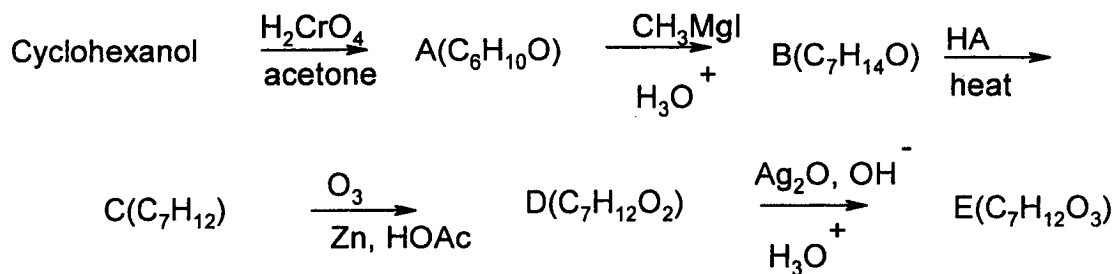
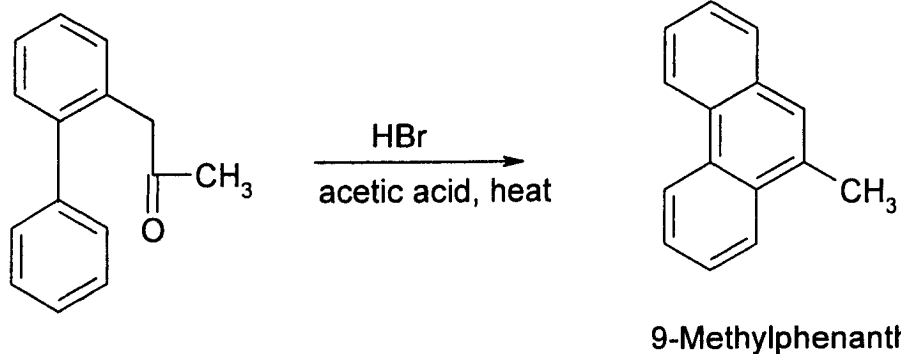


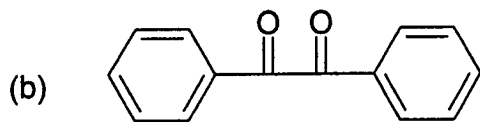
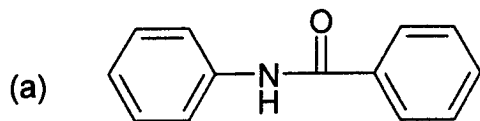
- Starting with 2-aminobenzotrifluoride, and using any other required reagents, show how you would synthesize 2,2'-bis(trifluoromethyl)-4,4'-diaminobiphenyl. (15%)
- Starting with 3,5-dimethoxybenzaldehyde and 4-methoxybenzyl alcohol, and using any other required reagents, show how you would synthesize 3,4',5-trihydroxystilbene(1-(hydroxyphenyl)-2-(3,5-dihydroxyphenyl)ethene). (20%)
- Give conformational structures for the major product formed when 1-tert-butylcyclohexene reacts with each of the following reagents. If the product would be obtained as a racemic form you should so indicate. (15%)  
(a) Br<sub>2</sub>, CCl<sub>4</sub> (b) OsO<sub>4</sub>, then aqueous NaHSO<sub>3</sub> (c) C<sub>6</sub>H<sub>5</sub>CO<sub>3</sub>H, then H<sub>3</sub>O<sup>+</sup>, H<sub>2</sub>O
- Give structures for compounds A-E. (15%)



- Give structural formulas for the products of the reaction (if one occurs) when propanal is treated with each of the following reagents: (10%)  
(a) OH<sup>-</sup>, H<sub>2</sub>O (b) C<sub>6</sub>H<sub>5</sub>CHO, OH<sup>-</sup> (c) HCN (d) NaBH<sub>4</sub> (e) Ag<sub>2</sub>O, OH<sup>-</sup>, then H<sub>3</sub>O<sup>+</sup>.
- Many polycyclic aromatic compounds have been synthesized by a cyclization reaction known as the **Bradsher reaction** or **aromatic cyclodehydration**. This method can be illustrated by the following synthesis of 9-methylphenanthrene. An arenium ion is an intermediate in this reaction, and the last step involves the dehydration of an alcohol. Propose a plausible mechanism for this example of the Bradsher reaction. (15%)

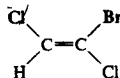
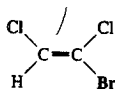


7. What product (or products) would you expect to obtain when the following compounds undergo ring bromination with  $\text{Br}_2$  and  $\text{FeBr}_3$ ? (10%)

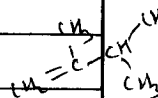
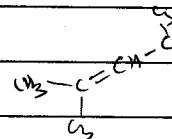
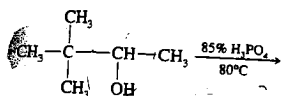


## ORGANIC CHEMISTRY TEST 5% for each

1. Using the (E)-(Z) designation give IUPAC names for each of the following:

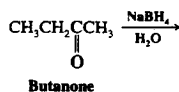
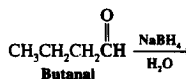
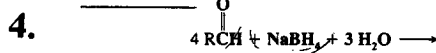


2. Some primary and secondary alcohols also undergo rearrangements of their carbon skeletons during dehydration. Write the skeletal structure of 2-methyl-2-butanol:

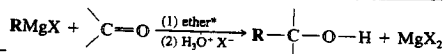


3. Starting with ethyne, outline syntheses of each of the following. You may use any other needed reagents, and you need not show the synthesis of compounds prepared in earlier parts of this problem.

(a) Propyne

 (b)  $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CD}$ 


5. **A Mechanism for the Reaction**



6. What products would you expect from the reaction of ethylmagnesium bromide ( $\text{CH}_3\text{CH}_2\text{MgBr}$ ) with each of the following reagents?

 (a)  $\text{H}_2\text{O}$ 

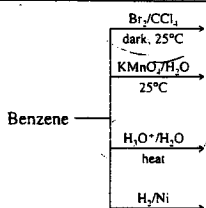
 (b)  $\text{C}_6\text{H}_5\text{COCH}_3$ , then  $\text{NH}_4\text{Cl}$ ,  $\text{H}_2\text{O}$ 

7. What organic products would you expect from each of the following reactions?

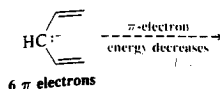
 (a) Methylolithium + 1-butyne  $\rightarrow$ 

 (b) Product of (a) + cyclohexanone, then  $\text{NH}_4\text{Cl}$ ,  $\text{H}_2\text{O}$   $\rightarrow$ 

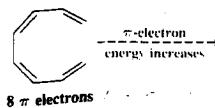
8.



9. (a) **Cyclopentadienyl Anion** Here we use a linear anion for our hypothetical transformation:



- (b) **Cyclooctatetraene** For cyclooctatetraene we consider the following hypothetical transformation:

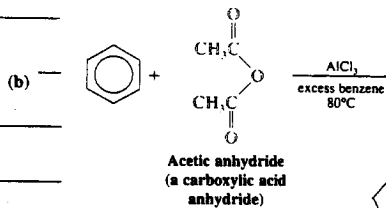
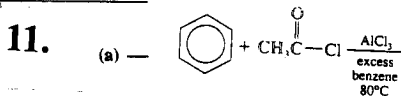


考試科目：

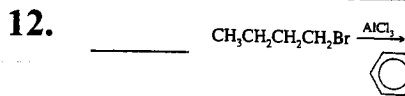
研究所  
 大學部  
 工程學院  
 系班別：

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10. Write structural formulas and give acceptable names for all representatives of the following:  
 (a) Tribromobenzenes (d) Methylbenzenesulfonic acids



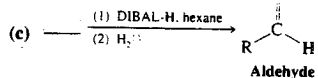
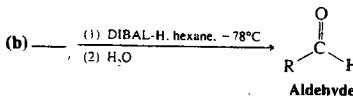
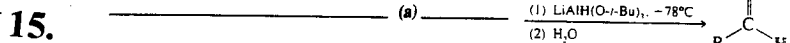
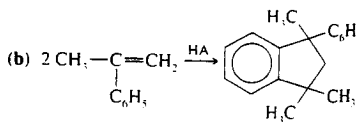
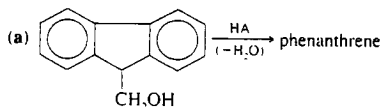
*Handwritten notes:*  
 CH<sub>3</sub> + AlCl<sub>3</sub> → AlCl<sub>4</sub><sup>-</sup> + CH<sub>3</sub><sup>+</sup>  
 Acetylphenone



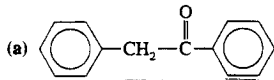
Friedel-Crafts reactions

13. Starting with benzene, outline a synthesis of each of the following:  
 (a) Isopropylbenzene (b) *m*-Dinitrobenzene

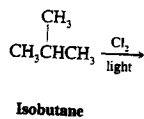
14. Write mechanisms that account for the products of the following reactions:



16. What monobromination product (or products) would you expect to obtain when the following compounds undergo ring bromination with Br<sub>2</sub> and FeBr<sub>3</sub>?



17. Chlorination of most higher alkanes



考試時間	月 (星期)	日上午 下午第 ( )晚間	節	份數	任課 教師
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國立臺灣科技大學

學年度第 學期 考試命題用紙

第 3 頁共 3 頁

考試科目：

研究所  
 大學部  
 工程在職進修

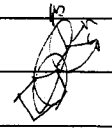
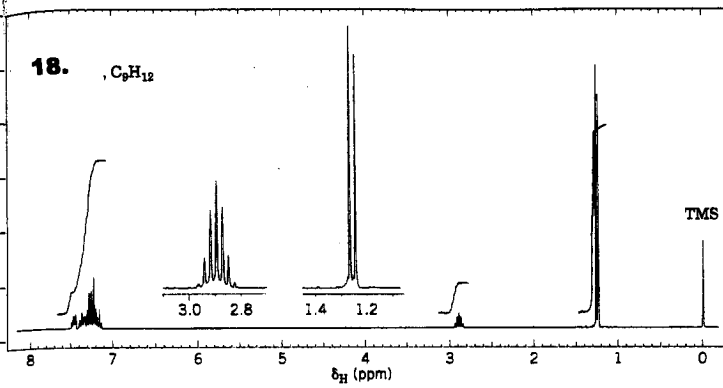
系班別：

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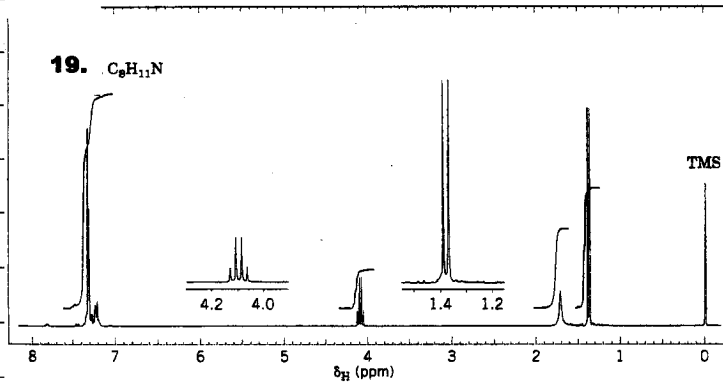
ASSIGN STRUCTURES to each of the COMPOUNDS 18, 19 and 20. (H-NMR SPECTRA ARE SHOWN)

*C<sub>9</sub>H<sub>12</sub> + 2*  
*C<sub>9</sub>H<sub>19</sub> + 2*  
*C<sub>9</sub>H<sub>20</sub>*  
*C<sub>9</sub>H<sub>10</sub>*  
*10/2/15*

18.



19.



20.

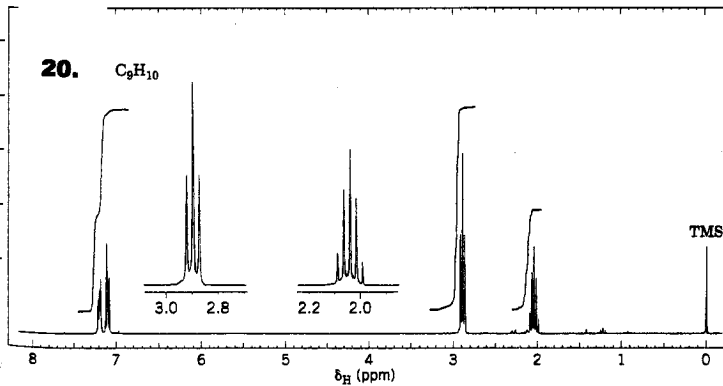


FIGURE The 300-MHz  $^1H$  NMR spectra