系組：地質學系二、三年級　　日期節次：7 月 29 日第 3 節

科目：普通化學　(108-31)

一、(a)Use the Henderson-Hasselbalch equation to calculate the pH of a buffer solution that is 0.45M in NH_4Cl and 0.15M in NH_3 (b)How would you prepare an NH_4Cl-NH_3 buffer that has a pH of 9.00 ? (NH_3 $K_b=1.8*10^{-5}$) 20%

二、Calculate the pH and the concentration of all species present (H_2CO_3 , HCO_3^- , CO_3^{2-} , H_3O^+ , and OH^-) in a 0.04 M carbonic acid sulotion.

(H_2CO_3　$Ka_1= 4.3 \times 10^{-7}$, $Ka_2= 5.6 \times 10^{-11}$)　(20%)

三、Consider the titration of 40 mL of a 1.00 M solution of the protonated form of the amino acid alanine (H_2A^+) with 1.0 M NaOH, calculate the pH after addition of the following volume of 1.0 M NaOH: (a) Before addition of any NaOH (b) Halfway to the first equivalence point (c) At the first equivalence point (d) Halfway between the first and second equivalent points (e) At the second equivalence point (H_2A^+: $Ka1= 4.6*10^{-3}$ $Ka2= 2.0*10^{-10}$) (20%)

四、Draw the structure of the following compounds. (a) 3-isopropyl-2-methylhexane (b) t-butyl alcohol (c) Acetic acid (d) Ethyl acetate (e) Acetone (f) Acetylene (g) Ethylene glycol (h) Glycerol (i) Phenol (j) Aniline (20%)

五、describe the following the terms in detail and give a example , explain ?
(a) Viscosity (b) surface tension(20%)