LAMPIRAN

1. Hasil Perhitungan Kelembaban

A. Contoh Hasil Perhitungan Pada Test Point Sensor Kelembaban Suhu 32 ºC dan 33 ºC

Pada Suhu 32 ºC

Display

$$\text{Xn} = \frac{63.22 + 63.12 + 63.12 + 63.32 + 63.42 + 63.52 + 62.52 + 62.42 + 62.42 + 62.31}{10}$$

Xn = 62.939

Test Point

$$\text{Xn} = \frac{2.186 + 2.183 + 2.183 + 2.191 + 2.193 + 2.196 + 2.186 + 2.183 + 2.183 + 2.179}{10}$$

Xn = 2.1863

Pada Suhu 33 ºC

Display

$$\text{Xn} = \frac{61.59 + 60.98 + 60.87 + 60.67 + 60.67 + 60.67 + 60.57 + 60.57 + 60.06 + 60.06}{10}$$

Xn = 60.671

Test Point

$$\text{Xn} = \frac{2.101 + 2.101 + 2.096 + 2.096 + 2.101 + 2.099 + 2.096 + 2.093 + 2.064 + 2.062}{10}$$

Xn = 2.0909

B. Contoh Hasil Perhitungan Kelembaban Terhadap Kalibrator di Dalam Inkubator Bayi Pada Titik 32 ºC dan 33 ºC

a. Hasil Perhitungan Kelembaban Pada Setting Suhu 32°C

Nilai Rata-rata Pada Display Modul:

$$\text{Xn} = \frac{63.12 + 63.12 + 63.22 + 63.42 + 63.42 + 63.52 + 63.52 + 62.72 + 62.61 + 62.62}{10}$$

Xn (Modul TA) = 63.029

Nilai Rata-rata Pada Pembanding Modul:

$$\text{Xn} = \frac{62 + 62.3 + 62.4 + 62.5 + 62.5 + 63.3 + 61.8 + 662 + 61.9 + 61.8}{10}$$

Xn (Pembanding) = 62.25

Simpangan:

Simpangan = 63.029 - 62.25 = 0.779

Error (%):

$$\% = \frac{63.029 - 62.25}{63.029} \text{x } 100\% = 1.251405622\ \%$$

Standar Deviasi

$$\text{SD} \sqrt{\frac{(63.12 - 63.029)^2 + (63.12 - 63.029)^2 + (63.22 - 63.029)^2 + (63.42 - 63.029)^2 + (63.52 - 63.029)^2}{10 - 1}}$$

$$\sqrt{\frac{(63.52 - 63.029)^2 + (63.52 - 63.029)^2 + (62.72 - 63.029)^2 + (62.61 - 63.029)^2 + (62.62 - 63.029)^2}{10 - 1}}$$

SD = 0.37966213

Ua (ketidakpastian):

$$Ua = \frac{0.37966213}{\sqrt{10 - 1}} = 0.126554043$$

b. Hasil Perhitungan Kelembaban Pada Setting Suhu 33°C

Nilai Rata-rata Pada Display Modul:

$$\text{Xn} = \frac{61.39 + 61.29 + 61.18 + 60.87 + 60.87 + 60.87 + 60.77 + 60.77 + 60.77 + 60.67}{10}$$

Xn (Modul TA) = 60.945

Nilai Rata-rata Pada Pembanding Modul:

$$\text{Xn} = \frac{60.5 + 60.4 + 60.4 + 60.2 + 60.1 + 60.1 + 60.1 + 60 + 60 + 59.9}{10}$$

Xn (Pembanding) = 60.17

Simpangan:

Simpangan = 60.945- 60.17= 0.775

Error (%):

$$\% = \frac{60.945 - 60.17}{60.945} \text{x } 100\% = 1.288017284\ \%$$

Standar Deviasi

$$\text{SD} \sqrt{\frac{(61.39 - 63.029)^2 + (61.29 - 63.029)^2 + (60.87 - 63.029)^2 + (60.87 - 63.029)^2 + (60.87 - 63.029)^2}{10 - 1}}$$

$$\sqrt{\frac{(60.77 - 63.029)^2 + (60.77 - 63.029)^2 + (61.29 - 63.029)^2 + (60.77 - 63.029)^2 + (60.67 - 63.029)^2}{10 - 1}}$$

SD = 0.248696602

Ua (ketidakpastian):

$$Ua = \frac{0.248696602}{\sqrt{10 - 1}} = 0.082898867$$

C. Contoh Hasil Perhitungan Kebisingan Terhadap Kalibrator Dengan Sound Generator Pada Aplikasi Laptop Titik 35 dB dan 40 dB

a. Hasil Perhitungan Kelembaban Pada Setting Suhu 35 dB

Nilai Rata-rata Pada Display Modul:

$$\text{Xn} = \frac{35.12 + 34.81 + 35.32 + 35.72 + 34.68 + 35.81 + 36.73 + 35.99 + 34.99 + 35.25}{10}$$

Xn (Modul TA) = 35.442

Nilai Rata-rata Pada Pembanding Modul:

$$\text{Xn} = \frac{35.7 + 34.9 + 35.5 + 34.9 + 36.1 + 36.9 + 36.4 + 35.2 + 35.5 + 36.1}{10}$$

Xn (Pembanding) = 35.72

Simpangan:

Simpangan = 35.72- 35.442= -0.278

Error (%):

$$\% = \frac{35.72 - 35.442}{5.72} \text{x } 100\% = 0.778275476\ \%$$

Standar Deviasi

$$\text{SD} \sqrt{\frac{(35.12 - 63.029)^2 + (34.81 - 63.029)^2 + (35.32 - 63.029)^2 + 35.72 - 63.029)^2 + (34.68 - 63.029)^2}{10 - 1}}$$

$$\sqrt{\frac{(35.81 - 63.029)^2 + (36.73 - 63.029)^2 + (35.99 - 63.029)^2 + (34.99 - 63.029)^2 + (35.25 - 63.029)^2}{10 - 1}}$$

SD = 0.62465635

Ua (ketidakpastian):

$$Ua = \frac{0.62465635}{\sqrt{10 - 1}} = 0.208218783$$

b. Hasil Perhitungan Kebisingan Pada Setting Suhu 35 dB

Nilai Rata-rata Pada Display Modul:

$$X = \frac{40.16 + 40.48 + 39.8 + 40.97 + 40 + 40.8 + 41.98 + 40.16 + 41.6 + 41.92}{10}$$

Xn (Modul TA) = 40.787

Nilai Rata-rata Pada Pembanding Modul:

$$Xn = \frac{40.3 + 40.2 + 39.4 + 40.9 + 39.6 + 40.9 + 42.4 + 40.2 + 41.7 + 41.8}{10}$$

Xn (Pembanding) = 40.74

Simpangan:

Simpangan = 40.74 - 40.787 = 0.047

Error (%):

$$\% = \frac{40.74 - 40.787}{40.74} \text{x } 100\% = 0.115365734\ \%$$

Standar Deviasi

$$SD \sqrt{\frac{(40.16 - 63.029)^2 + (40.48 - 63.029)^2 + (39.8 - 63.029)^2 + 40.97 - 63.029)^2 + (40 - 63.029)^2}{10 - 1}}$$

$$\sqrt{\frac{(40.8 - 63.029)^2 + (41.98 - 63.029)^2 + (40.16 - 63.029)^2 + (41.6 - 63.029)^2 + (41.92 - 63.029)^2}{10 - 1}}$$

SD = 0.807988586

Ua (ketidakpastian):

$$Ua = \frac{0.807988586}{\sqrt{10 - 1}} = 0.269329529$$

2. Program Arduino

```
#include
<LiquidCrystal.h>
LiquidCrystal lcd(0,
1, 2, 3, 4, 5);

//SUHU
float T1;
float T2;
float T3;
float T4;

float suhu1;
float suhu2;
float suhu3;
float suhu4;

float
referenceVoltage;

unsigned int adc1;
unsigned int adc2;
unsigned int adc3;
unsigned int adc4;

int temp1=A0;
int temp2=A1;
int temp3=A2;
int temp4=A3;

// Kelembaban Dan
Kebisingan
float Kelembaban=4;
float Kebisingan=5;

float Humidity;
float dBmeter;

unsigned int
ValueHumidity;
unsigned int
ValuedBmeter;

void setup()
{

analogReference(EXTERN
AL);

referenceVoltage=3.3;
  lcd.begin(20, 4);
  lcd.setCursor(1,1);
  lcd.print("Incubator
Analyzer ");
  delay(1000);
  lcd.setCursor(2,2);

lcd.print("ELEKTROMEDI
K UMY");
  delay(4000);
  lcd.clear();
}

void loop()
{

// SUHU
  adc1=0;
  adc2=0;
  adc3=0;
  adc4=0;

// Kelembaban
  ValueHumidity = 0;
  ValuedBmeter = 0;

  for(int i=0; i<30;
i++)
  {
    adc1
+=analogRead(temp1);
    adc2
+=analogRead(temp2);
    adc3
+=analogRead(temp3);
```

```
    adc4
+=analogRead(temp4);

  }

  // Kelembaban dan
Kebisingan
  for(int i = 0; i <
50; i++)
  {
    ValueHumidity +=
analogRead(Kelembaban)
;
  }
  for(int i = 0; i <
50; i++)
  {
    ValuedBmeter  +=
analogRead(Kebisingan)
;
  }

//Rumus SUHU
  T1=(adc1/30);
  T2=(adc2/30);
  T3=(adc3/30);
  T4=(adc4/30);


suhu1=(T1*11)/199.5254
24-3.32;

suhu2=(T2*11)/199.5254
24-4.3;

suhu3=(T3*11)/199.5254
24-3.32;

suhu4=(T4*11)/199.5254
24-4.9;

// Rumus Kelembaban
dan Kebisingan
  Humidity
=(ValueHumidity/50)*3.
3/1023;
  float hasilHumidity
= (31.847*Humidity)-
3.5;


dBmeter=(ValuedBmeter/
50)*3.3/1023;
  float  hasildBmeter=
(dBmeter*50)+3.5 ;

// Tampil SUHU
  if (hasildBmeter >
99);
  {
    lcd.clear();
  }
  lcd.setCursor(0,0);
  lcd.print("T1:");
  lcd.print(suhu1);
  lcd.print("C");

  lcd.setCursor(0,1);
  lcd.print("T2:");
  lcd.print(suhu2);
  lcd.print("C");

  lcd.setCursor(0,2);
  lcd.print("T3:");
  lcd.print(suhu3);
  lcd.print("C");

  lcd.setCursor(0,3);
  lcd.print("T4:");
  lcd.print(suhu4);
  lcd.print("C");

//Tampil Kelembaban
dan kebisingan
  lcd.setCursor(11,0);
```

```
lcd.print("Humidity");

  lcd.setCursor(11,1);
  lcd.print(":");

lcd.print(hasilHumidit
y);
  lcd.print("%");

  lcd.setCursor(11,2);
  lcd.print("dB
Meter");

  lcd.setCursor(11,3);
  lcd.print(":");

lcd.print(hasildBmeter
);
  lcd.print("dB");

  lcd.setCursor(10,0);
  lcd.print("|");

  lcd.setCursor(10,1);
  lcd.print("|");

  lcd.setCursor(10,2);
  lcd.print("|");

  lcd.setCursor(10,3);
  lcd.print("|");


  delay(1000);
}
```