

系所組別： 化學系

考試科目： 有機化學

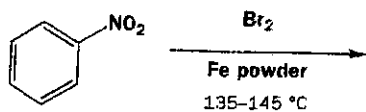
考試日期： 0307， 節次： 2

※ 考生請注意：本試題 可 不可 使用計算機

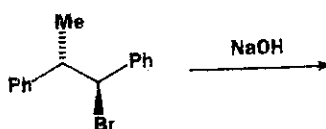
請依題號將答案寫在答案卷上

1. Predict the product for the following reactions (3% each)

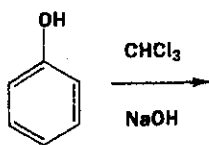
a.



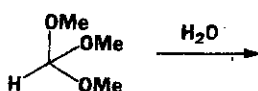
b.



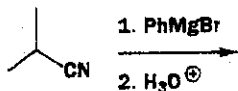
c.



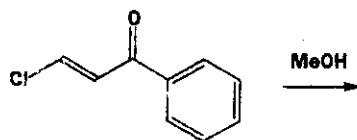
d.



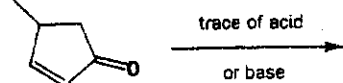
e.



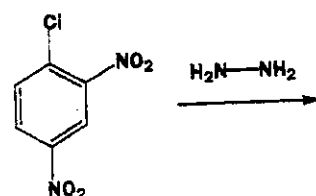
f.



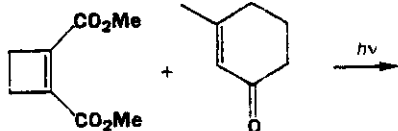
g.



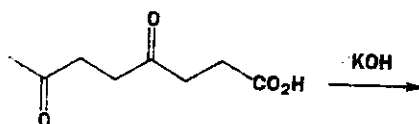
h.



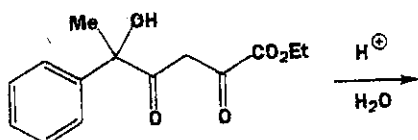
i.



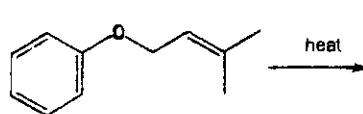
j.



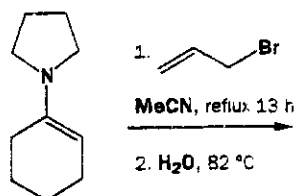
k.



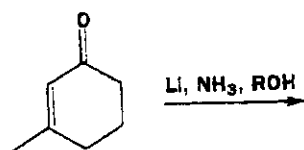
l.



m.



n.



(背面仍有題目,請繼續作答)

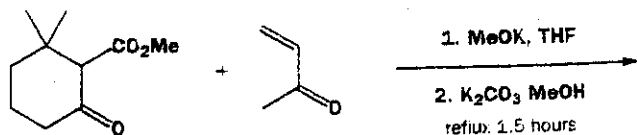
系所組別： 化學系

考試科目： 有機化學

考試日期： 0307， 節次： 2

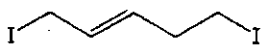
※ 考生請注意：本試題 可 不可 使用計算機

0.

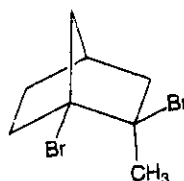


2. Each of the following molecules contains two halogens at different positions in the molecule. In each case, determine which of the two halogens will be the more reactive in S_N1 reaction. Explain. (6%)

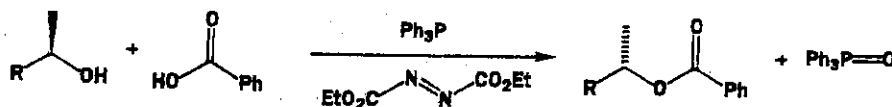
a).



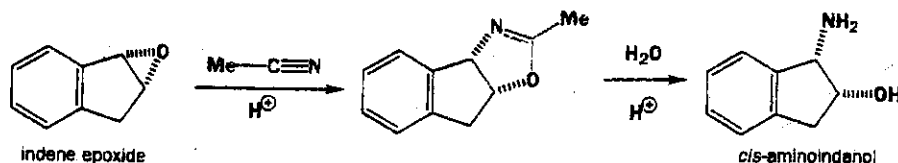
b).



3. Propose the mechanism for the following reaction. (6%)



4. Propose a reasonable mechanism for the following reactions. Be explaining why the $-OH$ and $-NH_2$ group are in *cis* position (8%)

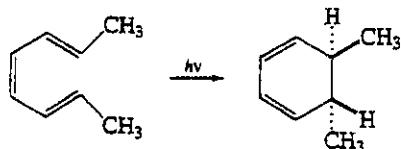


5. a). Spectroscopic studies of a number of carbenes of differing structures have found that they fall broadly into two types: (i) those whose bond angles are $130-150^\circ$; and (ii) whose bond angles are $100 - 110^\circ$. Please show the electronic structure for each type to explain the observations. (6%)

- b). Many carbenes, for example $:CH_2$ itself, can be found in either type and one is more stable. Please show which type is more stable for $:CH_2$? (2%) Why? (3%)

6. Please explain the observations for following reaction reactions. (8%)

a).



b).



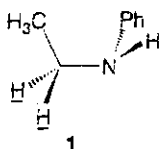
系所組別： 化學系

考試科目： 有機化學

考試日期：0307，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

7. How many signals for the methylene hydrogens (underlined) of $\text{CH}_3\text{CH}_2\text{NHPh}$ (1) will appear in the ^1H NMR spectrum? Analyze 1 exactly as shown in the figure. (6%)



8. When reactions are run in THF, it is often possible to isolate traces of an impurity, compound A. Compound A gives 81.76% C and 10.98% H upon elemental analysis. Spectral data for compound A are summarized below. Deduce the structure of compound A and explain your reasoning. (10%)

Compound A

Mass spectrum: $m/z = 220$ (p, 23), 205 (100), 57 (27)IR (Nujol): 3660 cm^{-1} (m, sharp) ^1H NMR (CDCl_3): δ 1.43 (s, 18H), 2.27 (s, 3H), 5.00 (s, 1H), 6.98 (s, 2H) ^{13}C NMR (CDCl_3): δ 21.2 (q), 30.4 (q), 34.2 (s), 125.5 (d), 128.2 (s), 135.8 (s), 151.5 (s)