

1. Name the following compounds: (10%)

- (1)  $(\text{CH}_3\text{CH}_2)_4\text{N}^+\text{Cl}^-$
- (2)  $\text{CH}_2=\text{CHCH}_2\text{Cl}$
- (3)  $\text{LiAlH}_4$
- (4)  $\text{K}_3\text{Fe}(\text{CN})_6$
- (5)  $\text{C}_6\text{H}_5\text{COOCH}_2\text{CH}_3$

2. Give the structure formulas of the following compounds: (10%)

- (1) 1,3-butadiene
- (2) aniline
- (3) pentachlorobenzoic acid
- (4) isopropyl methyl ether
- (5) Diammonium hydrogen phosphate

3. In contrast to addition polymers, condensation polymers can be synthetically formed. Please show the mechanisms of both polymerization reactions. (20%)

4. Distinguish among the primary, secondary, tertiary and quaternary structures of proteins and then write an equation to describe how amino acids combine to form proteins. (20%)

5. Calculate the concentration of proton of 0.100M  $\text{CH}_3\text{CO}_2\text{H}$  before and after the addition of 0.0500 mol/L of  $\text{CH}_3\text{CO}_2\text{Na}$ . The value of  $K_a$  for acetic acid is  $1.75 \times 10^{-5}$ . (20%)

6. Aldehydes and ketones can be reduced back to alcohols. Please significantly show the mechanism of a chemical reduction involves a Grignard reagent. (20%)