Acid Base problems Whitten

HA 🡨🡪 H+ + A-1 Where HA is chloroacetic acid

0.115 0 0

- x + x + x Ka = [H+][A-1]/[HA]

0.115 – x x x pH of 1.92 at Equil means [H+] = 0.012 = [A-]

 Ka = (0.012)2/0.115 = 1.26 x 10-3

50.0 mL of 0.115 M HA will be titrated with 0.0850 M KOH. Titrate with 33.80 mL of 0.0850 M KOH

HA + OH-1 🡪 H2O + A-

5.75 mmol 2.873 mmol 0

-2.873 - 2.873 + 2.873

Find pH, Is there something significant about this point?

#2 Ka = H+)(A-1)/HA = [H+] = [A-1] = 5.916 x 10-5 HA = 0.100 (0.0999 = 0.1)

3. 0.0703)(0.0107) = 7.81 x 10-4 This is the amount of H+ and A- produced.

(7.81 x 10-4)2/(0.0703) = Ka = 8.36 x 10-6

**Change initial volume of acid to 36.42 mL of** Titrated with 0.065 M NaOH

36.42)(0.0703) = 2.56 mmol of HA initially;

15.00 mL of (0.065 M OH) = 0.975 mmol OH

HA + OH-1 🡪 H2O + A-1

2.56 0.975 mmol 0

- 0.975 -0.975 + 0.975

2.46 mmol 0.0 0.975

pH = pKa + log (0.975/1.485) = 5.07 – 1.40 = pH = 3.66

after 19.65 mL added OH (19.65 (0.065) = 1.278 mmol OH

HA + OH-1 🡪 H2O + A-1

2.56 1.28 mmol 0

1.28 1.28 + 1.28

1.28 mmol 0.0 1.28

pH = pKa + log (1.28/1.28) = 5.07 pH = pKa at halfway point

for part C **Change volume to 39.35 mL**(39.35 mL )(0.065) = 2.56 mmol OH

HA + OH-1 🡪 H2O + A-1

2.56 2.56 mmol 0

2.56 2.56 + 2.56

0 mmol 0.0 2.56 mmol A-

Total volume is (39.35 + 36.42 = 75.77 mL

A-1 + H2O 🡨🡪 HA + OH‑  Hydrolysis

2.56 mmol 0 0

- x + x + x

2.56 mmol =x x x

Kb = Kw/Ka = 1 x 10-14/7.81 x 10-6 = 1.28 x 10-9‑

2.56 mmol/75.77 mL = [A-1] concentration =

Kb = (x)(x)/(0.0338 – x) x << 0.0388

x = [(1.28 x 10-9)(0.0338)]1/2 =6.58 x 10-6  = OH- 5.18 = pOH; pH = 8.81