General Chemistry II (CHEM 102) Dr. Naleway – Discussion 8	
Name	
Strong acid and strong base titration problems:	

1. 50 mL of 0.25 M HNO $_3$  is reacted with 100 mL of 0.25 M KOH. Determine the final pH of the solution.

2. 75 mL of 0.25 M H<sub>2</sub>SO<sub>4</sub> is reacted with 75 mL of 0.25 M Ca(OH)<sub>2</sub>. Determine the final pH of the solution.

#### Weak acid and strong base titration problems:

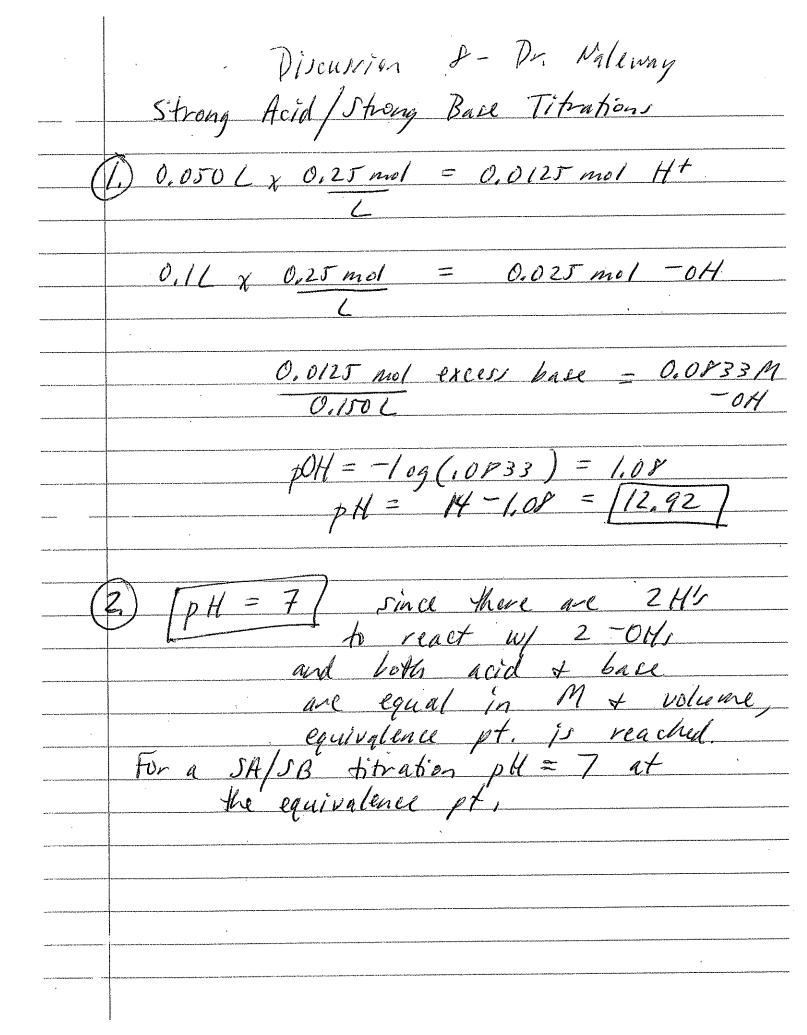
3. 50 mL of 0.25 M chloroacetic acid (CICH<sub>2</sub>COOH; pK<sub>a</sub> = 2.85) is reacted with 25 mL of 0.25 M Ca(OH)<sub>2</sub>. Determine the final pH of the solution.

#### General Chemistry II (CHEM 102) Dr. Naleway – Discussion 8 (2)

4. 80 mL of 0.25 M nitrous acid (HNO<sub>2</sub>; pK<sub>a</sub> = 3.35) is reacted with 40 mL of 0.25 M NaOH. Determine the final pH of the solution.

5. 30 mL of 0.25 M formic acid (HCOOH;  $pK_a = 3.17$ ) is reacted with 10 mL of 0.25 M Ca(OH)<sub>2</sub>. Determine the final pH of the solution.

6. 20 mL of 0.25 M cyanic acid (HCNO;  $pK_a = 3.46$ ) is in solution but is NOT reacted with any base. Determine the final pH.



	Weak actd / Strong base
	West actd / Strong base
(3,)	0.050Lx 0,25 mol 0.0/25 mol
	C/CH2COOM
,	
	$0.025L_{\chi}$ $0.25mol$ $\chi 2 = 0.0125mol$
	CaCON/2
***************************************	2C/CHCCOOH + CacoH) = 2HO-+
	2-0H 2016H6600
	01011 00011 1 -011 - 3 1/0 +
***************************************	CICHECOOH + -OH = HEO + CICHECOOT
ß	0,0/25 mol 0.0/25 mol - 0
r	-,0125 mol -0,0125 mol +0,0125 mol
4	0 0.0125 no)
F(	Control not
	0.0125 nul = 0.1667 M C/CH2 COV
	0.075 (
Version to the contract of the	

	WA/SI	UA/SB Titrations Discussion & Dr. Whleway		
and the second s	CICHECOO +			
1	0.1667M		<b>∠^</b> 1	A'
C	-X		tx	- tx
	E 0.1667-X		X	$\overline{\chi}$
	$\frac{\chi^2}{0.1667-\chi} = k$	1 = 7.08 x	10-12	
	<b>*</b>	4-2, P5 = 11		
		)-//./5 =		
	X = \( (7,08x)			
		4.43	4.44 x 11	
	poll= -log (4.8	14x 10=7) =	0.35	
	-pH= 14-6.	3/=		
	1,09 x 11 poM = -log ( pH = 1	109 × 10-6 14- 5,96 = [	[] ] = 5,96 F,04]	

### Discussion 8

## WA/SB Thations

	0.080 L x 0,25 mol - 0,02 mol HNU
	0.080 L x 0,25 mol - 0.02 mol HNO2
	0.040 L X 0.25 nw/ = 0.01 mol -04
	HNO2 + -OH = H20 + NO2- 0,02 0,01 = 0
$\mathcal{B}$	0,02 0,0/
	-0.01 -0.01 to.01
	B
A	0.01
	DU = DKa + 100 Ball
	PH = PKa + log Ball =
	1/= 335 + /20/10/1 - [227]
	pH = 3.35 + log(0.01) = 3.35
***	CON
	This is called an positional
	This is called an equinda
***	

# Discussion 8 - Dr. Naleway WA/SB Topations

	• • • • • • • • • • • • • • • • • • •	
	(5) 0.030 L x 0,25 Mol=	0.0077 mol Formic
		acid
e salah managai salah mahan kebanah salah managai mengan mengan mengan berapakan berapakan berapakan berapakan	0,010L x 0,25 mol x 2 =	0,005 not -0H
and Maryalauvinos Maryalauvinos surveys (surveys)		
rom jung makaran barik ajarran mekadaphikakali 44 bin		
	HCO2H + -OH =	H20 + HCOZ-
	B 0,0075 0,005	
	C-0,005 -0,005	+ 0.00T
	A 0.0025 O	0.005
	H 0,000	
papagana Abanasaar saar	11- Va + 130 B	
	pH = pKa + log B	
· <u> </u>	// 3 2 / / 005	
	pH = 3,17 + log 1005	=   3.47
**************************************	, , , , , , , , , , , , , , , , , , , ,	
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n y is an activity of the second seco		

### Discussion 8

# WA/NO Base

<u>(ler</u>	,
-	T acid
	HCNO + the = HO + CNO
,	I 0,25 M - 0 0
· .	$C - \chi$ $t\chi$ $t\chi$
	E 0,25-X X X
	anticul 12 TM
	0,005 nw/ = 0,25M
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1020 L
	x2 10-3.46
make the second	- = Ka Ka = 10
***************************************	$\frac{\chi^{2}}{0,25-\chi} = ka \qquad ka = 10^{-3.46}$ $0,25-\chi \qquad 3.47 \times 10^{-4}$
	$X = \int P.675 \times 10^{-7} = 0.00931 = H^{+}$
warend to the second se	1- (00021) - 1203
	-log (,00931) = [2,03]
+	
Manufacture (1970)	