

大同大學 101 學年度研究所碩士班入學考試試題

考試科目：有機化學

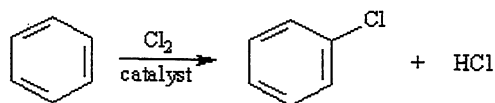
所別：化學工程研究所

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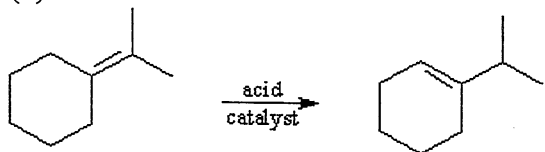
註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1. Identify the following reactions as **additions, eliminations, substitutions, or rearrangements**: (8%)

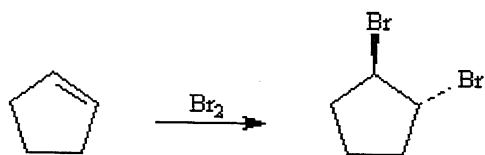
(1)



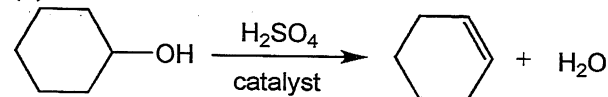
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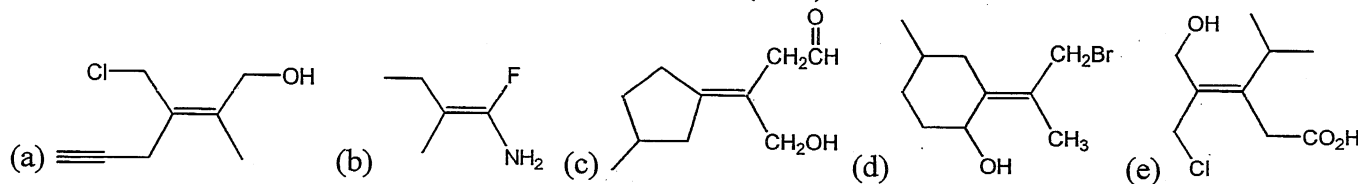
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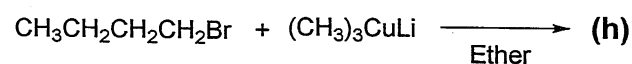
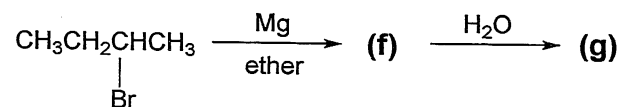
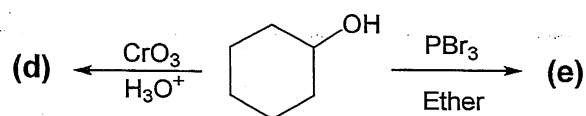
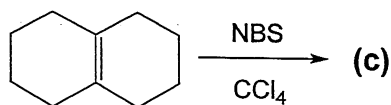
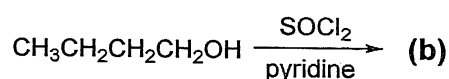
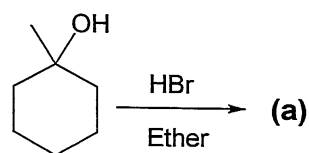
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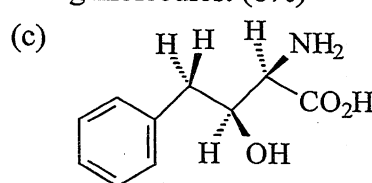
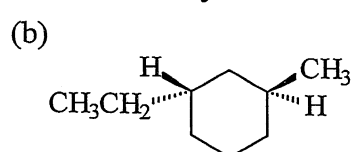
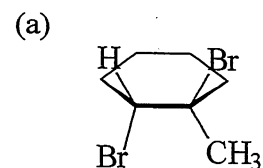
2. Assign E or Z configuration to the following alkenes. (10%)



3. Give the **major product** of each of the following reactions: (18%)



4. Assign R,S configurations to each chirality center in the following molecules. (6%)



<背面繼續>

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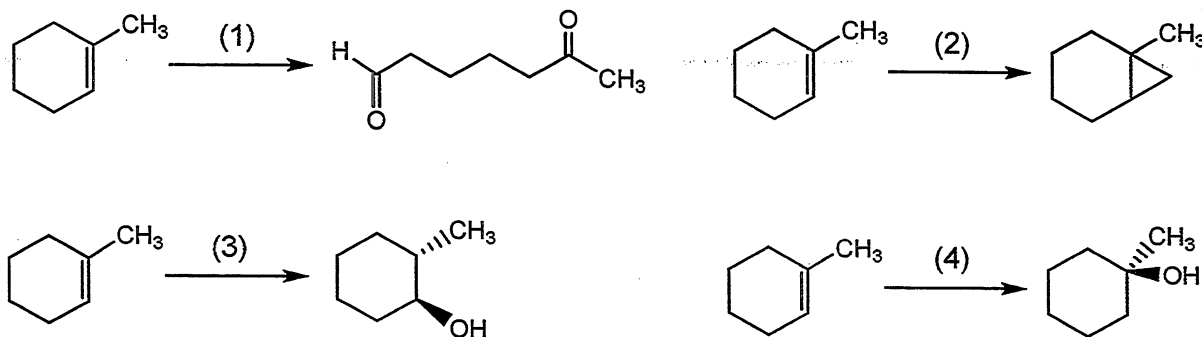
第2/3頁

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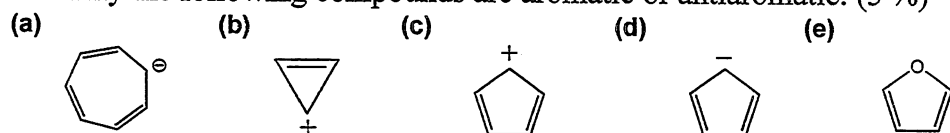
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5. Choose the best reagent from the list below for carrying out each transformation. (8%)

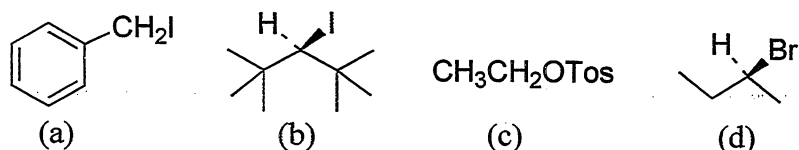
- (a) 1. O_3 2. Zn, H_3O^+ (b) 1. BH_3, THF 2. $H_2O_2, NaOH, H_2O$ (c) $CHCl_3, KOH$ (d) $H_2O, H_2SO_4, heat$
 (e) 1. OsO_4 2. $NaHSO_3, H_2O$ (f) $KMnO_4, H_3O^+$ (g) $CH_2I_2, Zn(Cu)$ (h) 1. $Hg(OAc)_2, CH_3OH$ 2. $NaBH_4$



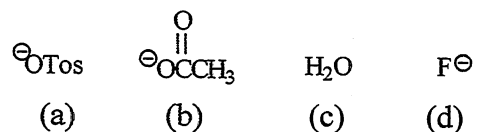
6. Identify the following compounds are aromatic or antiaromatic. (5%)



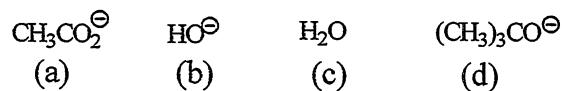
7. (1) Which is the *least* reactive compound in an S_N2 reaction? (2%)



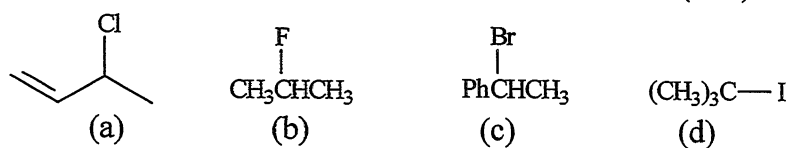
(2) Which is the *best* leaving group in an elimination reaction? (2%)



(3) Which is the *best* nucleophile in a substitution reaction at a primary carbon? (2%)



(4) Which is the *least* reactive compound in a S_N1 reaction? (2%)



8. Rank the following a-e compounds in decreasing order of their reactivity to electrophilic substitution. (5%)

- a. phenol b. benzene c. chlorobenzene d. benzoic acid e. toluene

9. Rank the following substances in order of increasing acidity: (4%)

- (a) *p*-Bromobenzoic acid (b) benzoic acid (c) *p*-nitrobenzoic acid (d) 2,4-dinitrobenzoic acid

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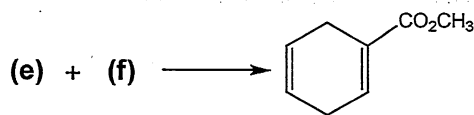
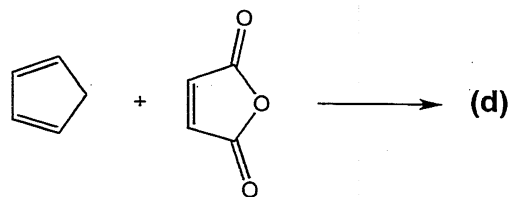
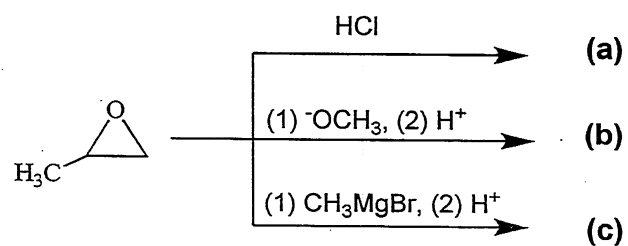
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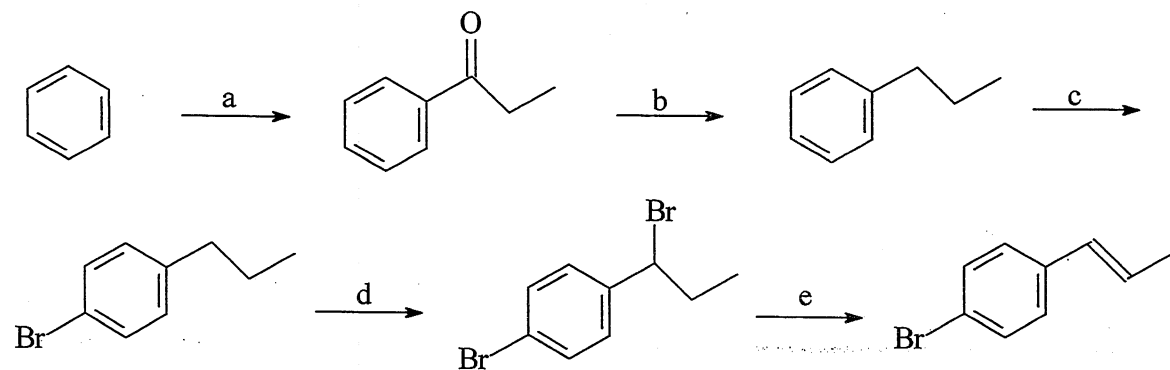
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10. Predict the reactants or major products of the following reactions. (12%)



11. Identify the reagents or product a-h in the following scheme: (16%)

(1)



(2)

