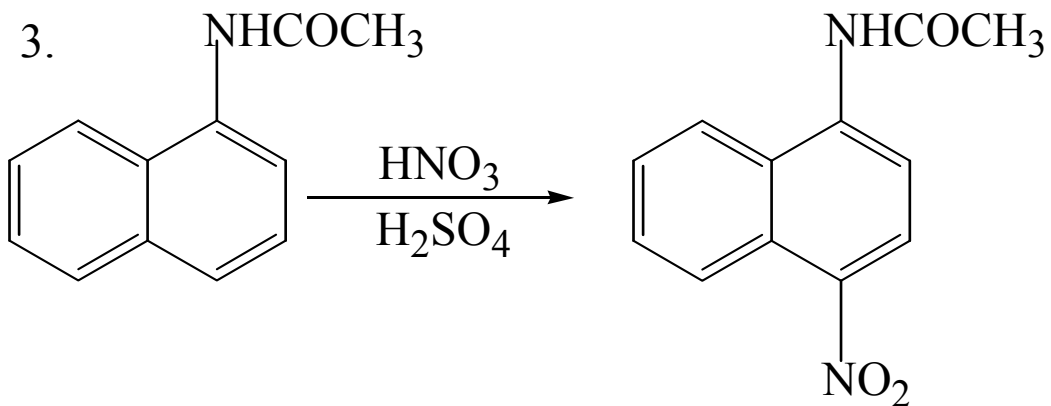
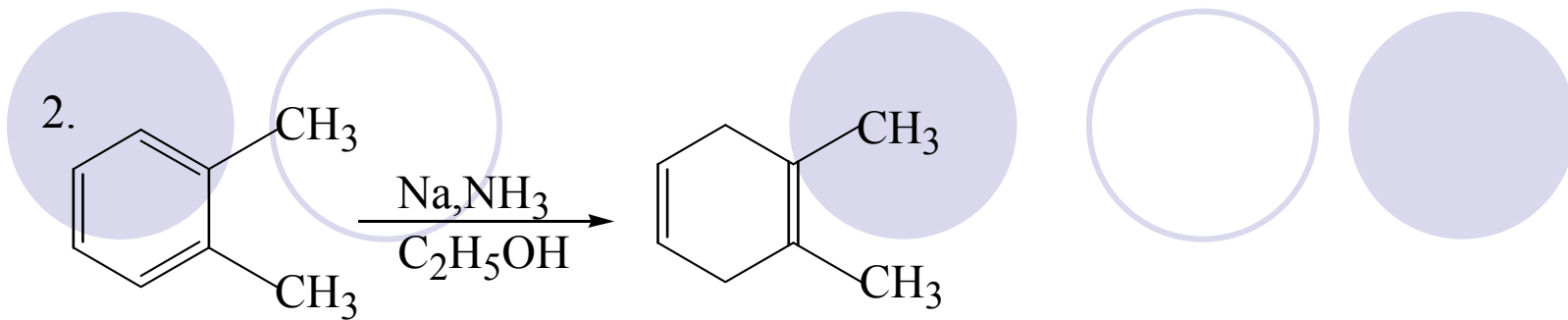
1, 3-Diphenyl-1, 4-pentadiene

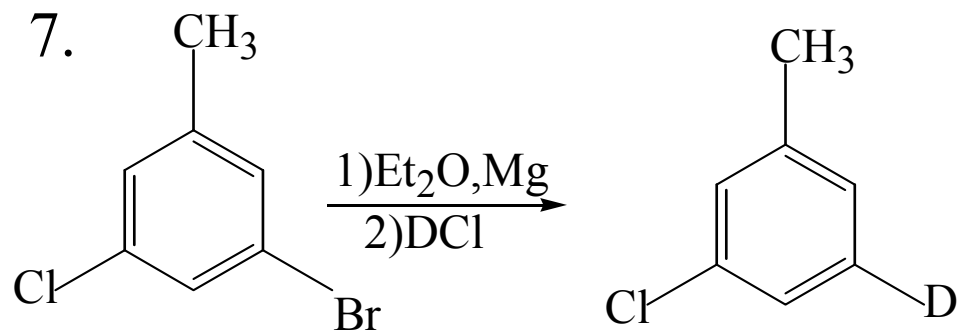
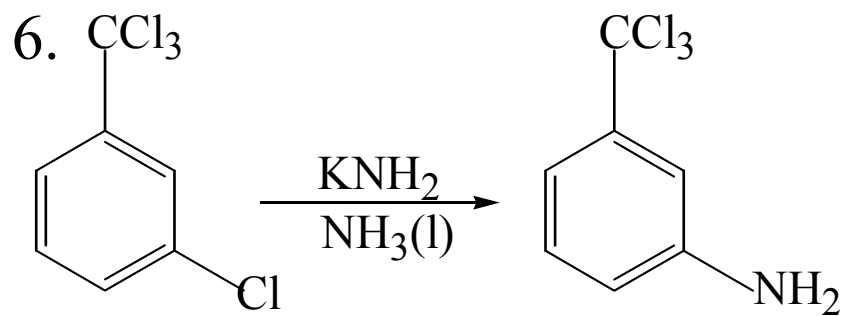
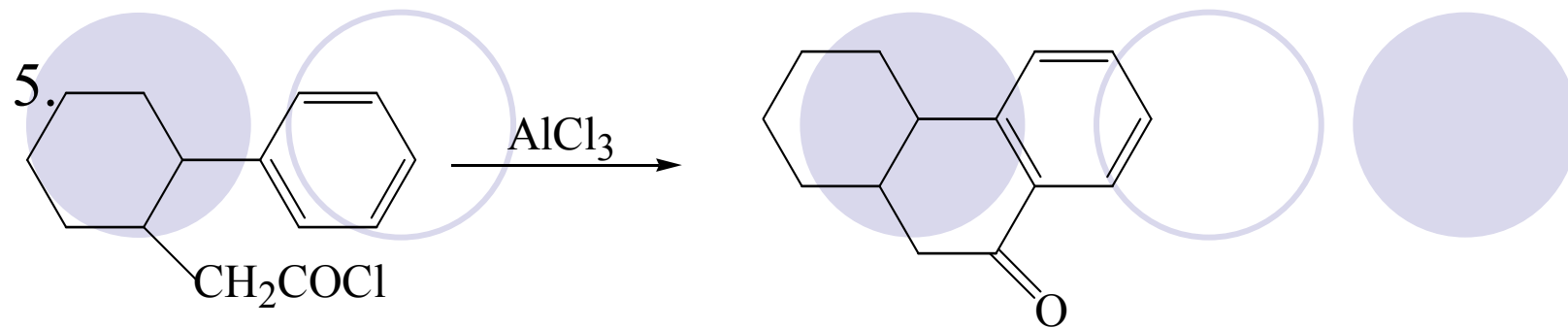


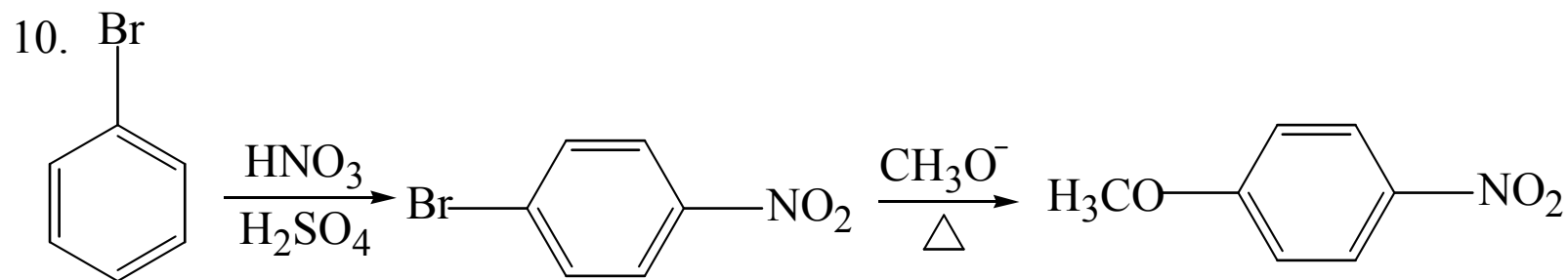
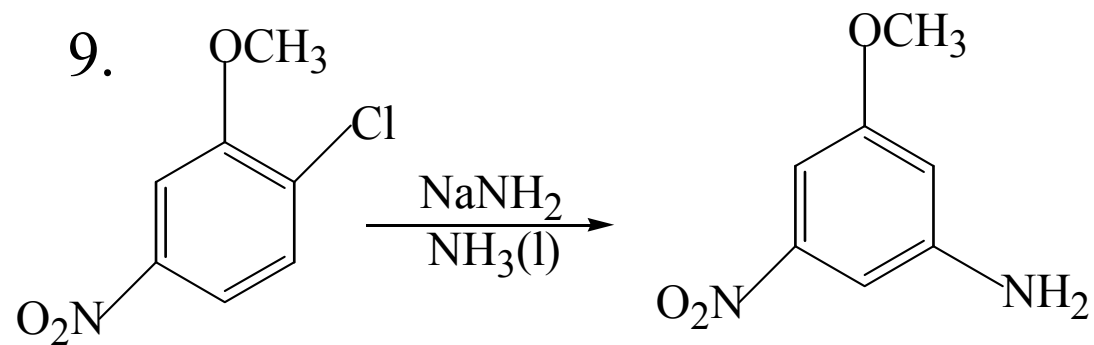
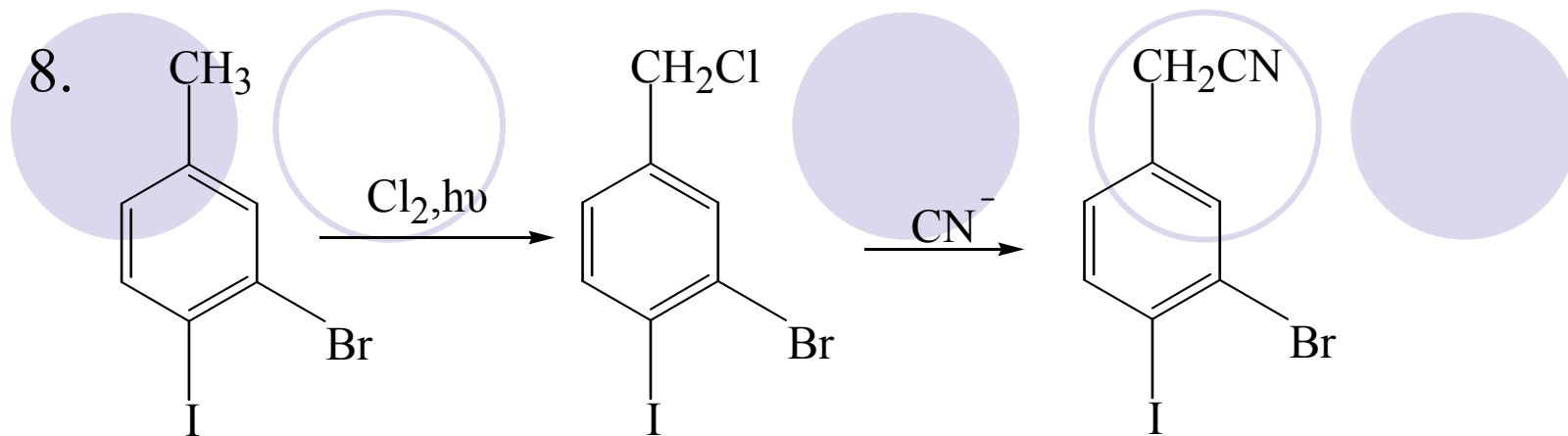
三、写出下列反应的主要有机产物, 如有立体化学问题, 请注明
(Write the structures, including stereochemistry, of the major organic products formed in the following reactions.)

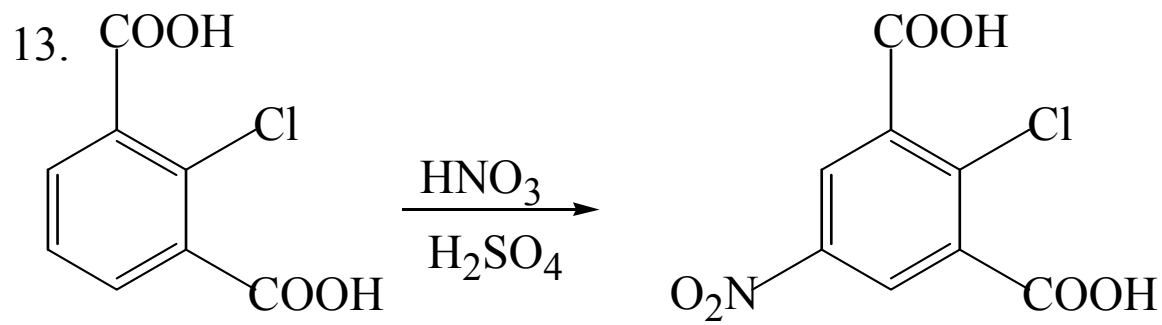
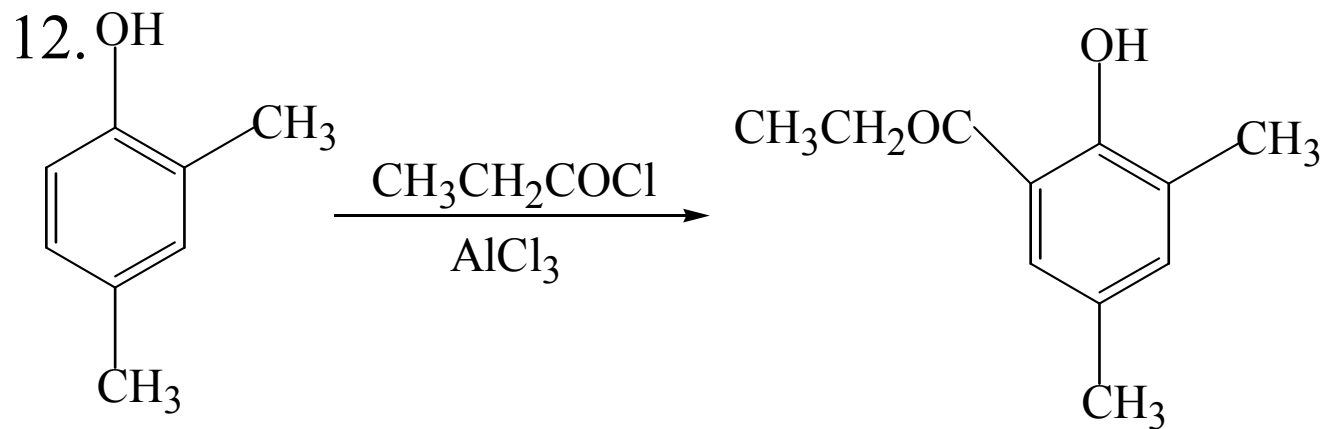
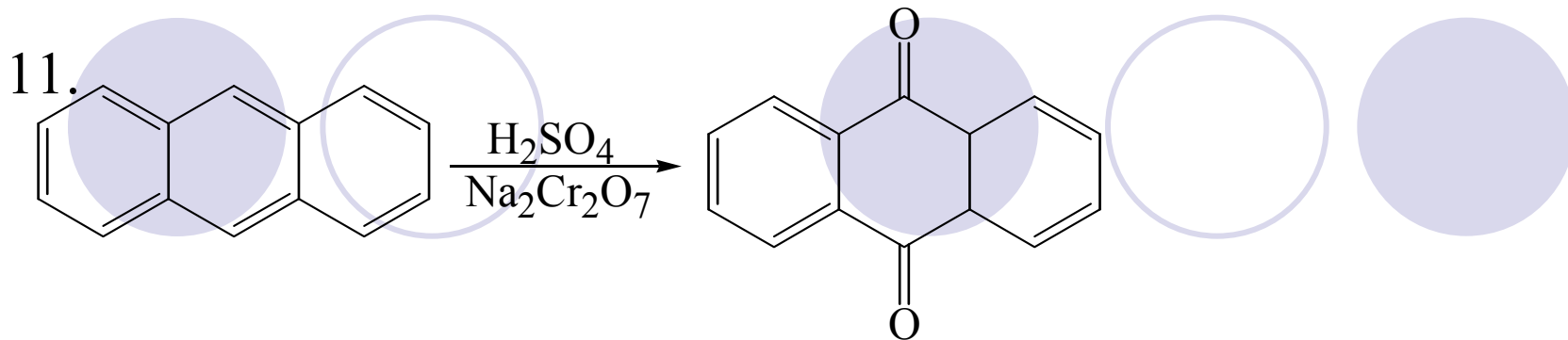
1.

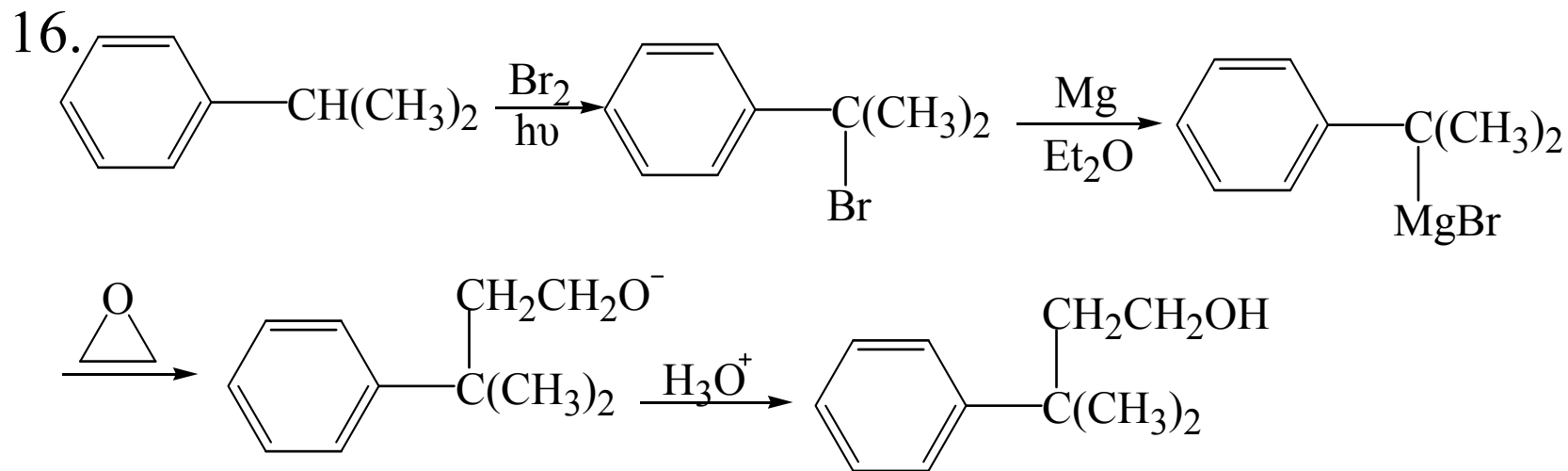
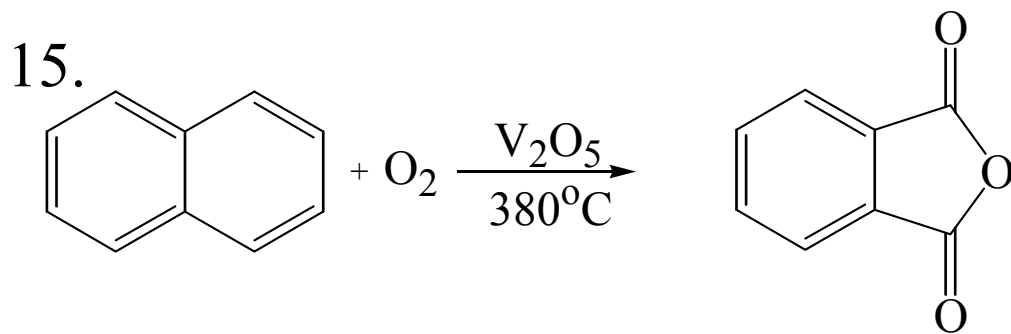
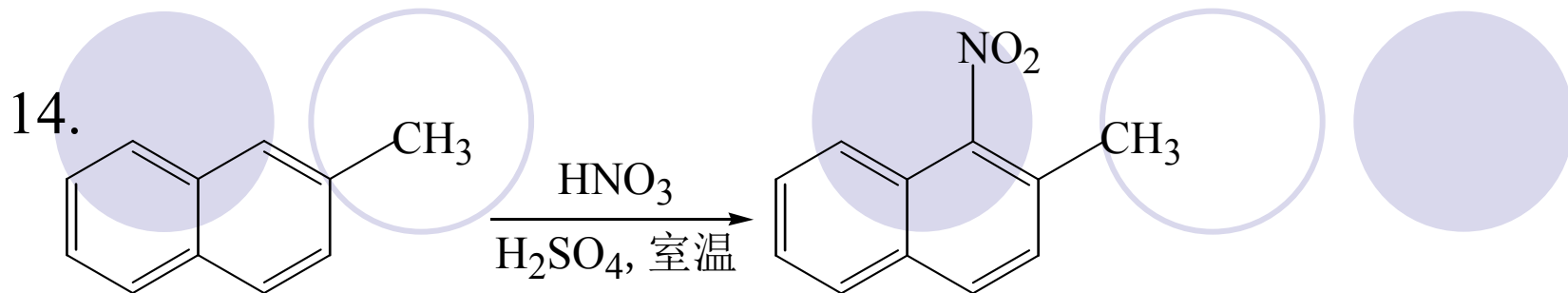






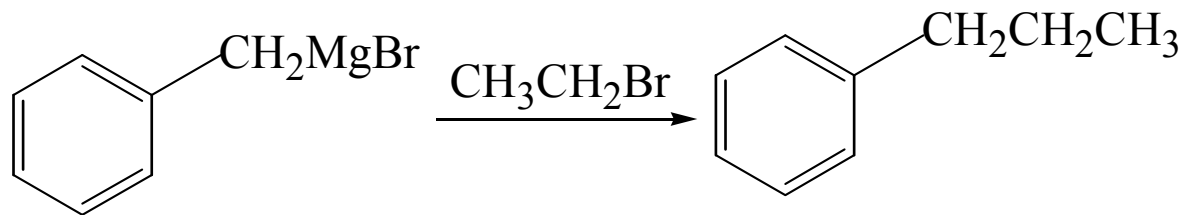
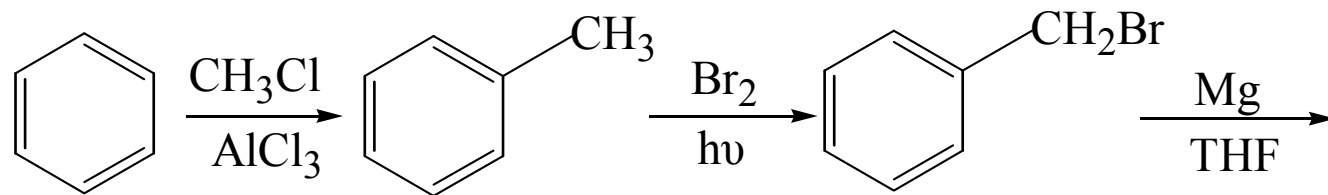




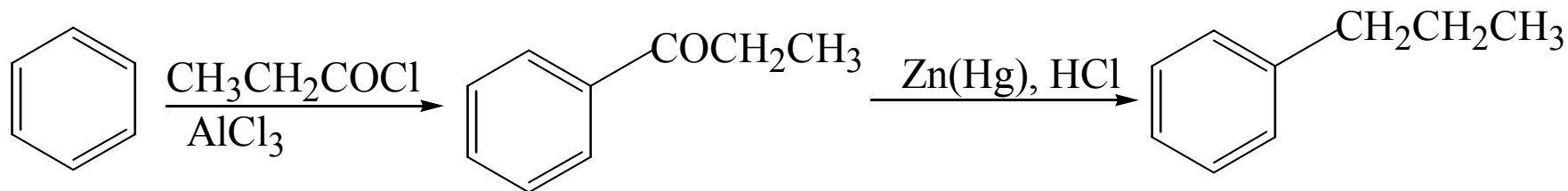
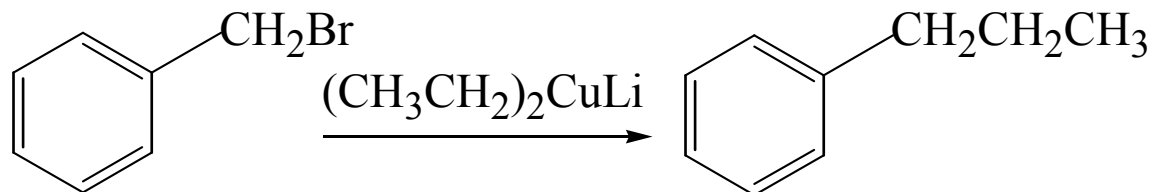


四. 合成:

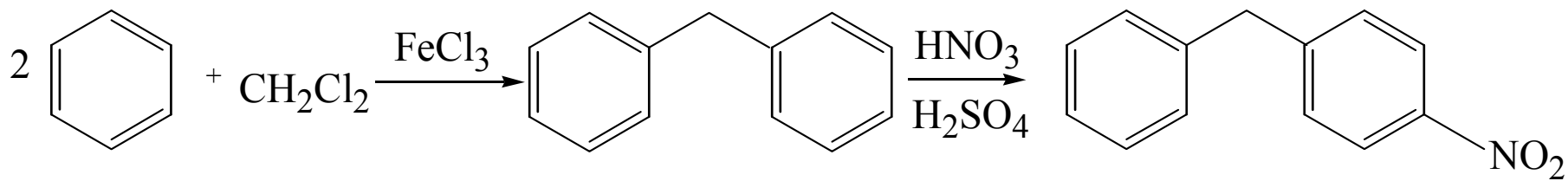
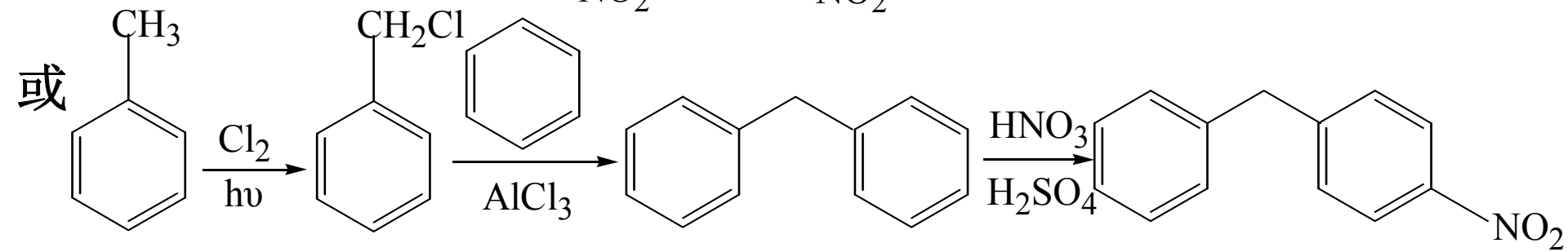
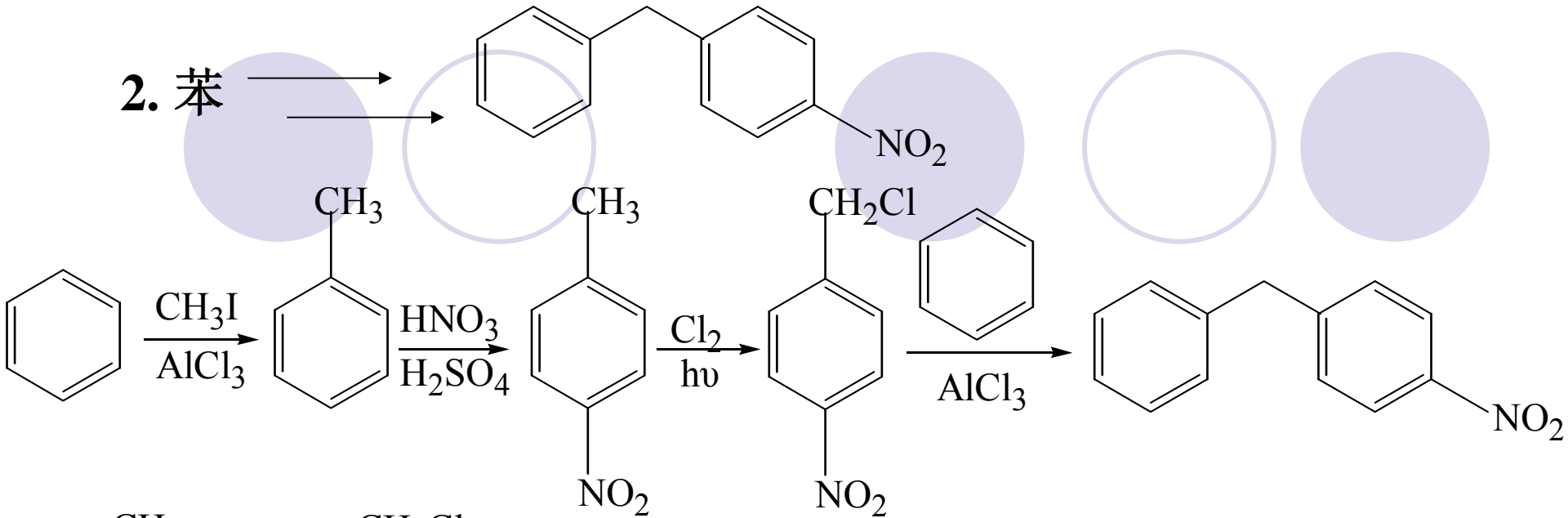
1. 苯 \longrightarrow 正丙苯



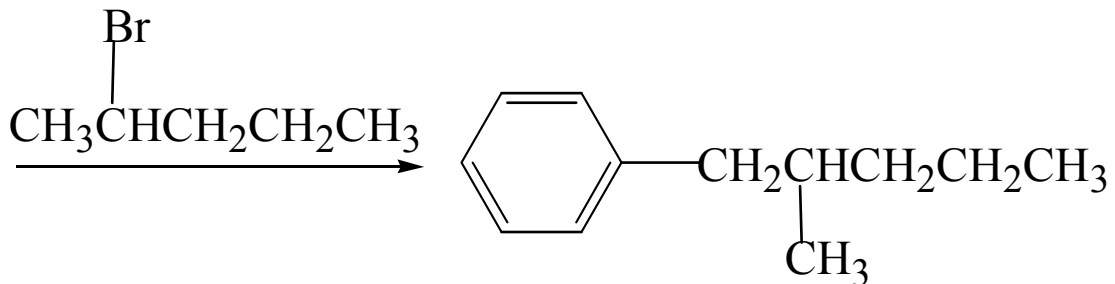
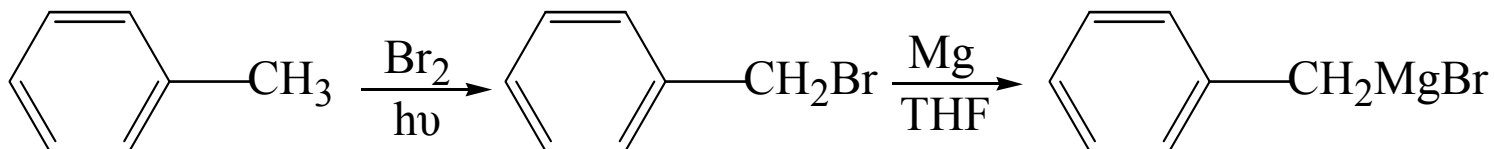
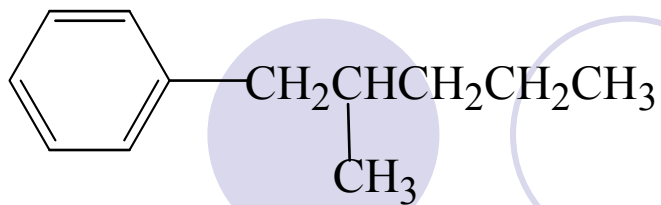
或



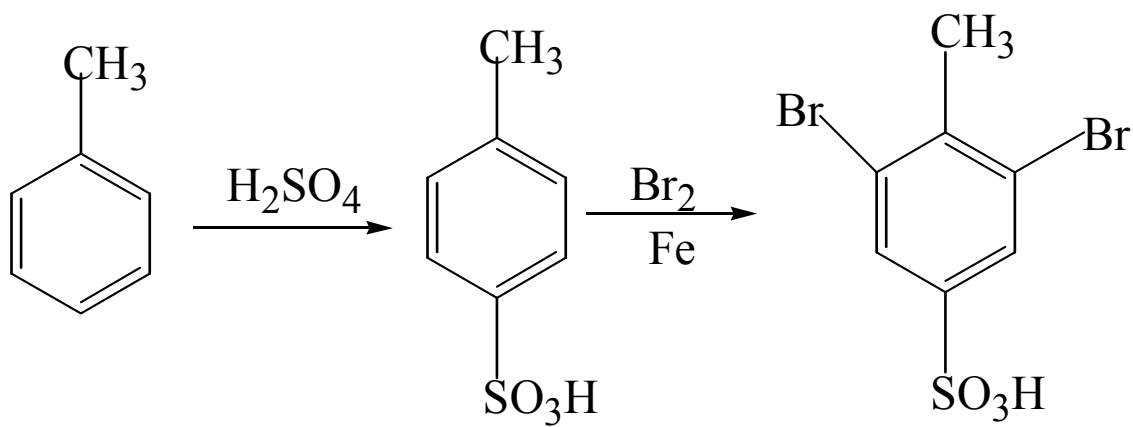
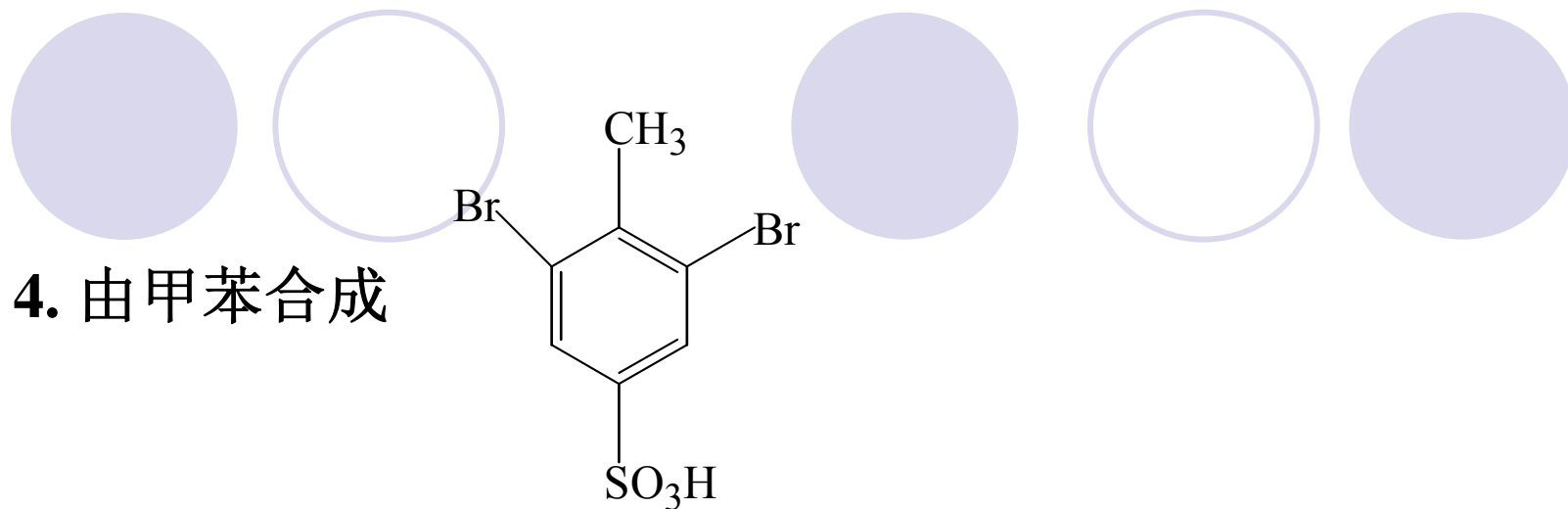
2. 苯



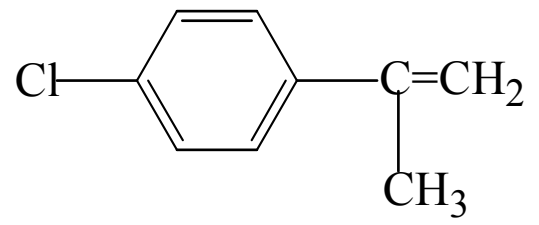
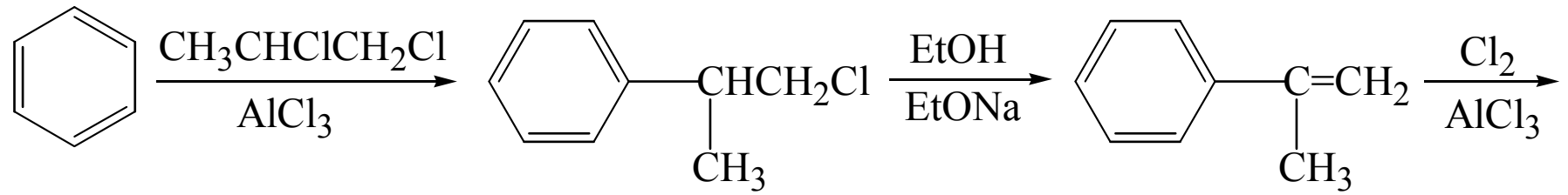
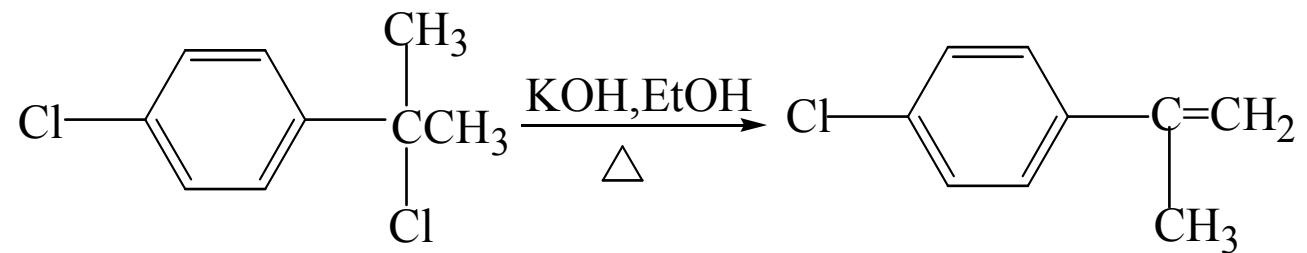
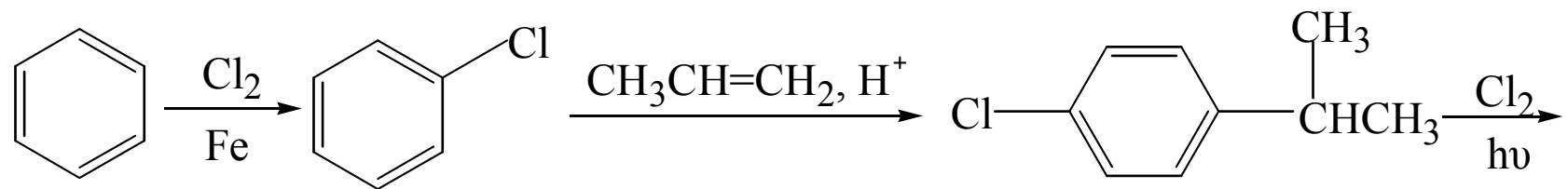
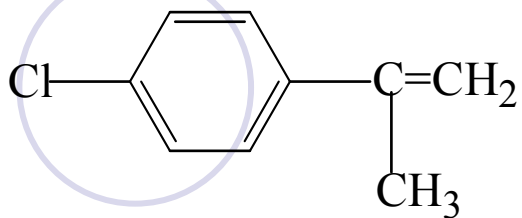
3. 用甲苯和2-溴戊烷合成



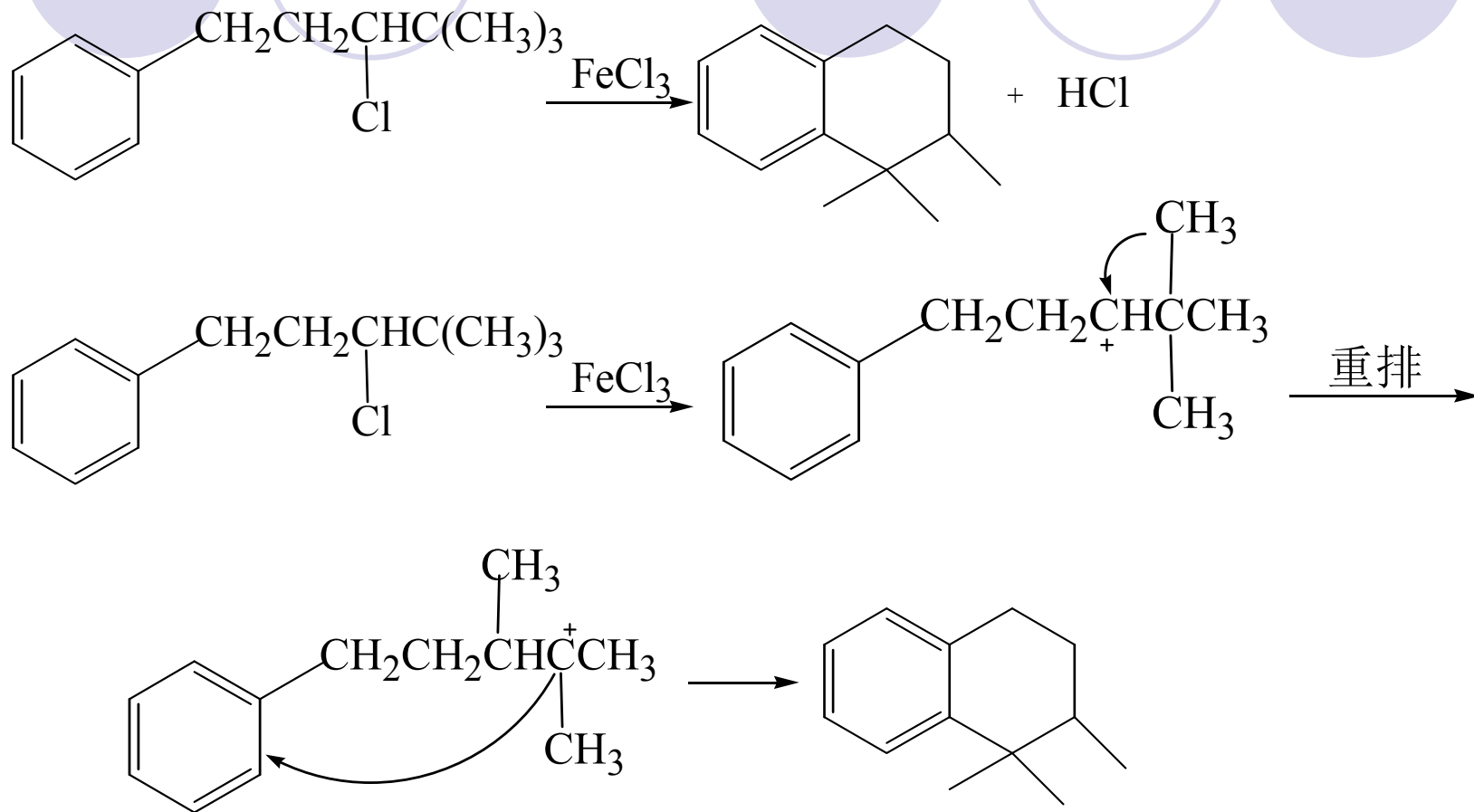
4. 由甲苯合成



5. 由苯合成



五、机理：解释反应：



六、推理结构:

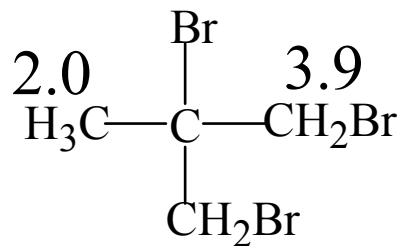
1. 有一化合物分子式为 $C_4H_7Br_3$, 其 1H NMR: δ 2.0(3H)单峰, 3.9(4H)单峰。请推测其结构, 并注明光谱归属。

分析: $C_4H_7Br_3 \Rightarrow$ 不饱和度 $= 4 - \frac{7+3}{2} + 1 = 0$

δ 2.0(3H)单峰 $\Rightarrow -CH_3$

δ 3.9(4H)单峰 $\Rightarrow 2CH_2Br$

\therefore 此化合物为:

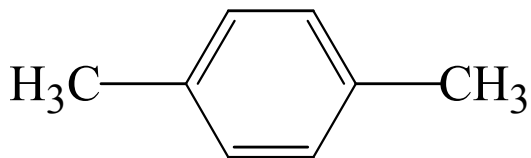


2. 化合物 C_8H_{10} 的 1H NMR谱只有2个单峰, 试推出其可能结构。

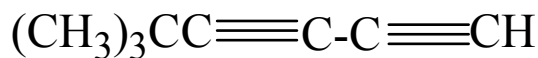
分析: $C_8H_{10} \Rightarrow$ 不饱和度 $= 8 - \frac{10}{2} + 1 = 4$

1H NMR谱只有2个单峰 \Rightarrow 化合物只有两组等价质子

\therefore 此化合物可能为:



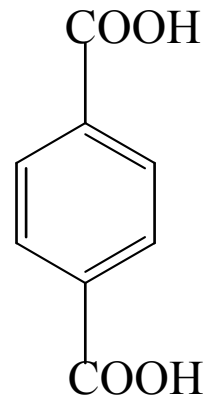
或



3. 芳烃A, 分子式 $C_{10}H_{14}$, 有5种可能的一溴取代物 $C_{10}H_{13}Br$ 。A经氧化得酸性化合物 $C_8H_6O_4$ (B)。B经一硝化只得一种硝化产物 $C_8H_5O_4NO_2$ (C)。试推出A, B, C的结构。

分析: A ($C_{10}H_{14}$) \Rightarrow 不饱和度 = 4

B ($C_8H_6O_4$) 经一硝化只得一种硝化产物 \Rightarrow B为:



A有5种可能的一溴取代物 \Rightarrow A为不对称的对位二取代苯

\therefore A, B, C的结构为:

