

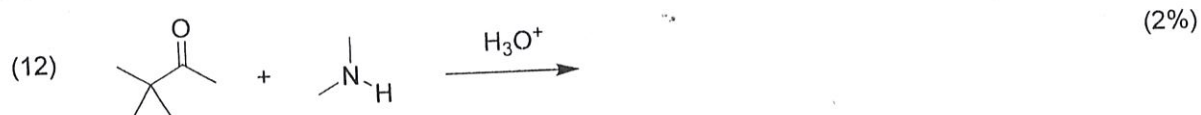
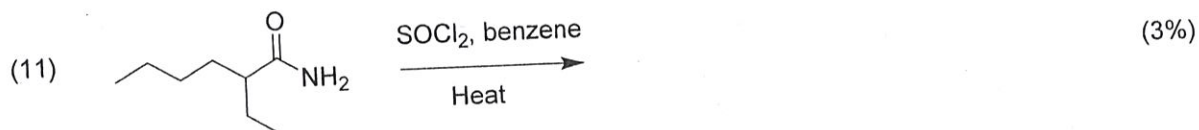
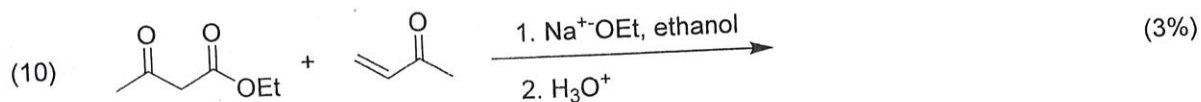
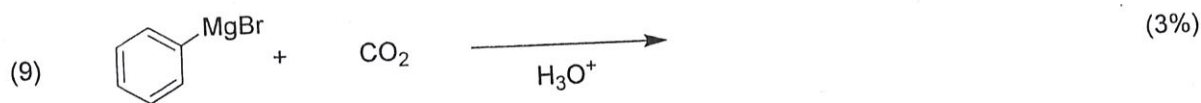
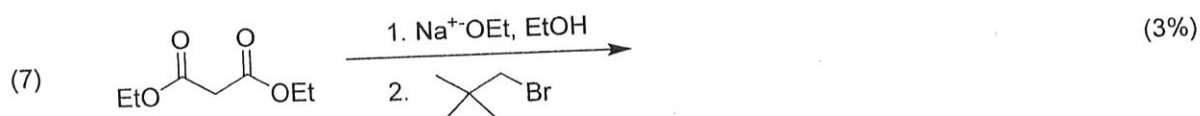
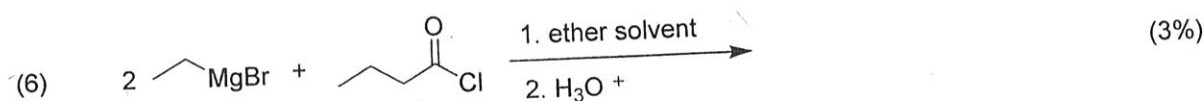
國立臺灣科技大學103學年度碩士班招生試題

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)

1. Predict the products of the following reactions. (35%)



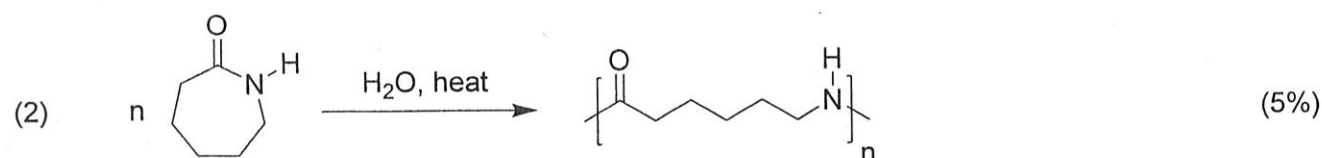
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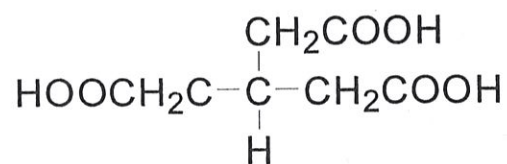
2. Propose the mechanism of the follow polymerizations. (15%)



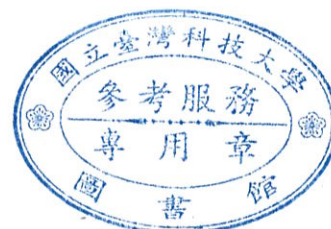
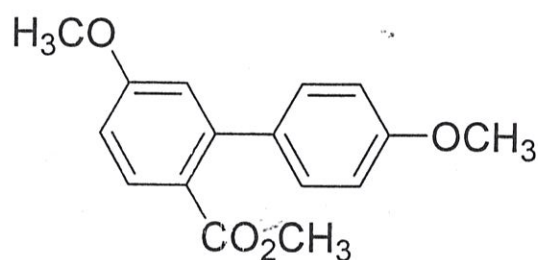
3. How can you explain the fact that *trans*-1-bromo-2-methylcyclohexane yields the non-Zaitsev elimination product, 3-methylcyclohexene on treatment with base? (3%)



4. Hydrocarbon **A** has the formula C_9H_{12} and absorbs 3 equivalents of H_2 to yield **B**, C_9H_{18} , when hydrogenated over a Pd/C catalyst. On treatment of **A** with aqueous H_2SO_4 in the presence of mercury(II), two isomeric ketones, **C** and **D**, are produced. Oxidation of **A** with KMnO_4 gives a mixture of acetic acid (CH_3COOH) and the tricarboxylic acid **E**. Propose structures for compounds **A**~**D**, and write the reactions. (12%)

**E**

5. How might you use a Suzuki-Miyaura coupling to prepare the following biaryl compound? Show the two potential reaction partners. (4%)



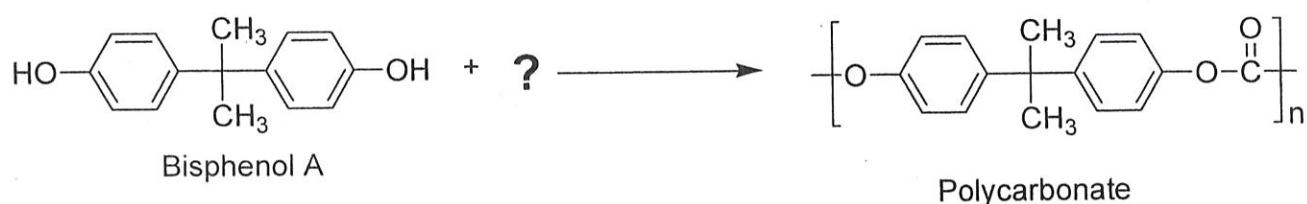
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(總分為100分)

6. Polycarbonate of bisphenol A is a highly transparent and tough material. It can be used as optical discs, containers, plastic glasses, and lenses. One of the two compounds used for preparing polycarbonates is bisphenol A.



(1). Please finish the chemical reaction for the preparation of polycarbonates as shown above. (3%)

(2). Bisphenol A is prepared from phenol and acetone in an acidic condition. What are the chemical reactions involved? (3%) Please show the chemical reaction and mechanism. (3%)

7. An unknown hydrocarbon **A** with the formula C_6H_{12} reacts with 1 molar equivalent of H_2 over palladium catalyst. Hydrocarbon **A** also reacts with OsO_4 to give diol **B**. When oxidized with $KMnO_4$ in acidic solution, **A** gives two fragments. One fragment is propanoic acid $CH_3CH_2CO_2H$, and the other fragment is ketone **C**. What are the structures of **A**, **B**, and **C**? Write all reactions and show your reasoning. (6%)

8. Please draw the chemical structure of the following polymers. (12%)

- (1). polyvinylalcohol (3%)
- (2). Kevlar fiber (3%)
- (3). Teflon (3%)
- (4). poly(3-hexylthiophene) (3%)

9. The following tertiary alkyl bromide does not undergo a nucleophilic substitution reaction by either S_N1 or S_N2 mechanisms. Explain. (4%)

