

國立臺灣科技大學102學年度碩士班招生試題

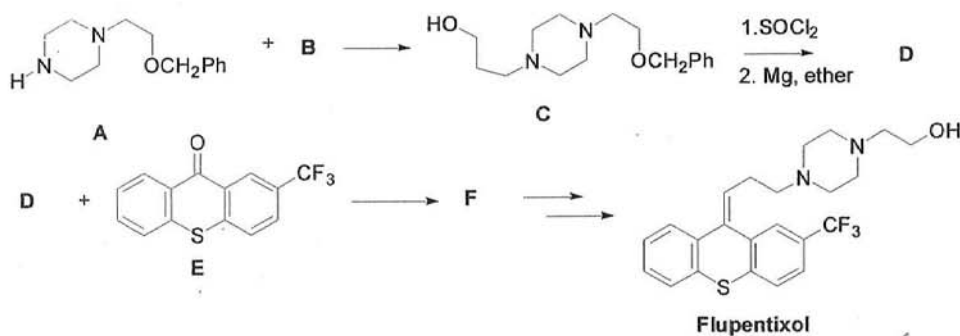
系所組別：材料科學與工程系碩士班甲組

科目：有機化學

(總分為100分)

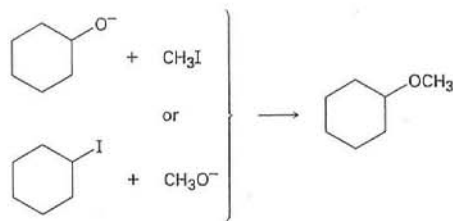
總分 100 分，共 9 大題。

1. A drug called flupentixol is prepared by the following scheme: (14%)

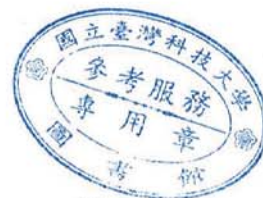
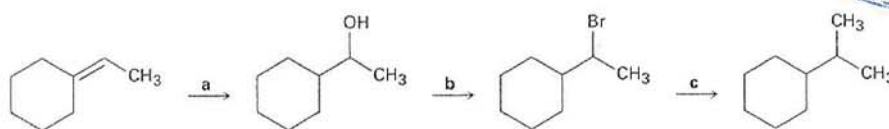


- (1) What alkyl chloride **B** reacts with amine **A** to form **C**? What type of reaction is this?(4%)
- (2) What is the chemical structure of **D**?(3%)
- (3) Reaction of **D** with **E** leads to the formation of tertiary alcohols, such as **F** with a chirality center. **F** exists as a pair of enantiomers. Draw both and assign *R*, *S* configuration.(4%)
- (4) Two stereoisomers of flupentixol are subsequently formed from **F**, but only one is shown in the scheme. Draw the both isomers in your answer sheet and identify the *E* or *Z* double bonds of these two isomers.(3%)

2. Ether can often be prepared by S_N2 reactions of alkoxide ions, RO^- , with alkyl halides. Suppose you wanted to prepare cyclohexyl methyl ether. Which of the two possible routes below would you choose? Please explain.(5%)



3. Identify the reagents **a-c** in the following scheme.(6%)



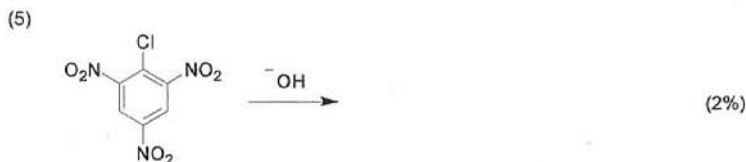
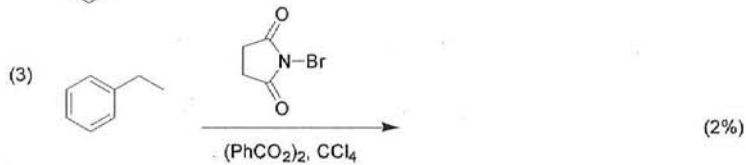
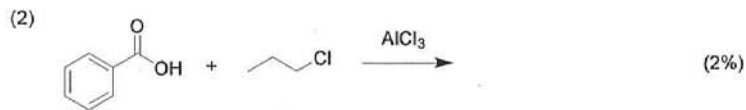
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4. Predict the products of the following reactions (10%)

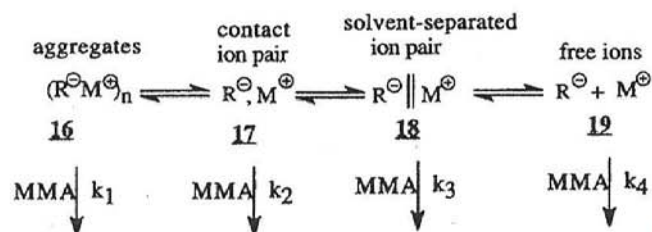


5. For anionic or cationic polymerization, the active chain ends are ionic in nature.

According to Winstein spectrum, ionic species exists in solvent in four different forms:

aggregates, contact ion pair (CIP), solvent separated ion pair (SSIP), and free ion (FI). These

four forms are in equilibrium. (4%)



Please explain how the following two factors affect the equilibrium.

(1) Polarity of solvents (2%)

(2) Concentration of polymer solution (2%)



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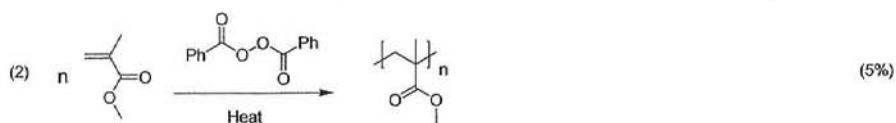
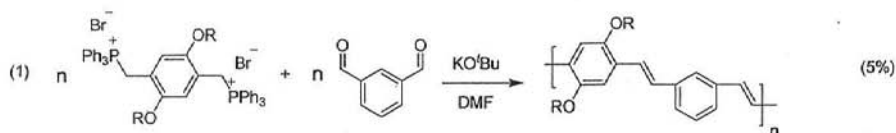
6. Please draw the chemical structures of the following polymers. (6%)

- (1) polystyrene PS (2%)
- (2) poly(vinylidene fluoride) PVDF (2%)
- (3) poly(ethylene terephthalate) PET (2%)

7. During condensation polymerization it is likely to form both linear and cyclic polymers. (5%)

- (1) Please explain how the monomer concentrations affect the formation of linear and cyclic polymers. (2%)
- (2) When cyclic polymers have the same molecular weights as linear polymers, and the concentrations of their solutions are also the same, whose viscosity would be higher? Please explain your reason. (3%)

8. The resulting polymers can go through either chain-growth or step-growth polymerization. By-products and end groups have been omitted for clarity. Please propose the mechanism of the follow polymerizations. (15%)



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9. Predict the products, reactants, reagents or intermediates of the following reactions.

(35%)

