

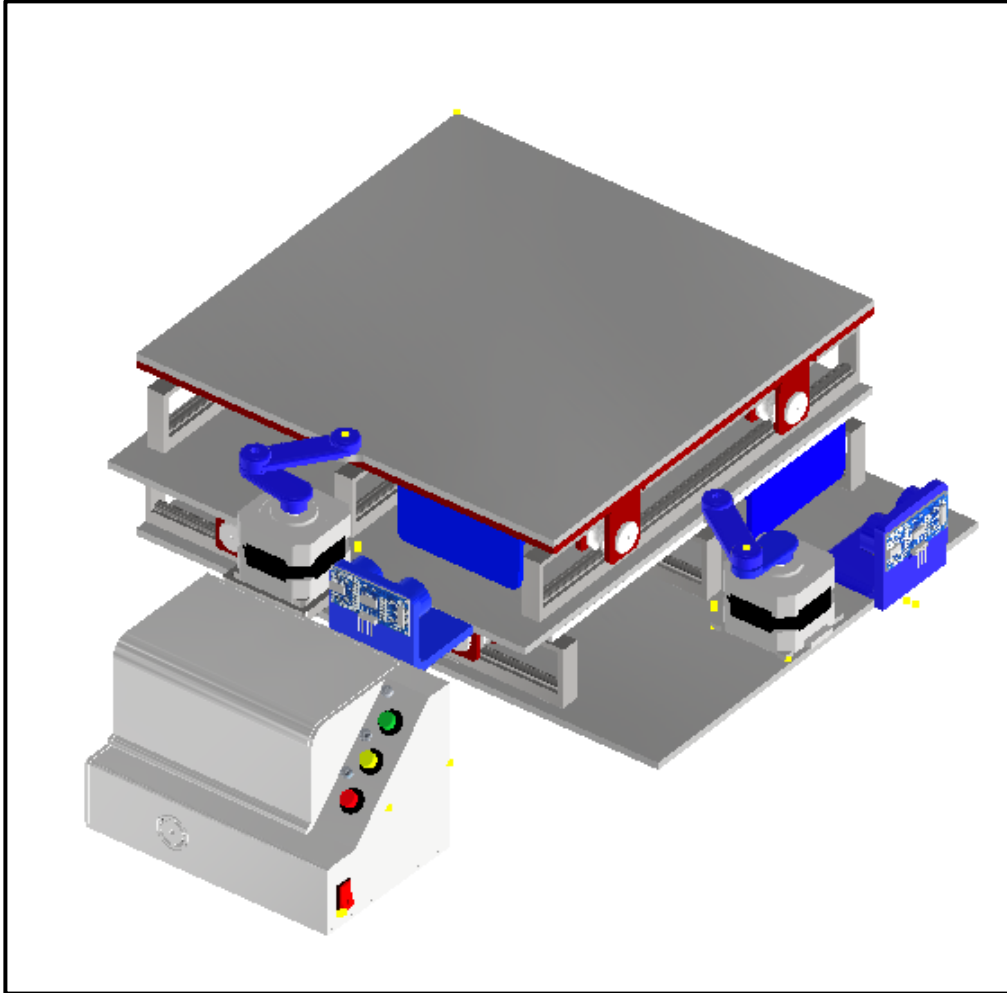
DAFTAR PUSTAKA

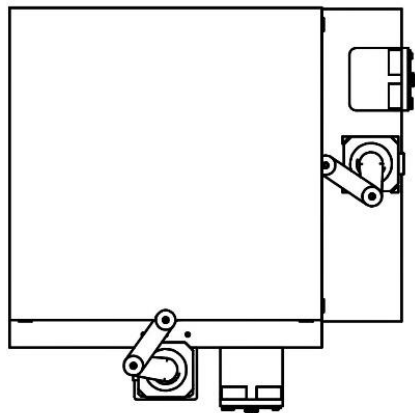
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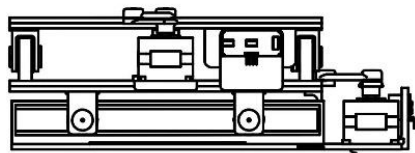
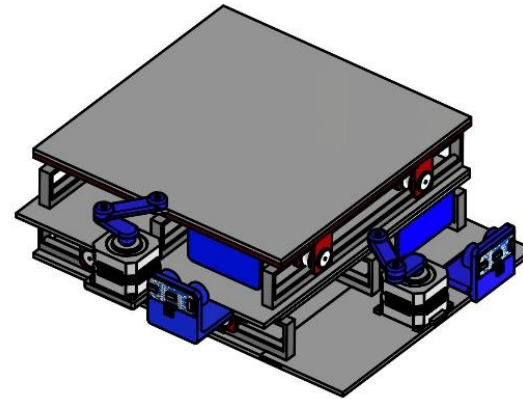
LAMPIRAN

Desain Shake Table

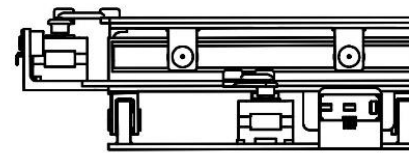




TOP VIEW

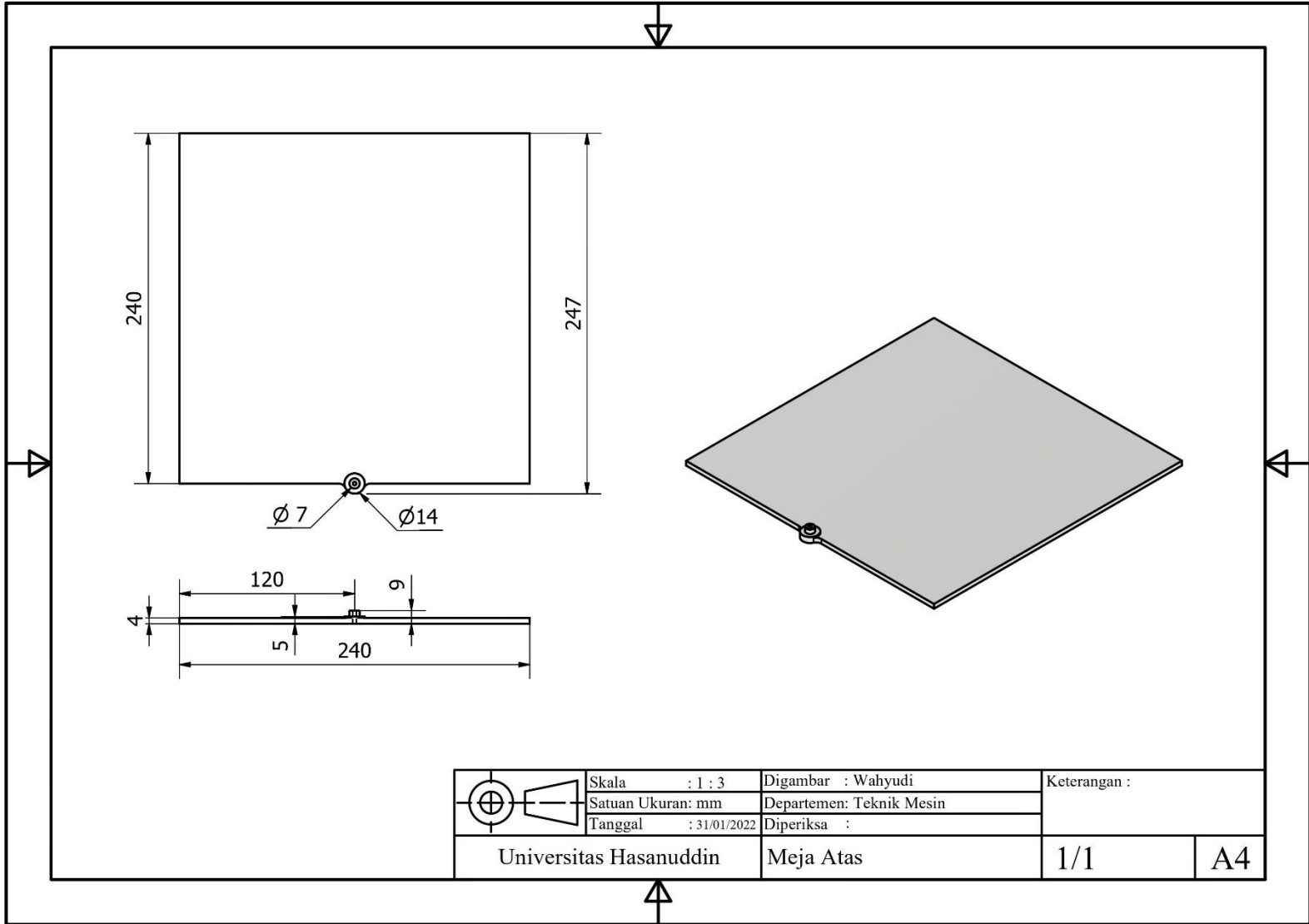


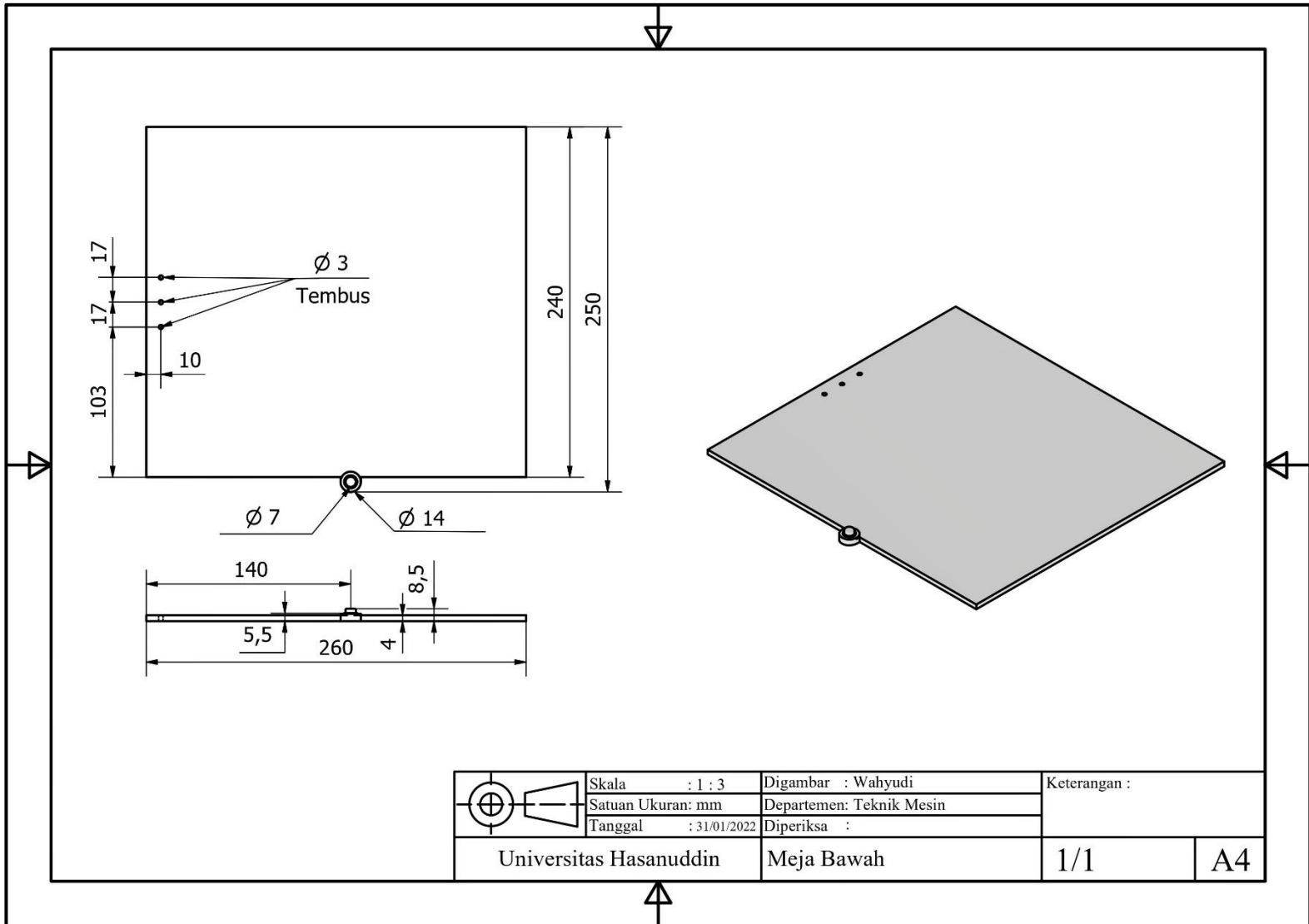
FRONT VIEW

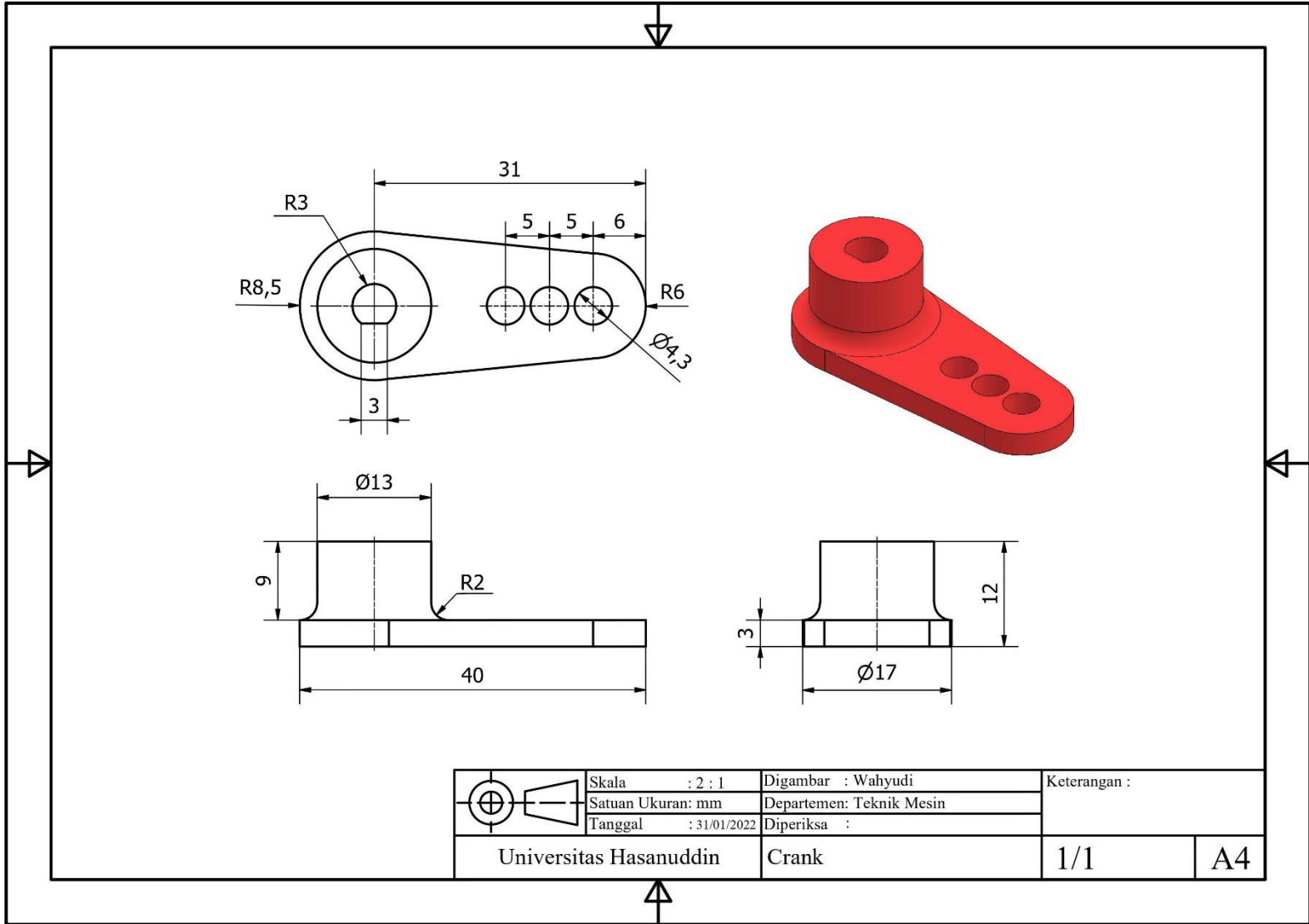


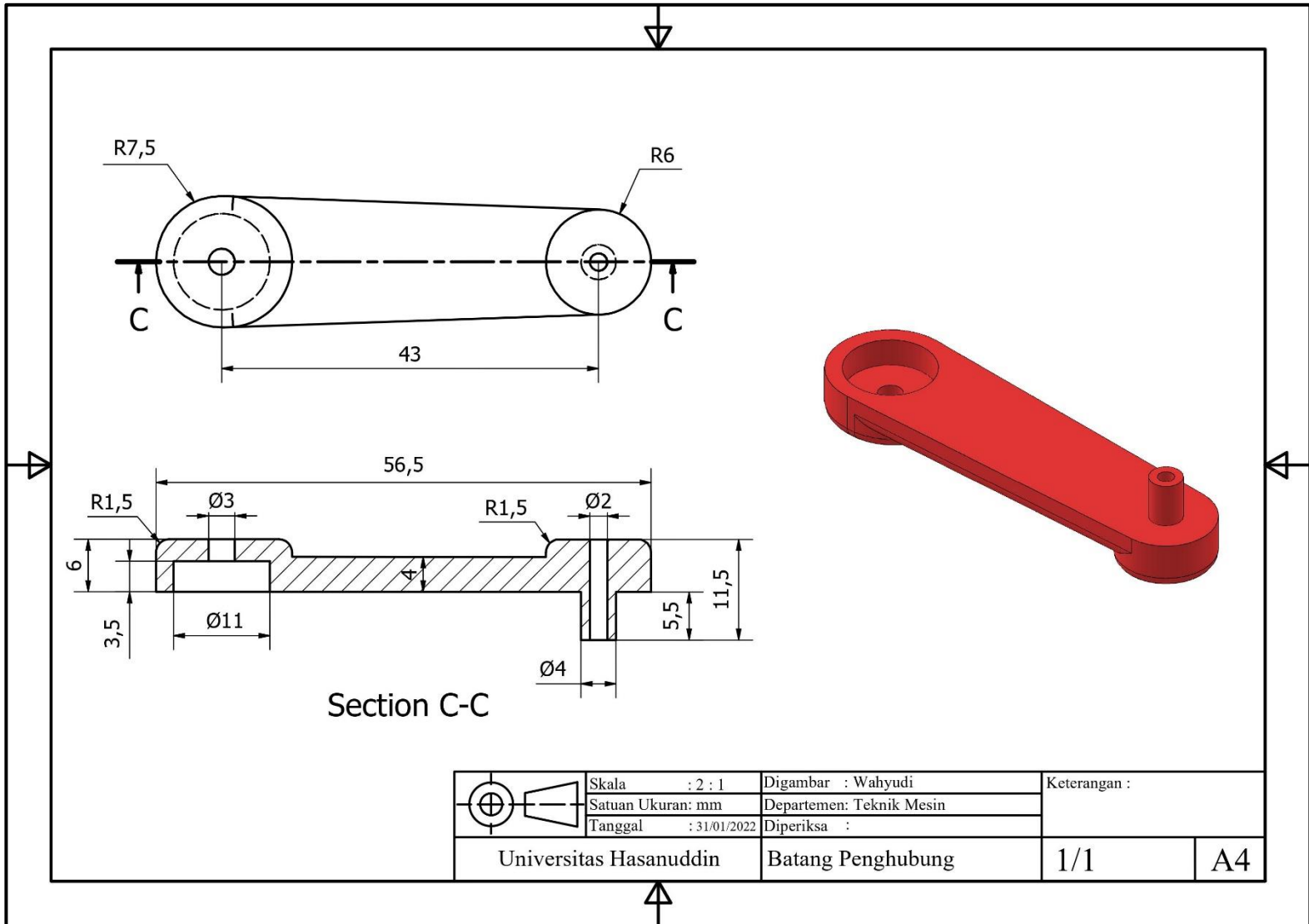
SIDE VIEW

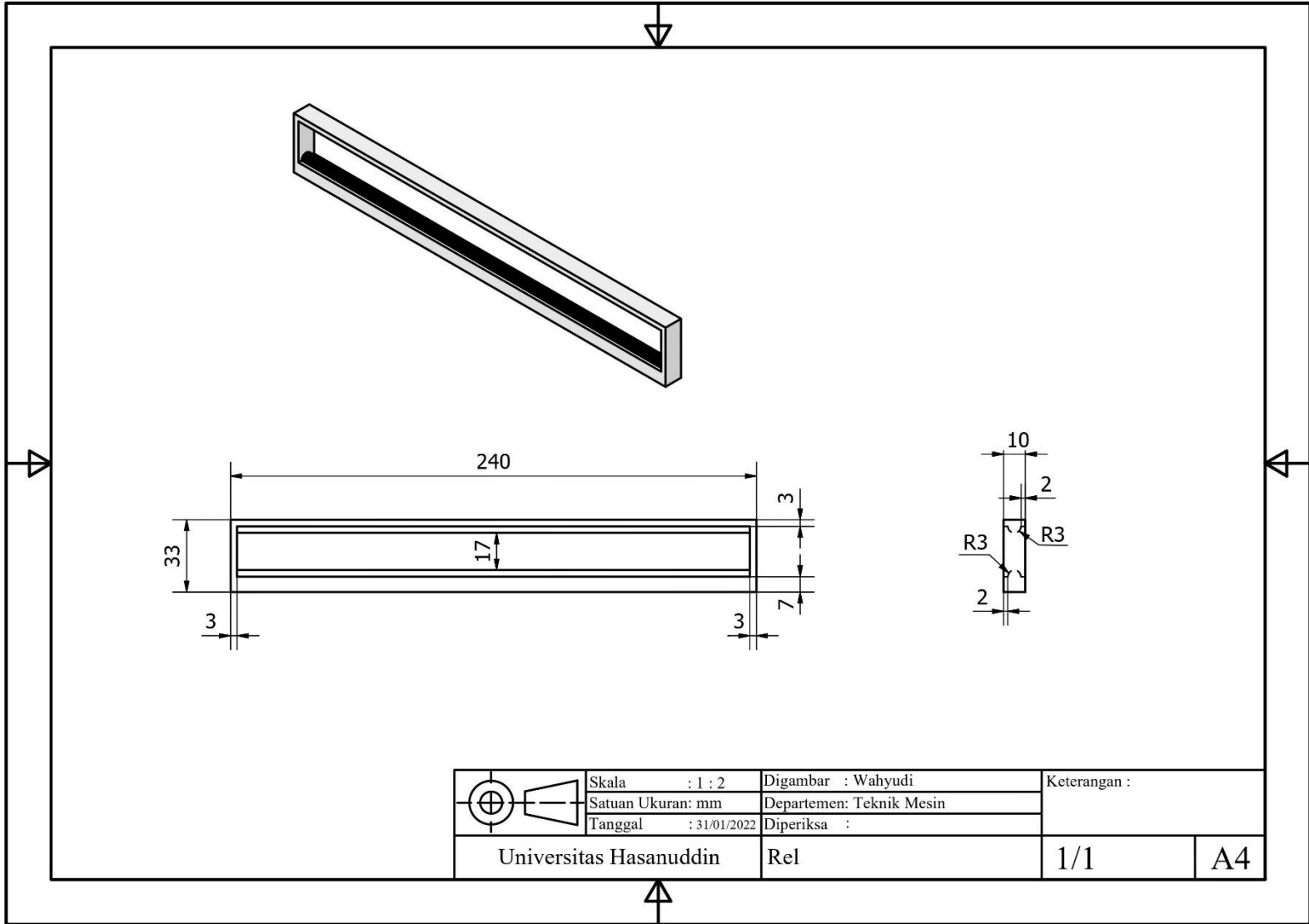
	Skala : 1 : 4	Digambar : Wahyudi	Keterangan :	
	Satuan Ukuran: mm	Departemen: Teknik Mesin		
	Tanggal : 31/01/2022	Diperiksa :		
Universitas Hasanuddin		Shake Table	1/1	A4

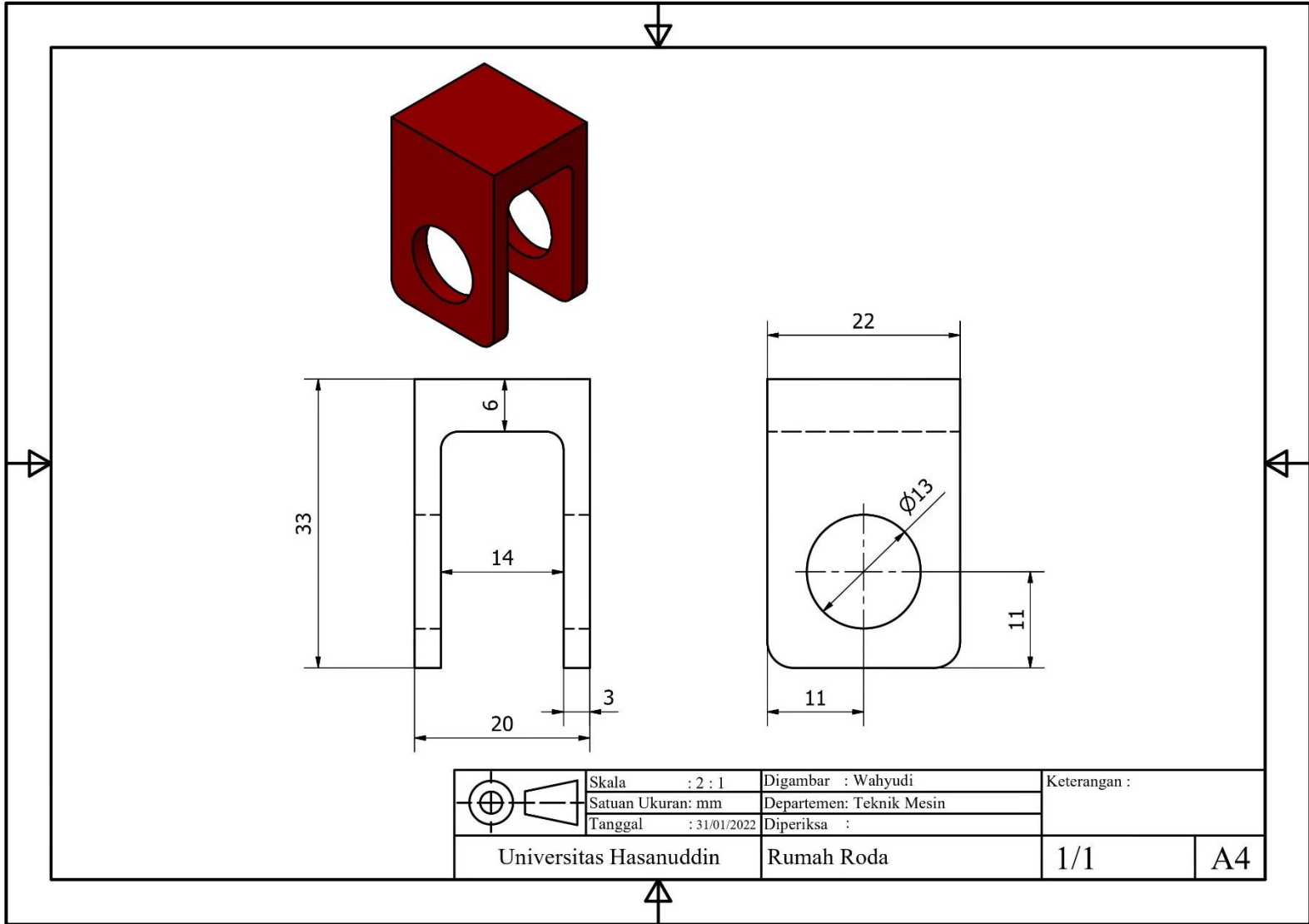


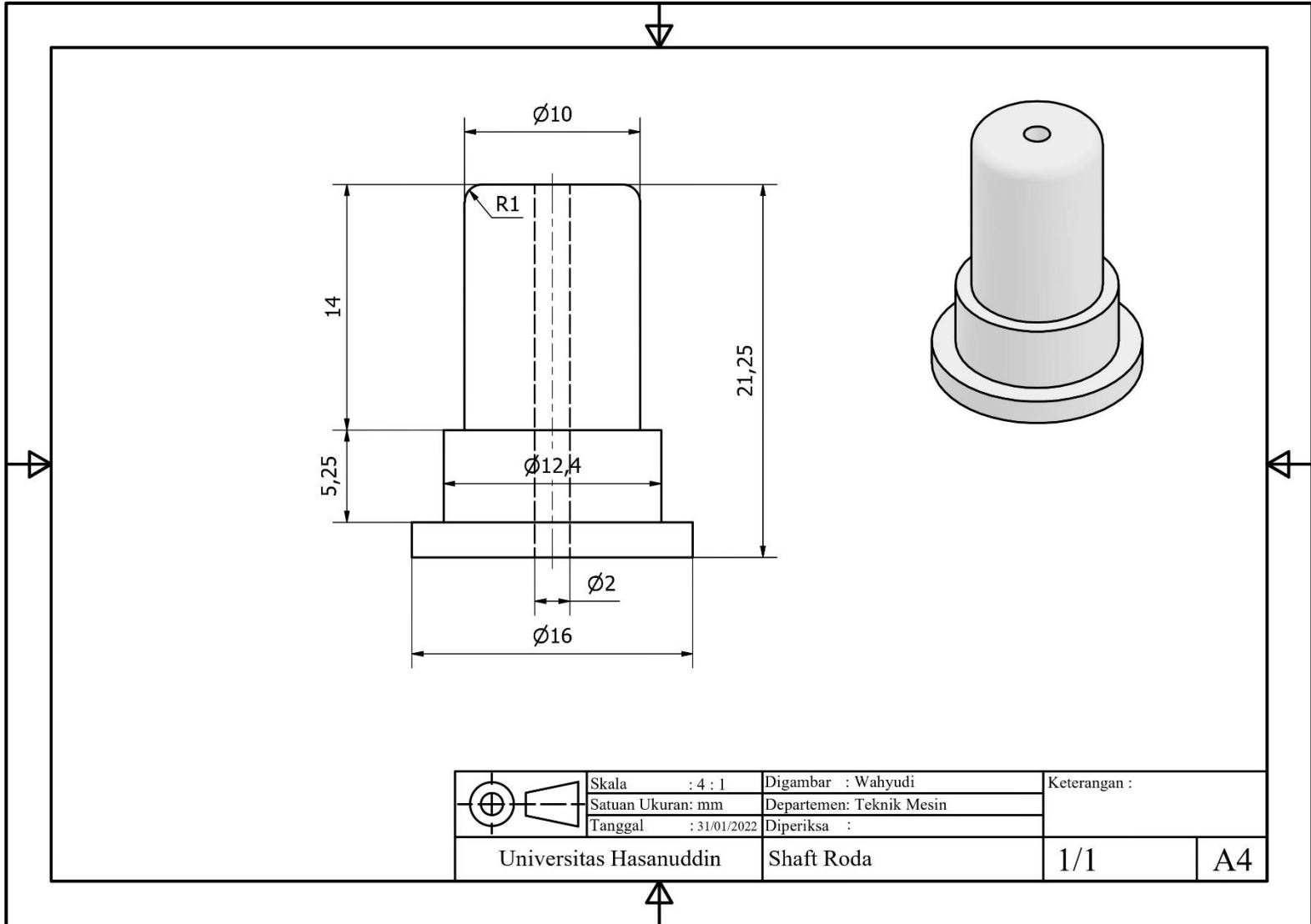


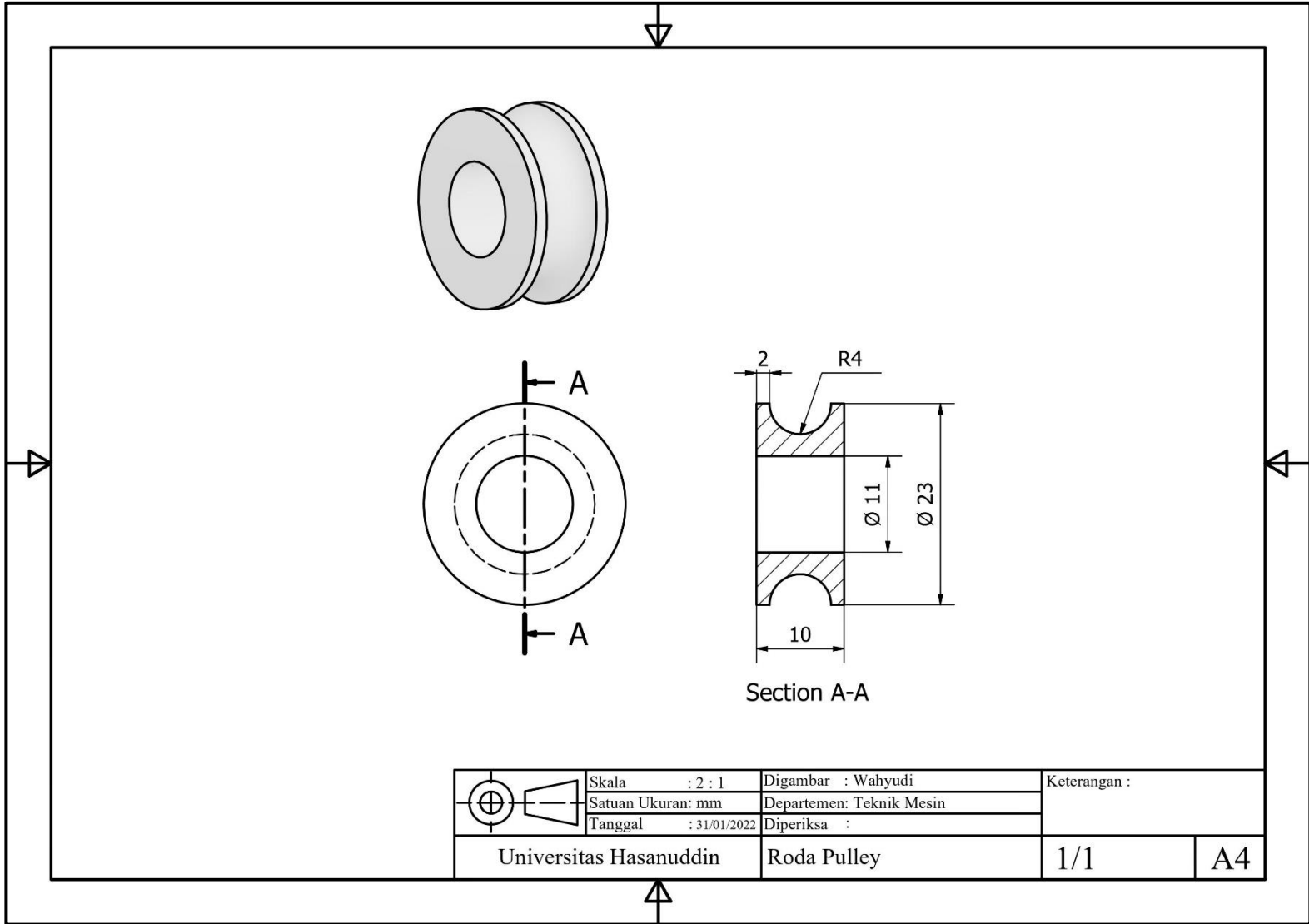


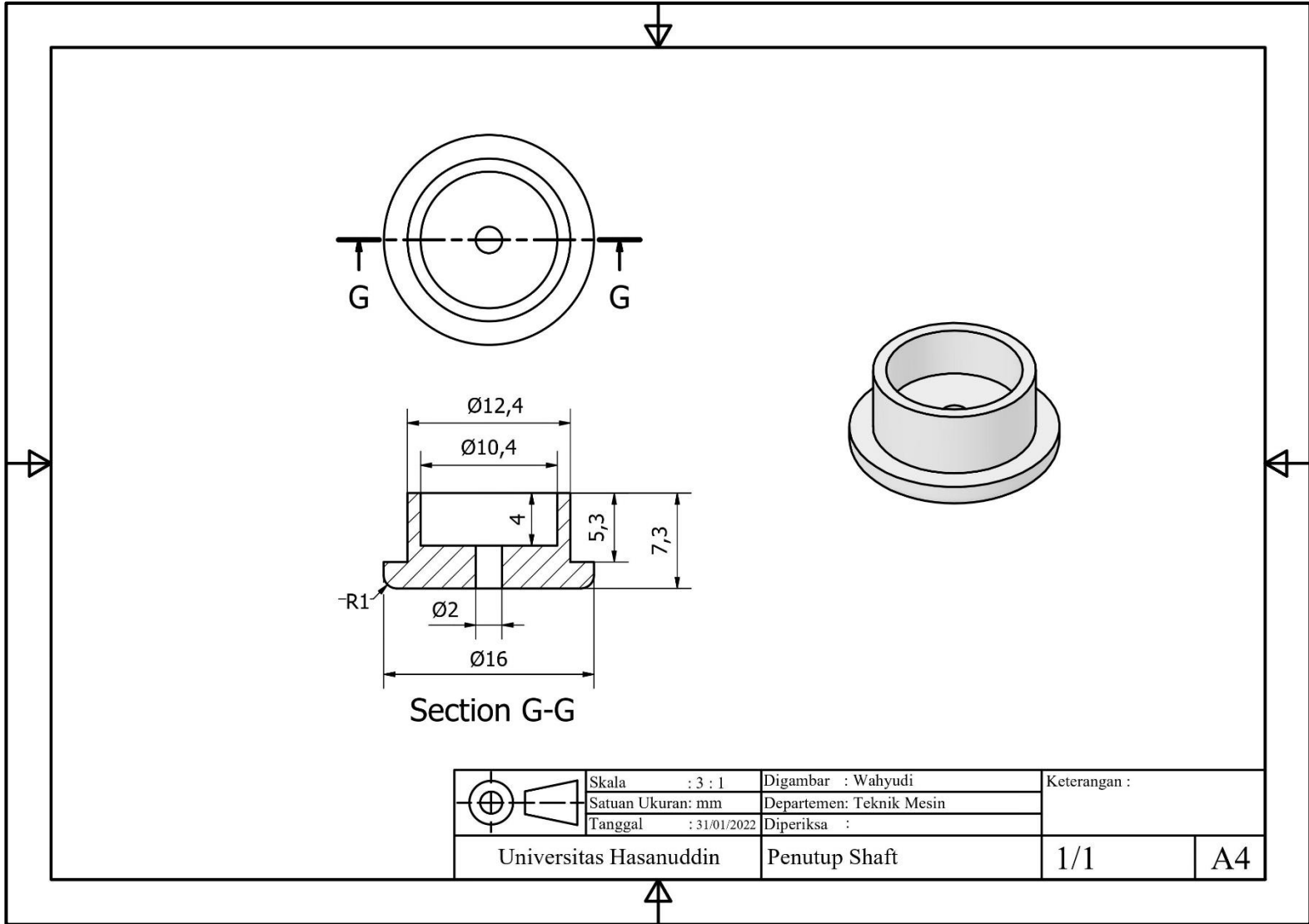








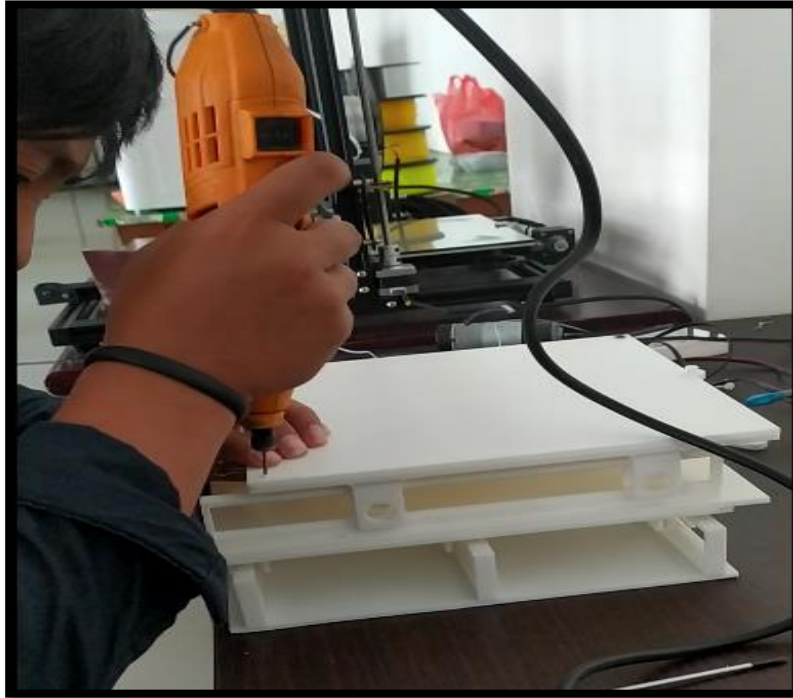




Perbandingan Simpangan *Shaking Table* secara Analitik dan Ekperimental

Step	Pertambahan Sudut (°)	Posisi Sudut (°)		X _{p_n} CCW (mm)	X _{p_n} CW (mm)	Secara Analitik		Secara Ekperimental	
		CCW	CW			CCW (mm)	CW (mm)	CCW (mm)	CW (mm)
0	0	74.7	74.7	42.84	42.84	0.00	0.00	0	0
5	4.5	79.2	70.2	40.67	45.03	-2.16	2.20	-1.5	1.5
10	9	83.7	65.7	38.56	47.25	-4.27	4.42	-4.5	4.5
15	13.5	88.2	61.2	36.52	49.46	-6.31	6.63	-6.5	6.7
20	18	92.7	56.7	34.57	51.65	-8.26	8.81	-7.5	8.5
25	22.5	97.2	52.2	32.71	53.79	-10.12	10.95	-9.5	10.5
30	27	101.7	47.7	30.96	55.85	-11.87	13.01	-11.5	12.5
35	31.5	106.2	43.2	29.32	57.82	-13.51	14.98	-13.5	15.5
40	36	110.7	38.7	27.80	59.67	-15.03	16.83	-14.5	16.5
45	40.5	115.2	34.2	26.41	61.38	-16.43	18.55	-15.5	18.5
50	45	119.7	29.7	25.13	62.93	-17.71	20.10	-17.5	19.5
55	49.5	124.2	25.2	23.98	64.30	-18.86	21.47	-17.5	20.5
60	54	128.7	20.7	22.94	65.48	-19.89	22.64	-19.5	21.5
65	58.5	133.2	16.2	22.02	66.44	-20.81	23.61	-20.5	22.5
70	63	137.7	11.7	21.22	67.18	-21.62	24.35	-21.5	23.5
75	67.5	142.2	7.2	20.52	67.69	-22.32	24.85	-21.5	23.5
80	72	146.7	2.7	19.91	67.96	-22.92	25.12	-21.5	24.5
83	74.7	149.4	0	19.60	68.00	-23.24	25.16	-22.5	24.5
85	76.5	151.2		19.41		-23.43		-22.5	
90	81	155.7		18.98		-23.85		-22.5	
95	85.5	160.2		18.64		-24.19		-23.5	
100	90	164.7		18.38		-24.46		-23.5	
105	94.5	169.2		18.19		-24.65		-23.5	
110	99	173.7		18.06		-24.77		-24.5	
115	103.5	178.2		18.01		-24.83		-24.5	

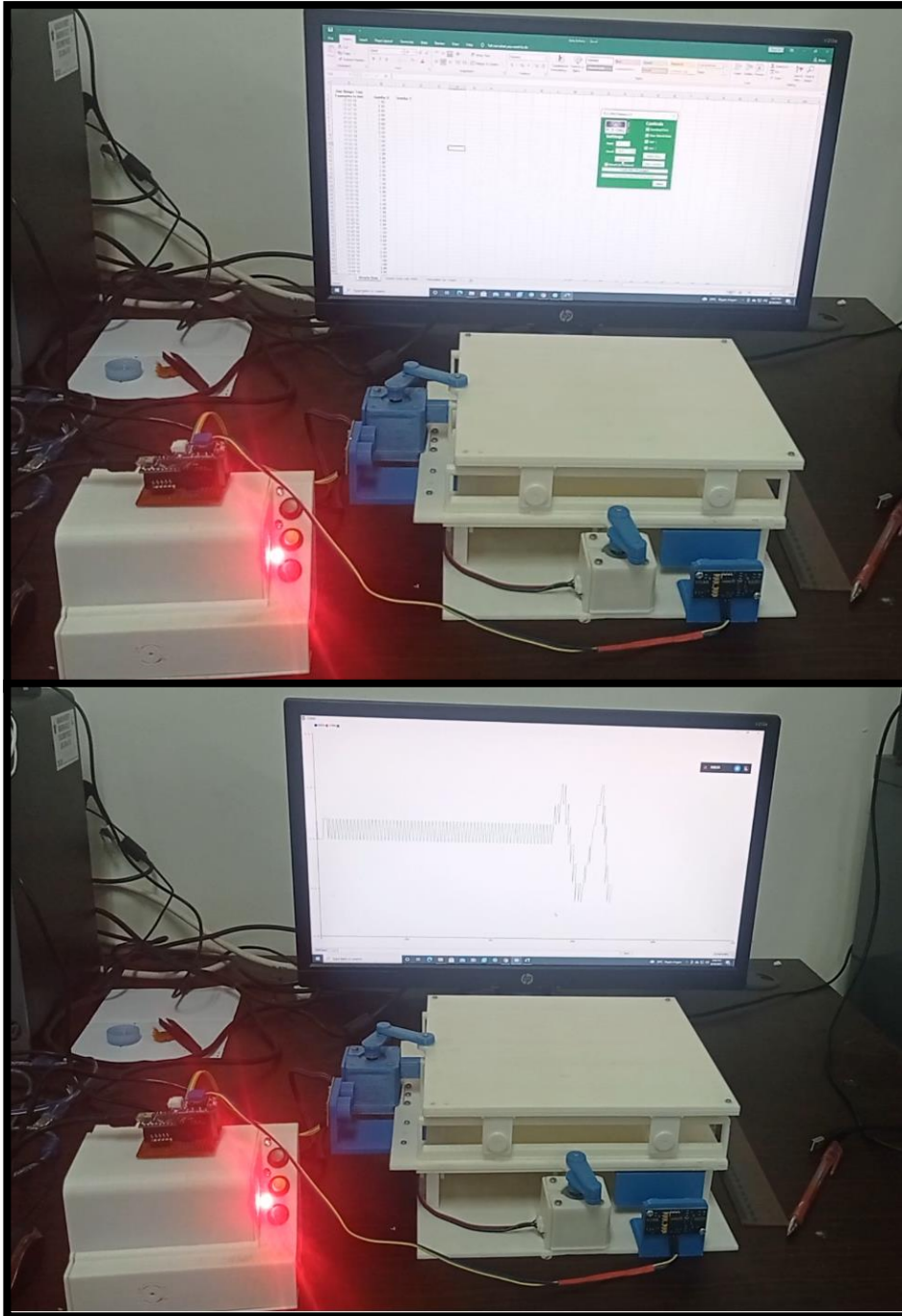
Perakitan Meja Simulasi



Perakitan Sistem Kelistrikan



Monitoring Simulasi Shaking Table



Kode Perintah pada Sistem penggerak Meja Simulasi

```
// Control and Robotic Laboratory
// Wahyudi
// D2115033
// Rancang Bangun Shaking Table Untuk Simulasi Gempa Bumi Pada Sumbu X dan
Sumbu Y

#include <AFMotor.h>

const int ledpin    = 30; //sumbuX
const int ledpin1   = 26; //sumbuY
const int ledpin2   = 24; //sumbuZ
const int buttonPin = 48;
const int buttonPin1 = 42;
const int buttonPin2 = 36;

int i;

int ledstate = 0;

int buttonnew;

int buttonold=1;

int dt=100;

AF_DCMotor motor(1);

AF_Stepper stepper(200, 1);

AF_DCMotor motor2(1);

AF_Stepper stepper2(200, 2);
```

```
void setup() {  
    pinMode(buttonPin, INPUT);  
    pinMode(buttonPin1, INPUT);  
    pinMode(buttonPin2, INPUT);  
    pinMode(ledpin, OUTPUT);  
    pinMode(ledpin1, OUTPUT);  
    pinMode(ledpin2, OUTPUT);  
  
    digitalWrite(ledpin,HIGH);  
    delay (250);  
    digitalWrite(ledpin1,HIGH);  
    delay (250);  
    digitalWrite(ledpin2,HIGH);  
    delay (250);  
    digitalWrite(ledpin2,LOW);  
    delay (250);  
    digitalWrite(ledpin1,LOW);  
    delay (250);  
    digitalWrite(ledpin,LOW);  
    delay (250);  
    motor.setSpeed(100);  
    motor.run(RELEASE);  
    motor2.setSpeed(100);  
    motor2.run(RELEASE);  
    Serial.println("SHAKING TABLE");  
}
```

```

Serial.begin(9600);
}
void loop() {
{
// PB MERAH
buttonnew=digitalRead(buttonPin);
if (buttonold==0 && buttonnew==1) {
    if (ledstate==0) {
        digitalWrite(ledpin,HIGH);
        ledstate=1;
        pengujian1_S1();
        //pengujian2_S1();
        //pengujian3_S1();
        digitalWrite(ledpin,LOW);
    }
    else
    {
        digitalWrite(ledpin,LOW);
        ledstate=0;
        STOP();
    }
}
buttonold=buttonnew;
delay(dt);
}

```

```

//PB KUNING
buttonnew=digitalRead(buttonPin1);
if (buttonold==0 && buttonnew==1) {
  if (ledstate==0) {
    digitalWrite(ledpin1,HIGH);
    ledstate=1;
    pengujian1_S2();
    //pengujian2_S2();
    //pengujian3_S2();
    digitalWrite(ledpin1,LOW);
  }
else
{
  digitalWrite(ledpin1,LOW);
  ledstate=0;
  STOP();
}
}
buttonold=buttonnew;
delay(dt);

// PB HIJAU
buttonnew=digitalRead(buttonPin2);
if (buttonold==0 && buttonnew==1) {
  if (ledstate==0) {
    digitalWrite(ledpin2,HIGH);

```

```
    ledstate=1;
    kombinasi54() ;
    //kombinasi72() ;
    //kombinasi90() ;
    digitalWrite(ledpin2,LOW);
}
else
{
    digitalWrite(ledpin2,LOW);
    ledstate=0;
    STOP();
}
}
buttonold=buttonnew;
delay(dt);
}
```

Kode Perintah Sistem Pembacaan Gerakan Meja Simulasi

```
const int pingPin = 11 ;
const int pingPin1 = 12 ;
int PushButton = 13;

void setup() {
  Serial.begin(9600);
  pinMode (PushButton, INPUT);
  Serial.print ("SHAKE TABLE");
  Serial.println();
  delay(10);
}

void loop() {
  long duration, inches, cm, mm, mm1;
  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(5);
  digitalWrite(pingPin, LOW);
  pinMode(pingPin, INPUT);
  duration = pulseIn(pingPin, HIGH);
  // convert the time into a distance
  inches = microsecondsToInches(duration);
  cm = microsecondsToCentimeters(duration);
  mm = microsecondsToMillimeters(duration);
  mm1 = microsecondsToMillimeters(duration);
```

```

pinMode(pingPin1, OUTPUT);
digitalWrite(pingPin1, LOW);
delayMicroseconds(2);
digitalWrite(pingPin1, HIGH);
delayMicroseconds(5);
digitalWrite(pingPin1, LOW);
pinMode(pingPin1, INPUT);
duration = pulseIn(pingPin1, HIGH);

Serial.print ("DATA,TIME,");
Serial.print(mm-60);
Serial.print(" , ");
Serial.print(mm1-64);
Serial.println();
delay(10);
}

long microsecondsToInches(long microseconds) {
// See: http://www.parallax.com/dl/docs/prod/acc/28015-PING-v1.3.pdf
return microseconds / 74 / 2;
}

long microsecondsToCentimeters(long microseconds) {
// The speed of sound is 340 m/s or 29 microseconds per centimeter.
return microseconds / 29 / 2;
}

long microsecondsToMillimeters(long microseconds) {
return microseconds / 2.9 / 2;
}

```