

LAMPIRAN

1. Perhitungan hasil pengukuran debit konstan

Debit konstan	Volume (mL)			Waktu (s)
	Displacement	Gelas ukur	Rumus	
420mL/min	141	140	140	20s
	143	145	140	
	140	142	140	
570mL/min	191	190	190	
	190	185	190	
	190	185	190	
75mL/min	250	245	250	
	252	245	250	
	254	250	250	
80mL/min	262	265	266	
	264	260	266	
	263	260	266	
990nL/min	334	320	330	
	333	330	330	
	326	330	330	
1,120mL/min	372	370	373	
	373	370	373	
	370	375	373	
1,160mL/min	387	385	386	
	387	387	386	
	382	390	386	

a. Debit konstan 420 ml/min

1) Perhitungan rata-rata *display*

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{141+143+140}{3} \\ &= 141,3 \text{ mL}\end{aligned}$$

2) Perhitungan rata-rata gelas ukur

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{140+145+142}{3} \\ &= 142,3 \text{ mL}\end{aligned}$$

3) Perhitungan rata-rata rumus

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{140+140+140}{3} \\ &= 140 \text{ mL}\end{aligned}$$

4) Perhitungan rumus

$$\begin{aligned}\text{Volume} &= \text{debit} * \text{waktu} \\ &= 420 * \frac{20}{60} \\ &= 420 * \frac{1}{3} \\ &= \frac{420}{3} \\ &= 140 \text{ mL}\end{aligned}$$

b. Debit konstan 570 ml/min

1) Perhitungan rata-rata *display*

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{191+190+190}{3} \\ &= 190,3 \text{ mL}\end{aligned}$$

2) Perhitungan rata-rata gelas ukur

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{190+185+185}{3} \\ &= 186,67 \text{ mL}\end{aligned}$$

3) Perhitungan rata-rata rumus

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{190+190+190}{3} \\ &= 190 \text{ mL}\end{aligned}$$

4) Perhitungan rumus

$$\begin{aligned}\text{Volume} &= \text{debit} * \text{waktu} \\ &= 570 * \frac{20}{60} \\ &= 570 * \frac{1}{3} \\ &= \frac{570}{3} \\ &= 190 \text{ mL}\end{aligned}$$

c. Debit konstan 750 ml/min

1) Perhitungan rata-rata *display*

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{250+252+254}{3} \\ &= 252 \text{ mL}\end{aligned}$$

2) Perhitungan rata-rata gelas ukur

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{245+245+250}{3} \\ &= 246,67 \text{ mL}\end{aligned}$$

3) Perhitungan rata-rata rumus

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{250+250+250}{3} \\ &= 250 \text{ mL}\end{aligned}$$

4) Perhitungan rumus

$$\begin{aligned}\text{Volume} &= \text{debit} * \text{waktu} \\ &= 750 * \frac{20}{60} \\ &= 750 * \frac{1}{3} \\ &= \frac{750}{3} \\ &= 250 \text{ mL}\end{aligned}$$

d. Debit konstan 800 ml/min

1) Perhitungan rata-rata *display*

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{262+264+263}{3} \\ &= 263\text{mL}\end{aligned}$$

2) Perhitungan rata-rata gelas ukur

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{265+260+260}{3} \\ &= 261,67\text{mL}\end{aligned}$$

3) Perhitungan rata-rata rumus

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{266+266+266}{3} \\ &= 266 \text{ mL}\end{aligned}$$

4) Perhitungan rumus

$$\begin{aligned}\text{Volume} &= \text{debit} * \text{waktu} \\ &= 800 * \frac{20}{60} \\ &= 800 * \frac{1}{3} \\ &= \frac{800}{3} \\ &= 266 \text{ mL}\end{aligned}$$

e. Debit konstan 990 ml/min

1) Perhitungan rata-rata *display*

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{334+333+326}{3} \\ &= 331 \text{ mL}\end{aligned}$$

2) Perhitungan rata-rata gelas ukur

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{320+330+330}{3} \\ &= 326,67 \text{ mL}\end{aligned}$$

3) Perhitungan rata-rata rumus

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{330+330+330}{3} \\ &= 330 \text{ mL}\end{aligned}$$

4) Perhitungan rumus

$$\begin{aligned}\text{Volume} &= \text{debit} * \text{waktu} \\ &= 990 * \frac{20}{60} \\ &= 990 * \frac{1}{3} \\ &= \frac{990}{3} \\ &= 330 \text{ mL}\end{aligned}$$

f. Debit konstan 1,120 ml/min

1) Perhitungan rata-rata *display*

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{372+373+370}{3} \\ &= 371,67 \text{ mL}\end{aligned}$$

2) Perhitungan rata-rata gelas ukur

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{370+370+375}{3} \\ &= 371,67 \text{ mL}\end{aligned}$$

3) Perhitungan rata-rata rumus

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{373+373+373}{3} \\ &= 373 \text{ mL}\end{aligned}$$

4) Perhitungan rumus

$$\begin{aligned}\text{Volume} &= \text{debit} * \text{waktu} \\ &= 1,120 * \frac{20}{60} \\ &= 1,120 * \frac{1}{3} \\ &= \frac{1,120}{3} \\ &= 373 \text{ mL}\end{aligned}$$

g. Debit konstan 1,160 ml/min

1) Perhitungan rata-rata *display*

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{387+385+382}{3} \\ &= 384,67 \text{ mL}\end{aligned}$$

2) Perhitungan rata-rata gelas ukur

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{385+385+390}{3} \\ &= 386,67\text{mL}\end{aligned}$$

3) Perhitungan rata-rata rumus

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{386+386+386}{3} \\ &= 386 \text{ mL}\end{aligned}$$

4) Perhitungan rumus

$$\begin{aligned}\text{Volume} &= \text{debit} * \text{waktu} \\ &= 1,160 * \frac{20}{60} \\ &= 1,160 * \frac{1}{3} \\ &= \frac{1,160}{3} \\ &= 386 \text{ mL}\end{aligned}$$

2. Perhitungan hasil pengukuran *volume* 100mL

Gelas ukur (mL)	Alat TA (mL)	Koreksi	<i>Error %</i>
100	104	4	0,04
100	102	2	0,02
100	101	1	0,01
100	103	3	0,03
100	100	0	0
Rata- rata	102	2	0,02

a. Perhitungan rata-rata pembacaan alat TA

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{104+102+101+103+100}{5} \\ &= 102 \text{ mL}\end{aligned}$$

b. Perhitungan rata-rata koreksi

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{4+2+1+3+0}{5} \\ &= 2\end{aligned}$$

c. Perhitungan *error %*

$$\begin{aligned}\text{error} &= \frac{\text{nilai seharusnya-pembacaan alat}}{\text{nilai sebenarnya}} \\ &= \frac{100-104}{100} \times 100\% \\ &= 0,04\%\end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{100 - 102}{100} \times 100\% \\
 &= 0,02\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{100 - 101}{100} \times 100\% \\
 &= 0,01\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{100 - 103}{100} \times 100\% \\
 &= 0,03\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{100 - 100}{100} \times 100\% \\
 &= 0\%
 \end{aligned}$$

d. Perhitungan rata-rata *error* %

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{0,04 + 0,02 + 0,01 + 0,03 + 0}{5} \\
 &= 0,02\%
 \end{aligned}$$

3. Perhitungan hasil pengukuran *volume* 200mL

Gelas ukur (mL)	Alat (mL)	Koreksi	<i>Error %</i>
200	198	2	0,01
200	204	4	0,02
200	201	1	0,005
200	204	4	0,02
200	197	3	0,015
Rata- rata	200,8	2,8	0,014

a. Perhitungan rata-rata pembacaan alat TA

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{198+204+201+204+197}{5} \\ &= 200,8 \text{ mL}\end{aligned}$$

b. Perhitungan rata-rata koreksi

$$\begin{aligned}\text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\ &= \frac{2+4+1+4+3}{5} \\ &= 2,8\end{aligned}$$

c. Perhitungan *error %*

$$\begin{aligned}\text{error} &= \frac{\text{nilai seharusnya - pembacaan alat}}{\text{nilai sebenarnya}} \\ &= \frac{200-198}{200} \times 100\% \\ &= 0,01\%\end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{200 - 204}{200} \times 100\% \\
 &= 0,02\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{200 - 201}{200} \times 100\% \\
 &= 0,005\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{200 - 204}{200} \times 100\% \\
 &= 0,02\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{200 - 197}{200} \times 100\% \\
 &= 0,015\%
 \end{aligned}$$

d. Perhitungan rata-rata *error* %

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{0,01 + 0,02 + 0,005 + 0,02 + 0,015}{5} \\
 &= 0,014\%
 \end{aligned}$$

4. Perhitungan hasil pengukuran *volume* 300mL

Gelas ukur (mL)	Alat (mL)	Koreksi	<i>Error %</i>
300	300	0	0
300	303	3	0,01
300	300	0	0
300	302	2	0,006
300	300	0	0
Rata- rata	301	1	0,0032

a. Perhitungan rata-rata pembacaan alat TA

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{300+303+300+302+300}{5} \\
 &= 301\text{mL}
 \end{aligned}$$

b. Perhitungan rata-rata koreksi

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{0+3+0+2+0}{5} \\
 &= 1
 \end{aligned}$$

c. Perhitungan *error %*

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya - pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{300-300}{300} \times 100\% \\
 &= 0\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{300 - 303}{300} \times 100\% \\
 &= 0,01\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{300 - 300}{300} \times 100\% \\
 &= 0\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{300 - 302}{300} \times 100\% \\
 &= 0,006\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{300 - 300}{300} \times 100\% \\
 &= 0\%
 \end{aligned}$$

d. Perhitungan rata-rata *error* %

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{0 + 0,01 + 0 + 0,006 + 0}{5} \\
 &= 0,0032\%
 \end{aligned}$$

5. Perhitungan hasil pengukuran *volume* 400mL

Gelas ukur (mL)	alat (mL)	Koreksi	<i>Error %</i>
400	392	8	0,02
400	396	4	0,01
400	398	2	0,005
400	401	1	0,0025
400	400	0	0
Rata- rata	397,4	3	0,0075

a. Perhitungan rata-rata pembacaan alat TA

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{392+396+398+401+400}{5} \\
 &= 397,4\text{mL}
 \end{aligned}$$

b. Perhitungan rata-rata koreksi

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{8+4+2+1+0}{5} \\
 &= 3
 \end{aligned}$$

c. Perhitungan *error %*

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya - pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{400-392}{400} \times 100\% \\
 &= 0,02\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{400 - 396}{400} \times 100\% \\
 &= 0,01\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{400 - 398}{400} \times 100\% \\
 &= 0,005\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{400 - 401}{400} \times 100\% \\
 &= 0,0025\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{400 - 400}{400} \times 100\% \\
 &= 0\%
 \end{aligned}$$

d. Perhitungan rata-rata *error* %

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{0,02 + 0,01 + 0,005 + 0,0025 + 0}{5} \\
 &= 0,0075\%
 \end{aligned}$$

6. Perhitungan hasil pengukuran *volume* 500mL

Gelas ukur (mL)	Alat (mL)	Koreksi	<i>Error %</i>
500	504	4	0,008
500	500	0	0
500	503	3	0,006
500	500	0	0
500	497	3	0,006
Rata- rata	500,8	2	0,004

a. Perhitungan rata-rata pembacaan alat TA

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{504+500+503+500+497}{5} \\
 &= 500,8 \text{ mL}
 \end{aligned}$$

b. Perhitungan rata-rata koreksi

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{4+0+3+0+3}{5} \\
 &= 2
 \end{aligned}$$

c. Perhitungan *error %*

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya-pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{500-504}{500} \times 100\% \\
 &= 0,008\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{500 - 500}{500} \times 100\% \\
 &= 0\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{500 - 503}{500} \times 100\% \\
 &= 0,006\%
 \end{aligned}$$

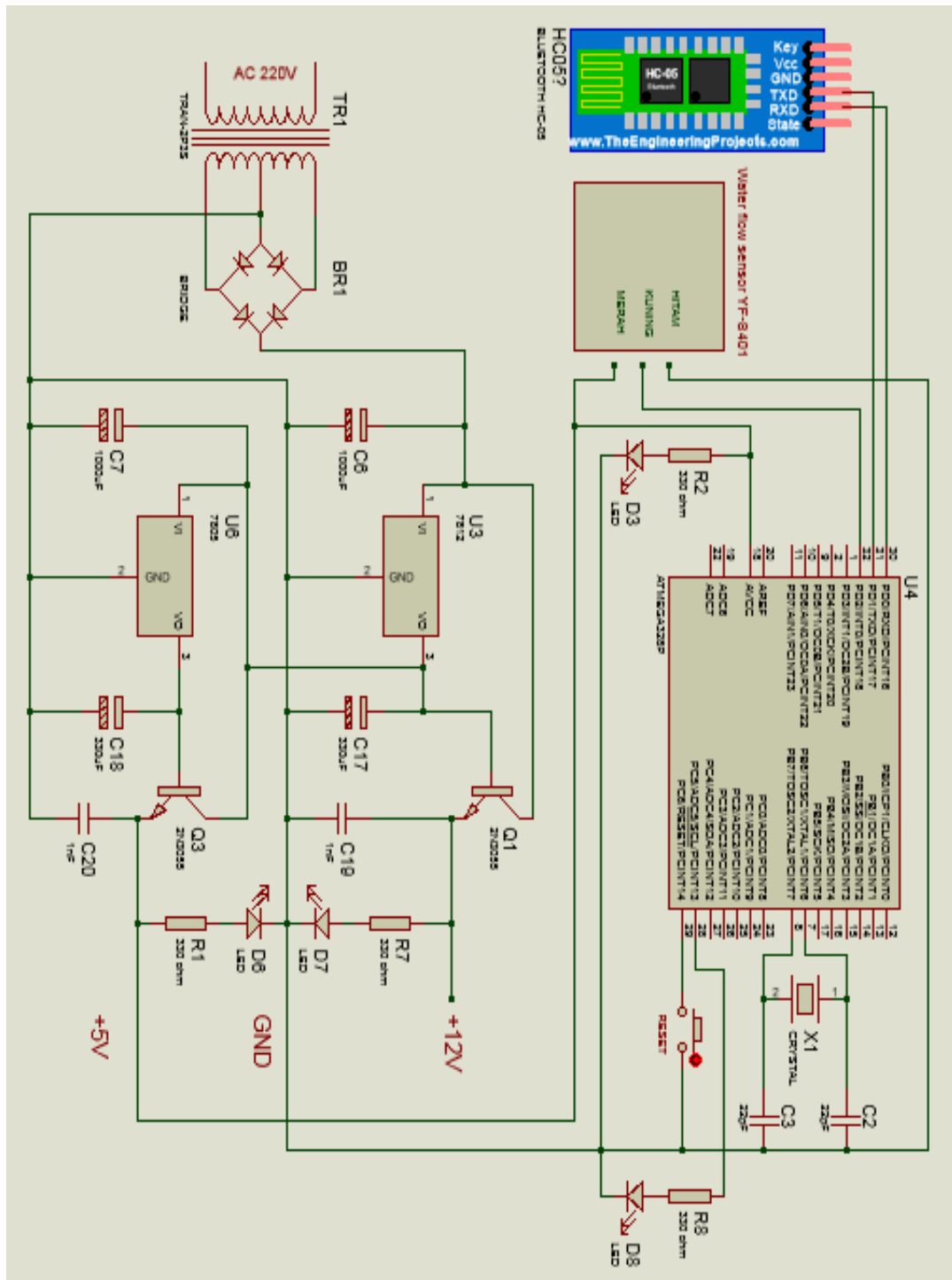
$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{500 - 500}{500} \times 100\% \\
 &= 0\%
 \end{aligned}$$

$$\begin{aligned}
 \text{error} &= \frac{\text{nilai seharusnya} - \text{pembacaan alat}}{\text{nilai sebenarnya}} \\
 &= \frac{500 - 497}{500} \times 100\% \\
 &= 0,006\%
 \end{aligned}$$

d. Perhitungan rata-rata *error* %

$$\begin{aligned}
 \text{Rata - rata} &= \frac{\text{Jumlah data}}{\text{jumlah pengambilan data}} \\
 &= \frac{0,008 + 0 + 0,006 + 0 + 0,006}{5} \\
 &= 0,004\%
 \end{aligned}$$

RANGKAIAN KESELURUHAN



CODING PROGRAM ARDUINO UNO

```
#include <SoftwareSerial.h> // library softserial
SoftwareSerial bt(4,3);//penempatan kaki tx rx di bluetooth
byte indikator = 13; // pin untuk indikator
byte sensorInt = 0;
byte flowsensor = 2 ; // pin untuk waterflow sensor
float konstanta = 50.0; //konstanta flow meter 100ml
volatile byte pulseCount;
float debit; // tipe data debit
unsigned long debitml;
unsigned int flowmlt;//tipe data flowmlt
unsigned long totalmlt;//tipe data totalmlt
unsigned long oldTime;//tipe data oldtime

void setup()
{
  bt.begin(9600);
  Serial.begin(9600);
  pinMode(indikator, OUTPUT);//pin indikator sebagai output
  digitalWrite(indikator, HIGH); // indikator hidup
```

```

pinMode(flowsensor, INPUT); // pin pada sensor waterflow sebagai
inout untuk menghasilkan flowrate dan volume

digitalWrite(flowsensor, HIGH); // sensor akan bernilai high untuk
mendapatkan output.

pulseCount = 0; // semua counter atau nilai berawal dari nol
debit = 0.0; // semua counter atau nilai berawal dari nol
flowmlt = 0; // semua counter atau nilai berawal dari nol
totalmlt = 0; // semua counter atau nilai berawal dari nol
oldTime = 0; // semua counter atau nilai berawal dari nol
attachInterrupt(sensorInt, pulseCounter, FALLING); // aktifkan
interupsi
}
void loop()
{
  if((millis() - oldTime) > 1000) // pengambilan data setiap 1000 mili
second
  {
    detachInterrupt(sensorInt); // non aktifkan interupsi
    debit = (((1000.0 / (millis() - oldTime)) * pulseCount) / konstanta); //
rumus debit
    oldTime = millis();
    debitml=(debit*1000); // rumus dari L ke mL
    flowmlt = (debit / 60)*1000; // rumus volume
    totalmlt += flowmlt; // nilai volume
    unsigned int frac;

```

```
bt.print(debitml); bt.println('a');  
delay(100);  
bt.print(totalmlt); bt.println('b');  
delay(100);  
  
Serial.println("TES KONEKSI");  
Serial.print ("debit"); Serial.println(debitml);  
Serial.print ("volume");Serial.println (totalmlt);  
Serial.println("KONEKSI BERHASIL");  
  
pulseCount = 0;// pilse count 0  
attachInterrupt(sensorInt, pulseCounter, FALLING);//aktifkan  
interupsi  
}}  
  
void pulseCounter()//data counter terus  
{  
pulseCount++;  
}
```

CODING PROGRAM DELPHI7

```
interface
uses
  Windows, Messages, SysUtils, Variants, Classes, Graphics, Controls, Forms,
  Dialogs, CPort, StdCtrls, Buttons, ComCtrls, strutils, ExtCtrls,
  TeeProcs, TeEngine, Chart, Series, jpeg;
type
  TForm1 = class(TForm)
    Edit1: TEdit;
    Button1: TButton;
    Button3: TButton;
    ComPort1: TComPort;
    Memo1: TMemo;
    Button4: TButton;
    Label1: TLabel;
    Label2: TLabel;
    Edit2: TEdit;
    Label6: TLabel;
    Button5: TButton;
    Label7: TLabel;
    Label8: TLabel;
    Chart1: TChart;
    Series3: TFastLineSeries;
    Image1: TImage.
```

```

procedure Memo1Change(Sender: TObject);
procedure Button4Click(Sender: TObject);
procedure Button5Click(Sender: TObject);
private
  { Private declarations }
public
  { Public declarations }
end;

var
  Form1: TForm1;
implementation
{$R *.dfm}
procedure TForm1.Button1Click(Sender: TObject);
begin
  if button1.Caption='CONNECT' then
  begin
    comport1.Port:='COM7';
    comport1.Open;
    button1.Caption:='DISCONNECT';
  end else
  if button1.Caption='DISCONNECT' then
  begin
    comport1.close;
    button1.Caption:='CONNECT';
  end;
end;

```



```

    end;
end;
procedure TForm1.Button3Click(Sender: TObject);
begin
    series3.Clear;
    memo1.Clear;
    edit1.Clear;
    edit2.Clear;
end;
procedure TForm1.ComPort1RxChar(Sender: TObject; Count: Integer);
var buff:string;
begin
    comport1.ReadStr(buff,count);
    memo1.Text:=memo1.Text + buff;
end;
procedure TForm1.Memo1Change(Sender: TObject);
var a,b:integer; x:integer; ambil,ambilin:string; hitung,vlm:double;
begin
    ambil:=memo1.Lines[memo1.Lines.count-1];
    ambilin:=memo1.Lines[memo1.Lines.count-2];
    if rightstr(ambil,1)='a' then
    begin
        edit1.Text:=leftstr(ambil,length(ambil)-1);
        hitung:=strtofloat(edit1.Text);
        edit1.Text:=floattostr(hitung);
    end;
end;

```

```

vlm:=hitung/60*1000;
edit2.Text:=floattostr(vlm);

chart1.Series[0].Add(hitung,"clyellow);
x:=chart1.GetMaxValuesCount;
end;
if rightstr(ambilin,1)='b' then
begin
edit2.Text:=leftstr(ambilin,length(ambilin)-1);
end;
if edit2.Text='0' then
begin
series3.Clear;
end;end;
procedure TForm1.Button4Click(Sender: TObject);
begin
application.Terminate;
end;

procedure TForm1.Button5Click(Sender: TObject);
var
DCDesk:HDC;
bmp:TBitmap;
begin

```

```
//buat bitmap
bmp:=TBitmap.Create;

//atur ukuran bitmap
bmp.Height:=Screen.Height;
bmp.Width:=Screen.Width;

//menangkap desktp
DCDesk:=GetWindowDc(GetDesktopWindow);

//salin image
BitBlt(bmp.Canvas.Handle, 0, 0, Screen.Width, Screen.Height,
DCDesk, 0, 0, SRCCOPY);

//simpan bitmap
bmp.SaveToFile('CAPTURE.bmp');

ReleaseDC(GetDesktopWindow, DCDesk);
bmp.Free;
end;
end.
```