

# 大同大學 97 學年度轉學入學考試試題

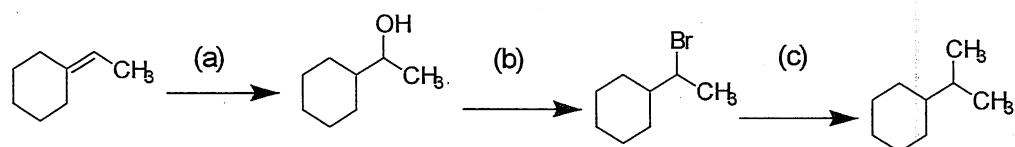
考試科目:有機化學

所別:化學工程學系

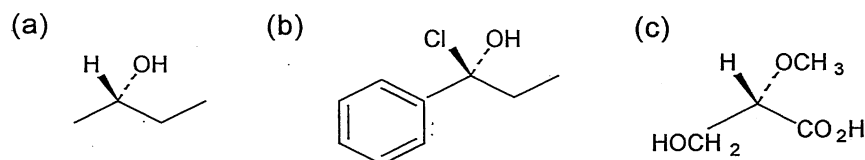
第 1/2 頁

註:本次考試 不可以參考自己的書籍及筆記; 不可以使用字典; 不可以使用計算器。

1. Identify the reagents a-c in the following scheme: (8%)



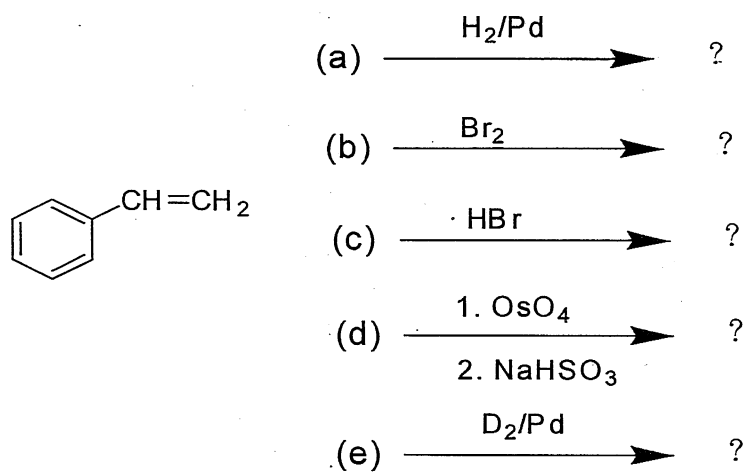
2. Assign R or S configurations to the chirality centers in the following molecules: (6%)



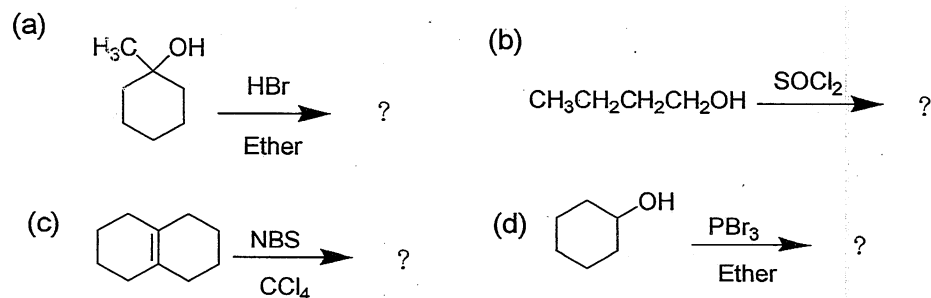
3. Order each of the following sets of compounds with respect to  $S_N2$  reactivity. (4%)

- (a).  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_3$ ,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OTs}$ ,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ .  
 (b).  $(\text{CH}_3)_2\text{CHCH}_2\text{Br}$ ,  $(\text{CH}_3)_3\text{CCH}_2\text{Br}$ ,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ .

4. Predict the products of the following reactions (the aromatic ring is unreactive in all cases). Indicate regiochemistry when relevant. (10%)



5. Predict the product(s) of the following reactions: (8%)



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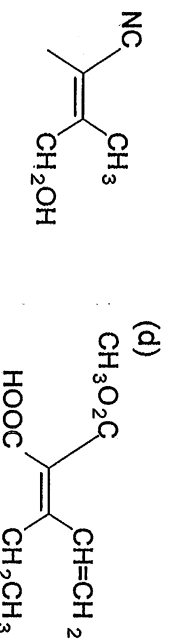
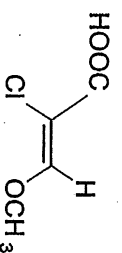
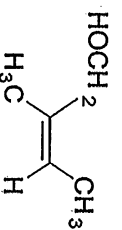
考試科目：有機化學

〈承接前科〉：化學工程學系

第 2 頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

6. Assign E or Z configuration to each of the following alkenes: (8%)



7. Predict the products from reaction of 1-hexyne with the following reagents: (12%)

- (a) 1equiv HBr (b) 1 equiv Cl<sub>2</sub> (c) H<sub>2</sub>, Lindlar catalyst  
 (d) NaNH<sub>2</sub> in NH<sub>3</sub>, then CH<sub>3</sub>Br (e) H<sub>2</sub>O, H<sub>2</sub>SO<sub>4</sub>, HgSO<sub>4</sub> (f) 2 equiv HCl

8. Which reaction in each of the following pairs would you expect to be faster. (8%)

- (a). The S<sub>N</sub>2 displacement by I<sup>-</sup> on CH<sub>3</sub>Cl or on CH<sub>3</sub>OTos  
 (b). The S<sub>N</sub>2 displacement by I<sup>-</sup> on CH<sub>3</sub>CO<sub>2</sub><sup>-</sup> on bromoethane or on bromocyclohexane  
 (c). The S<sub>N</sub>2 displacement on 2-bromopropane by CH<sub>3</sub>CH<sub>2</sub>O<sup>-</sup> or by CN<sup>-</sup>  
 (d). The S<sub>N</sub>2 displacement by HC≡C<sup>-</sup> on bromomethane in benzene or in hexamethylphosphoramide

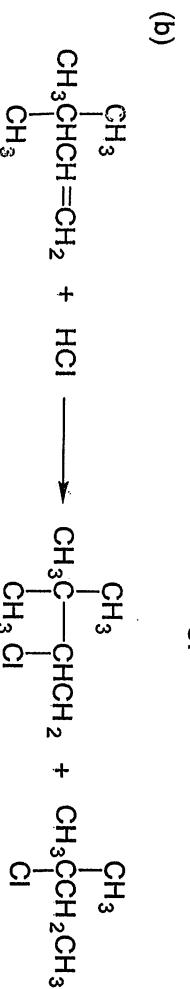
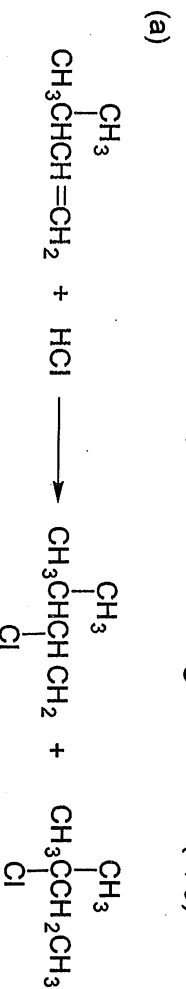
9. What products would you expect from the reaction of 1-bromopropane with each of the following reagents. (12%)

- (a) NaNH<sub>2</sub> (b) KOOC(CH<sub>3</sub>)<sub>3</sub> (c) NaI (d) NaCN (e) NaC≡CN (f) Mg, then H<sub>2</sub>O

10. Which reaction in each of the following pairs is more nucleophilic. (6%)

- (a) <sup>-</sup>NH<sub>2</sub> or NH<sub>3</sub> (b) H<sub>2</sub>O or CH<sub>3</sub>CO<sub>2</sub><sup>-</sup> (c) NaCN or HCN

11. Write the detailed steps (mechanism) for the following reactions. (8%)



12. Predict the products for the nitration (HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>) of the following compounds. (10%)

