

本試題是否可以使用計算機：可使用，不可使用（請命題老師勾選）

1. Calculate the molar mass of the following: (10%)
  - (a)  $\text{CH}_3\text{COOH}$
  - (b)  $\text{CCl}_4$
  - (c)  $\text{CaCO}_3$
  - (d)  $\text{H}_2\text{SO}_4$
  - (e)  $\text{H}_3\text{PO}_4$
2. Draw structural formulas of: (10%)
  - (a) Acetic acid
  - (b) *tert*-Butyl iodide
  - (c) Ethyl benzene
  - (d) Pentachlorophenol
  - (e) 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin
3. Explain why a mixture of ammonium chloride and ammonia in solution has a buffering action. (10%)
4. Describe the difference(s) between: (30%)
  - (a) Hydrolysis and hydrogenation
  - (b)  $\text{S}_{\text{N}}2$  reaction and  $\text{S}_{\text{N}}1$  reaction
  - (c) Ionic bond and covalent bond
  - (d)  $\beta$ -elimination and  $\alpha$ -elimination
  - (e) Activation energy and solvation energy
5. Explain the following terms: (40%)
  - (a) Ligand
  - (b) Entropy
  - (c) Beer's Law
  - (d) Stable isotope
  - (e) Isoelectric point
  - (f) Hydrogen bonds
  - (g) Reverse osmosis
  - (h) Avogadro number
  - (i) Diels-Alder reaction
  - (j) Resonance structure