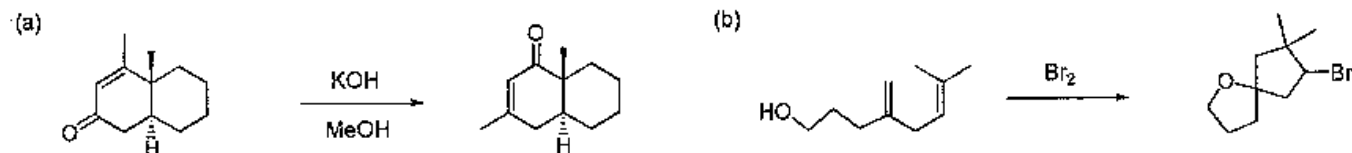


國立中央大學八十八學年度碩士班研究生入學試題卷

所別: 生命科學研究所 不分組 科目: 有機化學 共 2 頁 第 1 頁

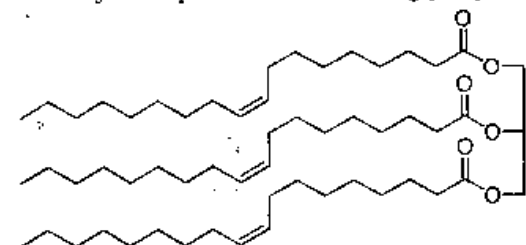
1. Draw a complete mechanism for the following reactions by using Curved-arrow formalism and intermediates. (10% for each and 20% in total)



2. Propose a structure for a compound that has the following spectra. (20%)

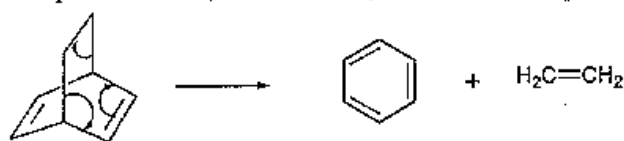
$^1\text{H NMR}$: δ 1.28 (3H, t, $J = 7$ Hz), 3.91 (2H, q, $J = 7$ Hz), 5.0 (1H, d, $J = 4$ Hz), 6.49 (1H, d, $J = 4$ Hz).
 IR: 3100, 1644(s), 1104, 1166, 694(s) cm^{-1} ; no IR absorption in the range 700-1100 or above 3100 cm^{-1} .
 Mass spectrum: $m/z = 152, 150$ (equal intensity; double molecular ion).

3. A major component of olive oil is glyceryl trioleate (structure below).

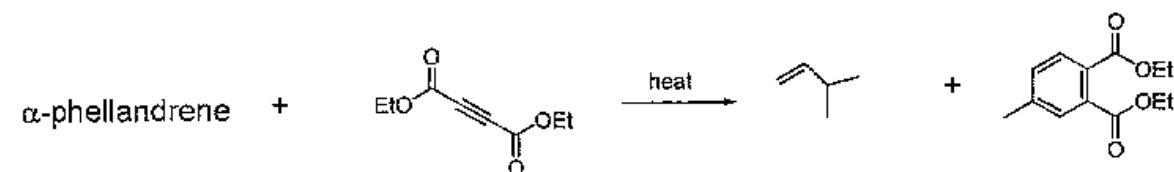


- (a) Give the structures of the products expected from the saponification of glyceryl trioleate with excess aqueous NaOH. (5%)
 (b) Give the structure of the saturated fat glyceryl tristearate, produced by the hydrogenation of glyceryl trioleate. (5%)
 (c) Phospholipids, which are closely related to fats, are important components in the formation of cell membrane. What are the driving forces of the formation of the lipid bilayer structures. (10%)

4. The Diels-Alder reactions is an equilibrium that, in some cases, favors the decomposition of the Diels-Alder adduct:



- (a) Suggest two reasons why this reaction proceeds in the direction shown. (10%)
 (b) The compound α -phellandrene ($\text{C}_{10}\text{H}_{16}$) adds H_2 in the presence of a catalyst to give 1-isopropyl-4-methylcyclohexane and undergoes the following reaction. Deduce the structure of α -phellandrene. (10%)

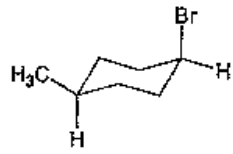


參考用

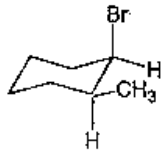
國立中央大學八十八學年度碩士班研究生入學試題卷

所別: 生命科學研究所 不分組 科目: 有機化學 共 2 頁 第 2 頁

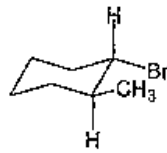
5. Look carefully at the compounds shown below and use the letters of compounds to answer the following questions. There might be more than one answer per question.



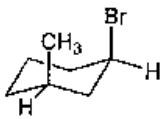
A



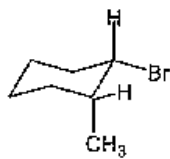
B



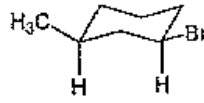
C



D



E



F

參考用

- Which of the compounds are enantiomers? (4%)
- Which of the compounds are diastereomers? (4%)
- Which of the compound(s) are constitutional isomers of B? (4%)
- Which of the compounds are conformers? (4%)
- Which of the compounds are achiral? (4%)