A. Perhitungan

a. Pembuatan Larutan NaOH 1 N

$$N = \frac{\text{Massa}}{\text{BE}} \text{ x } \frac{1000}{\text{V}}$$

$$= \frac{40 \text{ gram}}{\frac{40\ g/mol}{1}} \text{ x } \frac{1000}{1000 \text{ ml}}$$

$$= 1 \text{ N}$$

b. Pembuatan Larutan HCl 32%

$$M = \frac{\% \text{ x } \rho \text{ x } 1000}{\text{BM}}$$

$$= \frac{37 \text{ \% x } 1.18 \text{ g/ml x } 1000}{36.5 \text{ g/mol}}$$

= 11,96 M (Konsentrasi Larutan HCl pekat 37%)

Larutan HCl 32% dibuat dari larutan HCl 37%, dengan rumus:

$$V_1 \, . \, M_1 = V_2 . \, M_2$$

Keterangan :

V_1 = Volume larutan induk (ml)

M_1 = Konsentrasi larutan induk (%)

V_2 = Volume larutan (ml)

M_2 = Konsentrasi larutan (%)

Diketahui :

M_1 = 32 %

V_2 = 500 ml

M_2 = 37 %

V_1 . M_1 = V_2. M_2

V_1 . 37 % = 500 ml. 32%

V_1 = 432,43 ml

c. Volume NaOH teoritis

M $FeSO_4.7H_2O$ = $\frac{50\ gram}{278} x \frac{1000}{500\ ml} = 0{,}36\ M$

n $FeSO_4.7H_2O$ = M x V = 0,36 M x 100 ml = 36 mmol.

M NaOH = $\frac{N}{valensi} = \frac{1}{1} = 1$

V = ?

	Fe^{2+} +	2 NaOH →	$Fe(OH)_2$ +	$2\ Na^+$
m	36	1 M x volume	-	
b	36	72	36	
s	-	V – 72	36	

Volume asumsi = 80 ml (dibuat berlebih).

d. Volume HCl teoritis

Untuk HCl 28 %

M HCl = $\frac{\%\ x\ \rho\ x\ 1000}{BM} = \frac{0{,}28\ x\ 1{,}18\ x\ 1000}{36{,}5} = 9{,}05\ M$

V $Fe(OH)_3$ = 180 ml.

n $Fe(OH)_3$ = 36 mmol

Kb $Fe(OH)_3$ = $9x10^{-5}$

pH = 14 – POH

1 = 14 – log (OH^-)

-13 = – log (OH^-)

-1 x 10^{-13} = (OH^-)

	3 HCl	+	$Fe(OH)_3$	→	$FeCl_3$	+	3 H_2O
m	9,05x		36		-		
b	9,05x		3,0167x		3,0167x		
s	-		36 – 3,0167x		3,0167x		

(OH^-) = $kb \frac{\text{n basa}}{n\ garam}$

-1 x 10^{-13} = $9\ x\ 10^{-5} \frac{36 - 3{,}0167x}{3{,}0167x}$

-3,352 x 10^{-9} x = 36 – 3,0167x

3,0167x = 36

x = 12 ml

e. Pembuatan larutan induk $FeCl_3$

ppm = $\frac{\text{mg}}{\text{L}} = \frac{10\ mg}{0.1\ \text{L}}$ = 100 ppm

f. Pembuatan larutan standar $FeCl_3$

Larutan standar dengan konsentrasi 5 ppm, 10 ppm, 15 ppm, 20 ppm dan 25 ppm dibuat dari larutan induk $FeCl_3$ 100 ppm.

$$V_1.C_1 = V_2.C_2$$

Keterangan :

V_1 = Volume larutan induk (mL)

C_1 = Konsentrasi larutan induk (ppm)

V_2 = Volume larutan (mL)

C_2 = Konsentrasi larutan (ppm)

1. Larutan standar 5 ppm

   Diketahui :

   C_1 = 5 ppm

   V_2 = 50 mL

   C_2 = 100 ppm

   $$V_1.C_1 = V_2.C_2$$

   V_1. 100 ppm = 50 mL . 5 ppm

   $$V_1 = \frac{250 \cancel{\text{ ppm}}.\ \text{mL}}{100\ \cancel{\text{ppm}}} = 2{,}5\ \text{ml}$$

2. Larutan standar 10 ppm

   Diketahui :

   C_1 = 10 ppm

   V_2 = 50 mL

   C_2 = 100 ppm

   $$V_1.C_1 = V_2.C_2$$

   V_1. 100 ppm = 50 mL . 10 ppm

   $$V_1 = \frac{500 \cancel{\text{ ppm}}.\ \text{mL}}{100\ \cancel{\text{ppm}}} = 5\ \text{ml}$$

3. Larutan standar 10 ppm

   Diketahui :

   C_1 = 15 ppm

   V_2 = 50 mL

   C_2 = 100 ppm

   $$V_1.C_1 = V_2.C_2$$

   V_1. 100 ppm = 50 mL . 15 ppm

$$V_1 = \frac{750 \text{ ppm}. \text{ mL}}{100 \text{ ppm}} = 7{,}5 \text{ ml}$$

2. Larutan standar 20 ppm

   Diketahui :

   $C_1 = 20$ ppm

   $V_2 = 50$ mL

   $C_2 = 100$ ppm

   $$V_1.C_1 = V_2.C_2$$

   V_1. 100 ppm = 50 mL . 20 ppm

   $$V_1 = \frac{1000 \text{ ppm}. \text{ mL}}{100 \text{ ppm}} = 10 \text{ ml}$$

3. Larutan standar 25 ppm

   Diketahui :

   $C_1 = 25$ ppm

   $V_2 = 50$ mL

   $C_2 = 100$ ppm

   $$V_1.C_1 = V_2.C_2$$

   V_1. 100 ppm = 50 mL . 25 ppm

   $$V_1 = \frac{1250 \text{ ppm}. \text{ mL}}{100 \text{ ppm}} = 12{,}5 \text{ ml}$$

g. Pembuatan Larutan HNO_3 4 M

$$M = \frac{\% \text{ x } \rho \text{ x } 1000}{BM}$$

$$= \frac{65 \text{ \% x } 1{,}42 \text{ g/ml x } 1000}{63 \text{ g/mol}}$$

= 14,65 M (Konsentrasi Larutan HNO_3 pekat 65%)

Larutan HNO_3 4 M dibuat dari larutan HNO_3 65%, dengan rumus:

$$V_1 . M_1 = V_2 . M_2$$

Keterangan :

V_1 = Volume larutan induk (mL)

M_1 = Konsentrasi larutan induk (M)

V_2 = Volume larutan (mL)

M_2 = Konsentrasi larutan (M)

$$V_1 . M_1 = V_2 . M_2$$

$$V_1 . 14{,}65\ M = 100\ ml . 4\ M$$

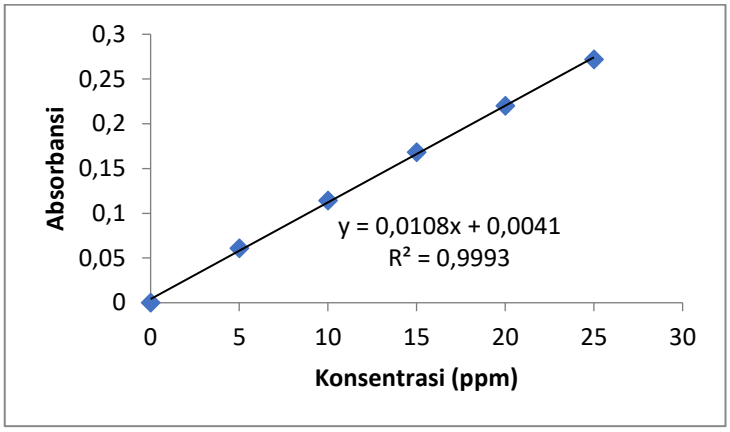
$$V_1 = 27{,}30\ ml$$

h. Pembuatan Larutan KSCN 10%

$$\% = \frac{\text{Massa}}{\text{Volume}} = \frac{10\ g}{100\ ml} = 10\ \%$$

B. Data Adsorbansi Larutan Standar Fe

Konsentrasi (ppm)	Absorbansi
0	0
5	0.061
10	0.114
15	0.168
20	0.220
25	0.272



Grafik Regresi Larutan Standar Fe

Konsentrasi Koagulan Feri Klorida

Dari plot linear antara konsentrasi melawan Absorbansi, diperoleh persamaan:

$$y = 0{,}0108\ x + 0{,}0041$$

Keterangan:

y = Absorbansi

x = konsentrasi (ppm)

Diketahui Absorbansi pada y pada HCl 32% = 0,159

y = 0,159

y = 0,0108 x + 0,0041

$$x = \frac{y - 0{,}0041}{0{,}0108}$$

$$x = \frac{0,159 - 0,0041}{0,0108}$$

x = 14,3426 ppm

Karena faktor pengenceran = $\frac{50}{5} = 10$

Maka, konsentrasi menjadi 14,3426 ppm x 10 = 143,426 ppm