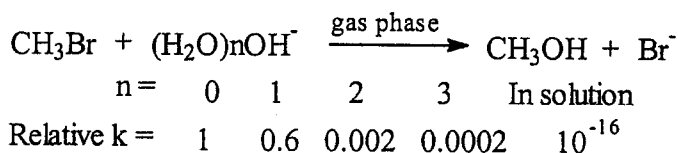本試題是否可以使用計算機： □可使用 ， ☑不可使用 （請命題老師勾選）

1. Use E2 reaction of dehydrohalogenation of 1-bromo-1,2-diphenylpropane to describe the following terms. (10%)
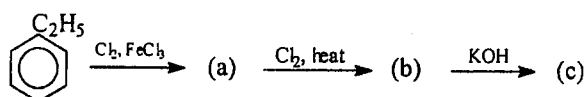   (a) Stereoselectivity (b) Stereospecificity

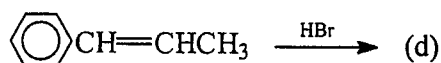2. Describe the solvent effect on the following reaction in detail. (5%)

$$CH_3Br + (H_2O)nOH^- \xrightarrow{\text{gas phase}} CH_3OH + Br^-$$

n =	0	1	2	3	In solution
Relative k =	1	0.6	0.002	0.0002	10^{-16}

3. Complete the following reactions. (10%)
   (1)

$$\xrightarrow{Cl_2, FeCl_3} \text{(a)} \xrightarrow{Cl_2, \text{ heat}} \text{(b)} \xrightarrow{KOH} \text{(c)}$$

   (2)

$$CH=CHCH_3 \xrightarrow{HBr} \text{(d)}$$

   (3)

$$CH=CHCH_3 \xrightarrow[\text{Peroxide}]{Br^\bullet} \text{(e)}$$
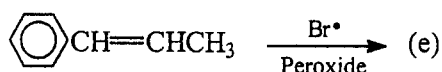
4. (a) Draw the chair configurations of cis-1,3-dimethylcyclohexane. (b) Flip the structures. (c) Predict the relationship between every set of enantiomers, if they are resolvable, why? (15%)

5. (a) Write the mechanism of the electrophilic aromatic substitution. (5%)
   (b) Use the isotope effect to describe the fact that the reaction is not a single step reaction. (5%)

6. Predict the [6+2] cycloaddition. Is the reaction a thermal or photo practicable reaction? Draw the LCAOs molecular orbitals and write your reasons in detail. (10%)

7. How can the NAD molecule "remember" which hydrogen it transferred to acetaldehyde? Write the reaction and describe it in detail.(10%)
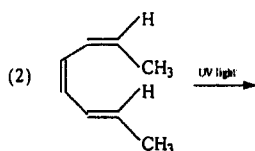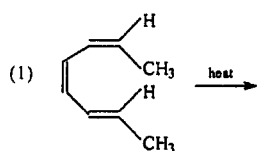
8. Give examples and describe the following terms. (10%)
   (1) pro-R (2) Si face (3) syndiotactic polymer
   (4) Diels-Alder reaction

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9. Predict the products of the following reactions.　　(10%)

(1) heat →

(2) UV light →

10. The rate of Hofmann degradation is increased by the presence of electro releasing substituents in the aromatic ring. The following steps are believed to proceed simultaneously. Explain the facts in detail.　　(10%)

(1) → + Br^-

(2) → $R-\ddot{N}=C=O$