

# 國立彰化師範大學105學年度碩士班招生考試試題

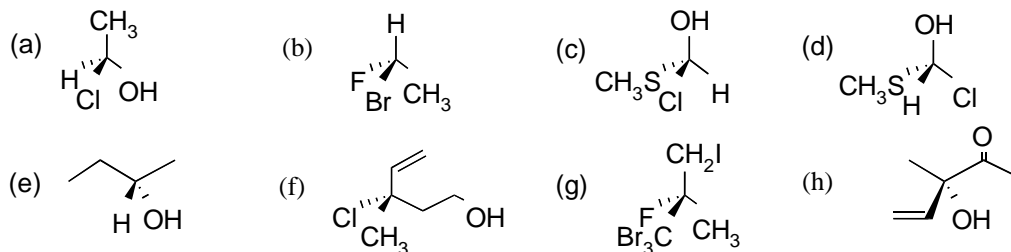
系所： 化學系

科目： 物理化學與有機化學

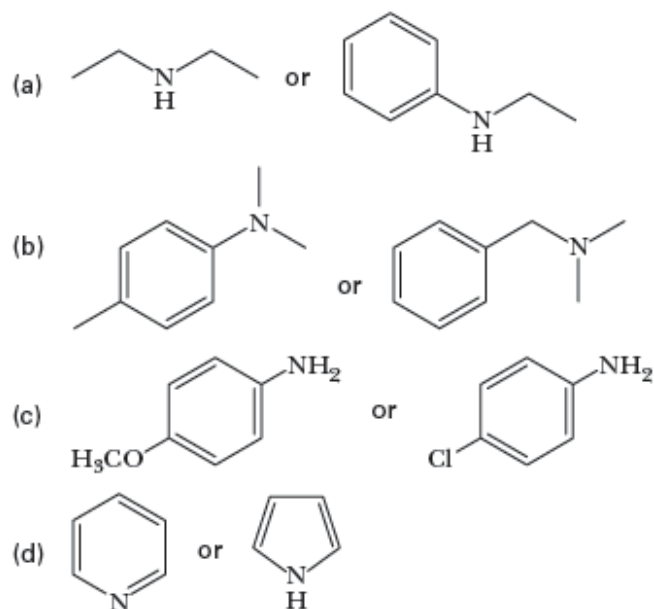
☆☆請在答案紙上作答☆☆

共 2 頁，第 1 頁

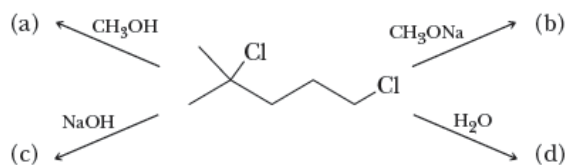
1. Assign absolute configurations (R or S) to each of the following compounds. (16%)



2. From each pair of compounds, select the stronger base: (8%)



3. Predict the major organic product of each of the following reactions: (16%)



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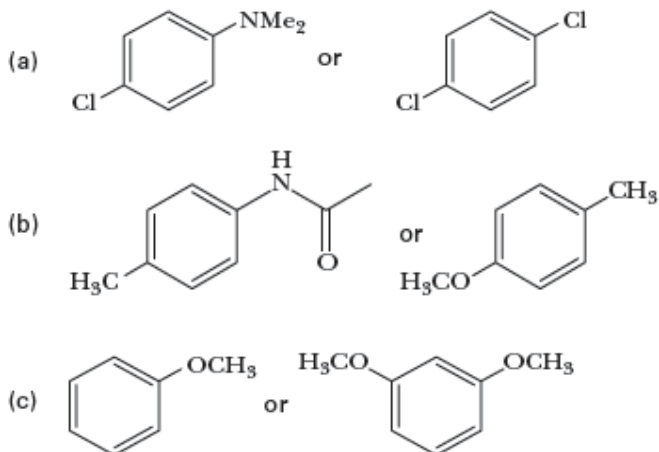
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共 2 頁，第 2 頁

4. For each pair of compounds indicate which would undergo electrophilic aromatic substitution more quickly. (10 %)



5. For a first order reaction with no back reaction, (a) write down the rate equation (differential equation relating reaction rate and the concentration of the reactant), (b) obtain the concentration and time relation, (c) express the half-life of the reactant. (the rate constant is  $k$ ) (15 %)

6. Explain the following: (a) zero-point energy, (b) Dalton's law of partial pressures, (c) expectation value in quantum chemistry, (d) internal energy, enthalpy and Gibbs free energy, (e) eigenvalue equation. (25 %)

7. In the infrared (IR) spectroscopy, the totally symmetric stretch vibrational modes (i.e., simultaneous stretching motion of 4 C-H bonds in methane or 6 C-H bonds in benzene) are forbidden. What is the reason behind this fact? (10 %)