

# 大同大學 104 學年度研究所碩士班入學考試試題

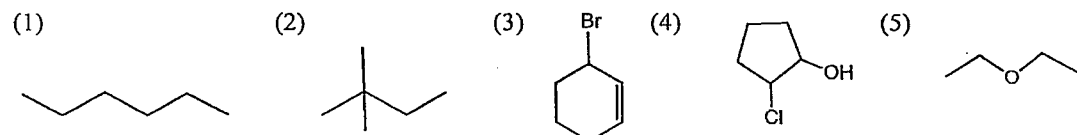
考試科目:有機化學

所別:化學工程研究所(乙組)

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。

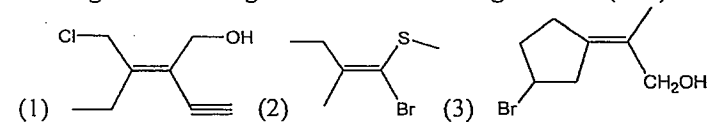
## 1. Nomenclature (10%)



## 2. Draw the following molecular structures. (10%)

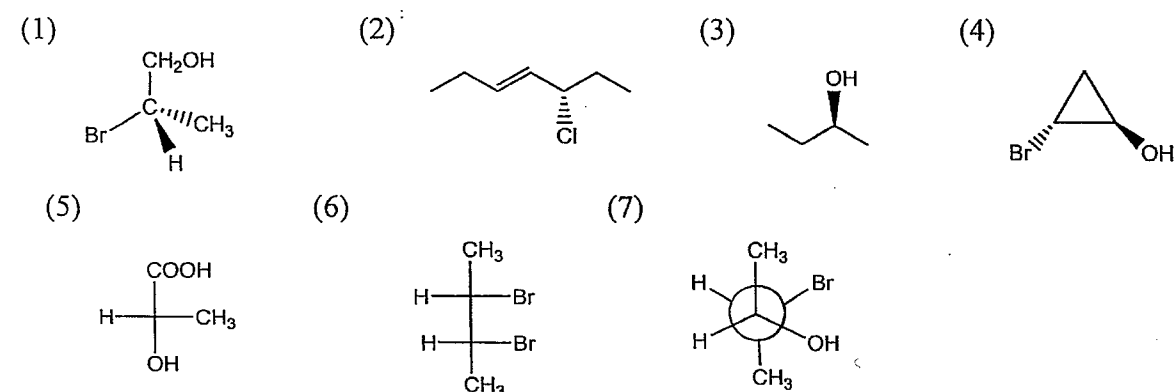
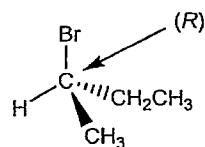
- (1) 2-propanol (2) 2,5-dimethylheptane (3) phenol (4) 6-*sec*-butyl-4-ethyldecane (5) (Z)-6-bromo-4-ethyl-3-methyloct-3-ene

## 3. Assign E or Z configuration to the following alkenes. (6 %)



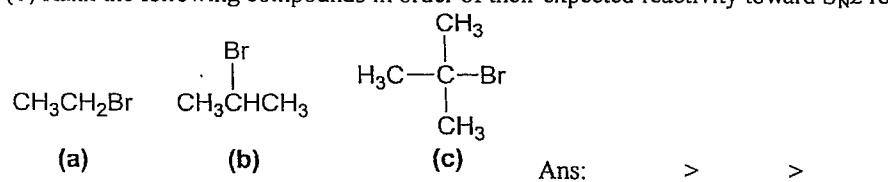
## 4. Indicate whether each of the following structures has the R or the S configuration: (10%)

For example :

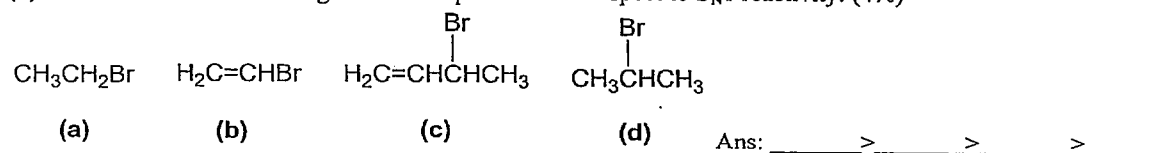


## 5.

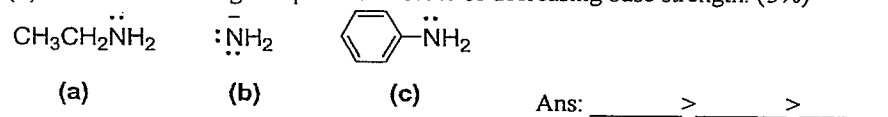
- (1) Rank the following compounds in order of their expected reactivity toward  $S_N2$  reaction: (3%)



- (2) Order each of the following sets of compounds with respect to  $S_N1$  reactivity: (4%)



- (3) Rank the following compounds in order of decreasing base strength. (3%)



〈背面尚有試題〉

# 大同大學 104 學年度研究所碩士班入學考試試題

考試科目：有機化學

所別：化學工程研究所(乙組)

第 2/2 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. Give the major products or reagents of each of the following reactions: (24%)

(1)   $\xrightarrow[t\text{-BuOH}]{t\text{-BuOK}}$  major product

(a)

$S_N1, S_N2, E1$  or  $E2$  : (b)

(2)   $\xrightarrow[t\text{-BuOH}]{t\text{-BuOK}}$  (c)

$S_N1, S_N2, E1$  or  $E2$  : (d)

(3)   $\xrightarrow{\text{CH}_3\text{OH}}$  major product


(e)

$E1$  or  $E2$  : (f)

(4)   $\xrightarrow{\text{CH}_3\text{ONa}}$  major product

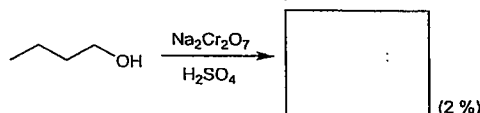
(g)

$S_N1$  or  $S_N2$  : (h)

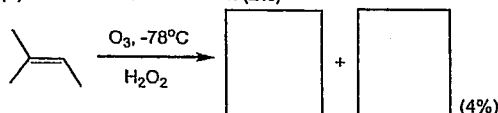
(5)  +  $\text{H}_3\text{C-COCl} \xrightarrow[2. \text{H}_2\text{O}]{1. \text{AlCl}_3}$  (i)  $\xrightarrow[\text{OH}^-]{\text{H}_2\text{NNH}_2}$  (j)  $\xrightarrow[\text{hv}]{\text{NBS, ROOR}}$  (k)  $\xrightarrow[t\text{-BuOH}]{t\text{-BuOK}}$  (l)

7. Give the products of the following reactions. Indicate whether each reaction is an oxidation or a reduction: (18%)

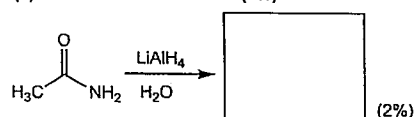
(1) oxidation or reduction (2%)



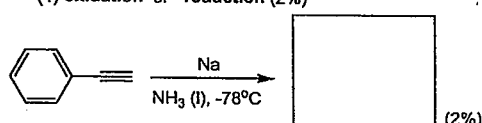
(2) oxidation or reduction (2%)



(3) oxidation or reduction (2%)



(4) oxidation or reduction (2%)



8. Please translation and explain the following essay. (12%)

## Blood Alcohol Content

As blood passes through the arteries in our lungs, an equilibrium is established between the alcohol in our blood and the alcohol in our breath. Therefore, if the concentration of one is known, then the concentration of the other can be estimated.

The test that law enforcement agencies use to approximate a person's blood alcohol level is based on the oxidation of breath ethanol. An oxidizing agent impregnated onto an inert material is enclosed within a sealed glass tube. When the test is to be administered, the ends of the tube are broken off and replaced with a mouthpiece at one end and a balloon-type bag at the other. The person being tested blows into the mouthpiece until the bag is filled with air. Any breath ethanol is oxidized as it passes through the column. When ethanol is oxidized, the oxidizing agent is reduced to green chromic ion. The greater the concentration of breath alcohol, the farther the green color spreads through the tube.

