

# 大同大學 104 學年度(暑)轉學入學考試試題

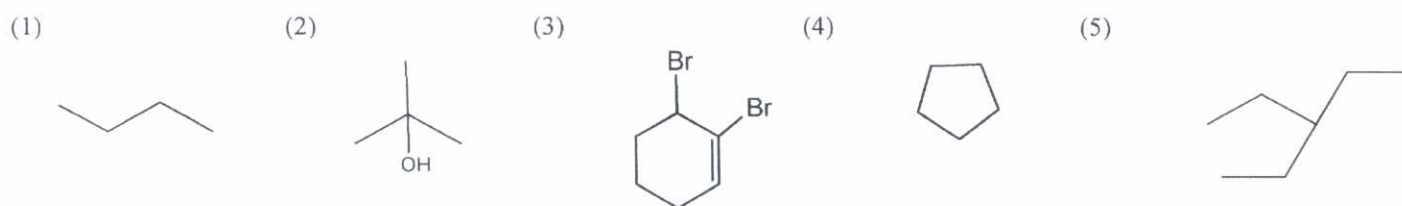
考試科目:有機化學

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。

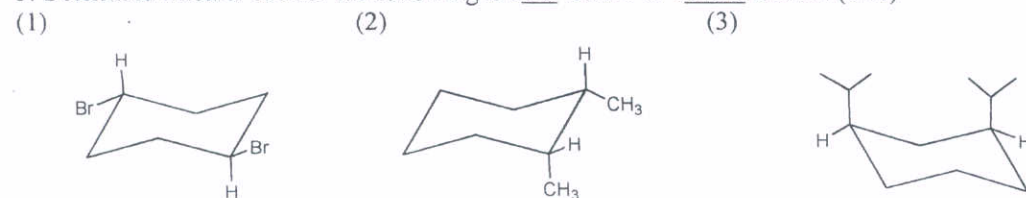
## 1. Nomenclature (10%)



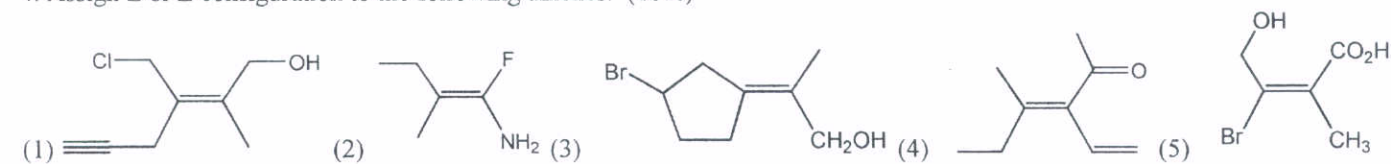
## 2. Draw the following molecular structures. (10%)

- (1) *tert*-butyl chloride (2) 2,2,5-trimethyloctane (3) benzene (4) 2-methylhexane  
 (5) (*E*)-6-chloro-4-ethyl-3-methyloct-3-ene

## 3. Determine whether each of the following is a *cis* isomer or a *trans* isomer: (6 %)

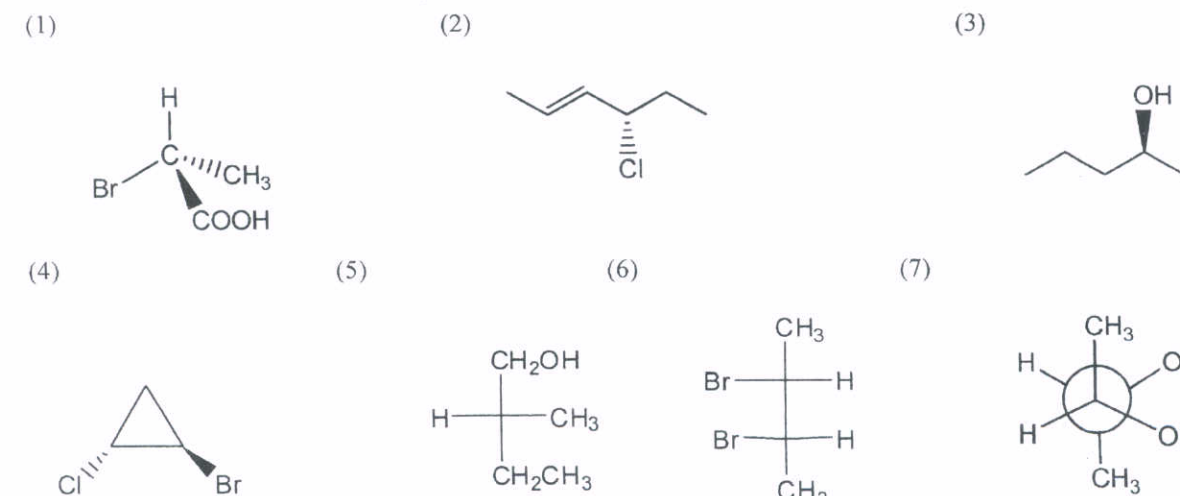
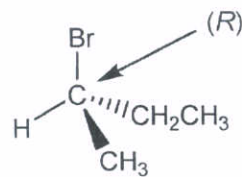


## 4. Assign E or Z configuration to the following alkenes. (10%)



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

For example :



<背面尚有試題>

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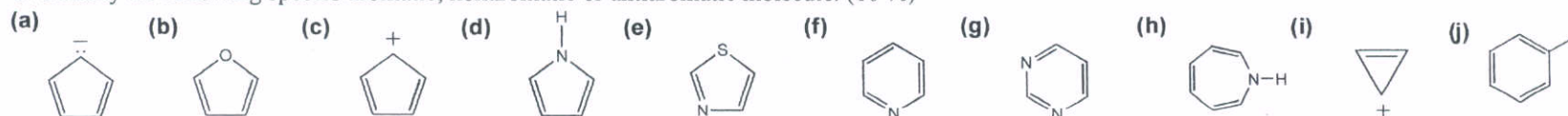
考試科目：有機化學

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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。

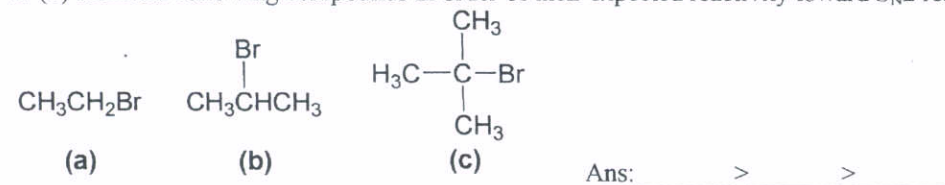
6. Classify the following species aromatic, nonaromatic or antiaromatic molecule. (10%)



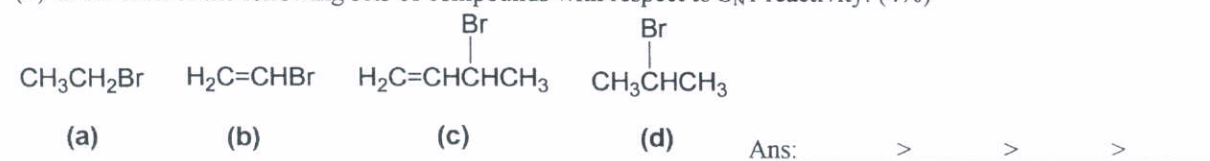
Aromatic: \_\_\_\_\_  
 Nonaromatic: \_\_\_\_\_  
 Antiaromatic: \_\_\_\_\_

7. Please draw the Newman projection of its **the most stable** and **the least stable** conformers for rotation about the C-3 —C-4 bond of 2,5-dimethylhexane. (8%)

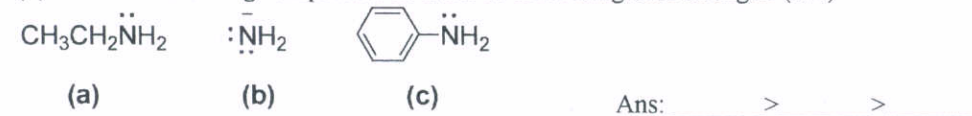
8. (1) Rank the following compounds in order of their expected reactivity toward  $S_N2$  reaction: (3%)



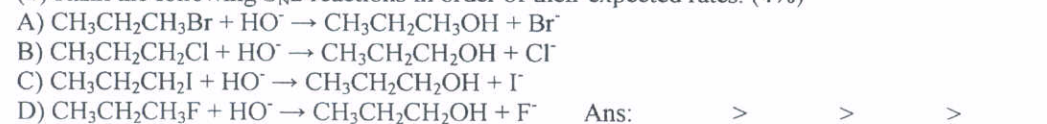
(2) Order each of the following sets of compounds with respect to  $S_N1$  reactivity: (4%)



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



(4) Rank the following  $S_N2$  reactions in order of their expected rates. (4%)



9. Indicate whether each of the following solvents is protic or aprotic: (10%)

a. dichloromethane b. diethyl ether c. acetic acid d. hexane e. THF f. DMSO  
 g. DMF h. ethanol i. benzene j. acetone

Protic solvents: \_\_\_\_\_ Aprotic solvents: \_\_\_\_\_

10. 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.

