

系所組別： 化學工程學系乙組

考試科目： 有機化學

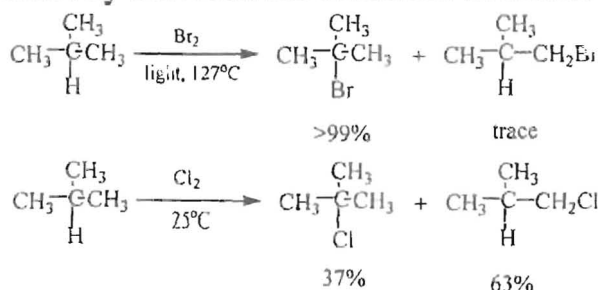
考試日期： 0219， 節次： 1

※ 考生請注意：本試題 可 不可 使用計算機

1. Give examples to explain the following facts: (a) Many but not all molecules that contain a chiral center are chiral; (b) Many but not all chiral molecules contain a chiral center. (10%)
2. Suppose that the products from (S)-sec-butyl chloride show an S,S:meso ratio of 25:75. What would we get from chlorination of racemic sec-butyl chloride? (10%)
3. Draw the 2-D and 3-D structures of (2S,3R)-2,3-dichloro-2-fluoro-3-isopropyl pentane, and specify its configuration. (10%)



4. (a) When *cis*-1-bromo-2-methylcyclohexane undergoes an E2 reaction, two products (cycloalkenes) are formed. What are these two cycloalkenes, and which would you expect to be the major product? Write conformational structures showing how each is formed. (b) When *trans*-1-bromo-2-methylcyclohexane reacts in an E2 reaction, only one cycloalkene is formed. What is this product? Write conformational structures showing why it is the only product. (10%)
5. Compare the following reactions and describe the difference of the selectivity between the reactions in detail. (10%)



(背面仍有題目,請繼續作答)

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6. Write all possible products of following dibromination. Point out chiral, achiral, and enantiomers. (10%)



7. Write the three dimensional structures for and give names using (R)--(S) and (E)-(Z) designations for the isomers of 2,4-dichloro-2-pentene. (10%)
8. Glycine is an amino acid that can be obtained from most proteins. In solution, glycine exists in equilibrium between two forms:

$$\text{H}_2\text{NCH}_2\text{COOH} \leftrightarrow \text{H}_3\text{N}^+\text{CH}_2\text{CO}_2^-$$
 (a) Which form is favored at equilibrium? (b) A handbook gives the melting point of glycine as 262°C . Which of the structures given above best represents glycine? Why? (10%)
9. Give examples to describe the following items in detail. (a) si-face; (b) pro-S; (c) e.e.%; (d) formal charge; (e) oxidation state. (10%)
10. Following is a COSY spectrum of 2-chloro-butane. Assign the peaks for each proton and describe their interaction in detail. What information can you get from this spectrum? (10%)

