

- 一、Draw the structure and write Chinese name of the following compounds. (a) n-hexane (b) Ethyl alcohol (c) Acetic acid (d) Ethyl acetate (e) Acetone (f) Acetylene (g) Methanol (h) Glycerol (i) Benzene (j) Chloroform 20%

- 二、Calculate the concentration of all species present (H_2CO_3 , HCO_3^- , CO_3^{2-} , H_3O^+ , and OH^-) in a 0.02 M carbonic acid solution. 20%



- 三、(a) Use the Henderson-Hasselbalch equation to calculate the pH of a buffer solution what is 0.45M in NH_4Cl and 0.15M in NH_3 (b) How would you prepare an $\text{NH}_4\text{Cl}-\text{NH}_3$ buffer that has a pH of 9.00? ($\text{NH}_3 \quad K_b = 1.8 \times 10^{-5}$) 20%

- 四、A platinum catalyst is used in automobile catalytic converters to hasten the oxidation of carbon monoxide: $2\text{CO}_{(g)} + \text{O}_{2(g)} \xrightleftharpoons{Pt} 2\text{CO}_{2(g)} \quad \Delta H^\circ = -566 \text{ kJ}$ Suppose that you has a reaction vessel containing an equilibrium mixture of $\text{CO}_{(g)}$, $\text{O}_{2(g)}$ and $\text{CO}_{2(g)}$ will the amount of CO increase, decrease, or remain the same when : (a) A platinum catalyst is added? (b) The temperature is increase? (c) The pressure is increase by decrease the volume? (d) The pressure is increased by adding argon gas? (e) The pressure is increased by adding O_2 gas? 20%

- 五、What is Chemistry? What is four major classification of chemistry? 20%