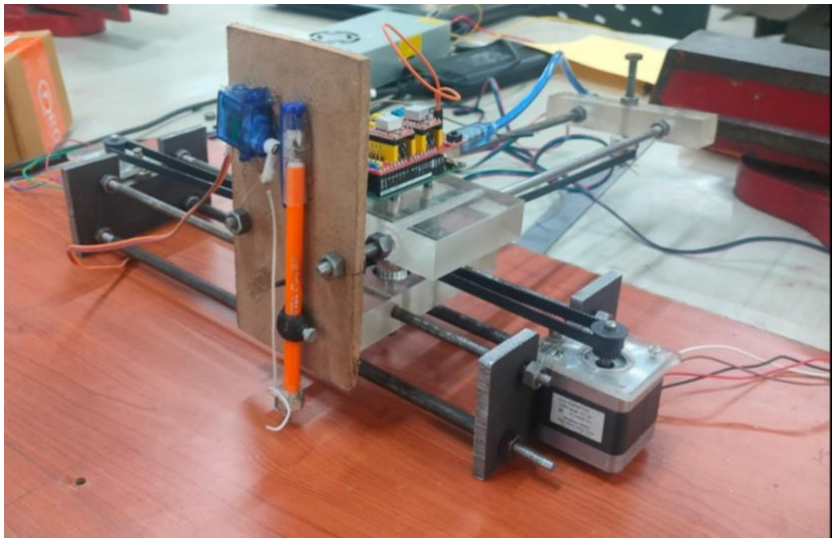
TA212
MANUFACTURING PROCESSES - II



CNC CONTINUOUS CURVE PLOTTER(USB BASED)

Group number : 27

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Tutor-In Charge

Project Guide
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PROJECT OVERVIEW

1) Objective of the Project

   The objective of a CNC (Computer Numerical Control) curve plotter project is to create a machine that can be accurately and precisely plot curves on a surface based on digital instructions. This typically involves using a computer to control the movement of pen along specified paths to create detailed curves . The project aims to automate the process of drawing curves allowing for efficient and repeatable results .

2) How many parts were manufactured ?

   Out of 13 parts 7 parts were manufactured and the rest were given in lab and bought from market.

3) Cost of the Project

   The cost of the project is 23197.25 Rs . It includes the cost of all parts

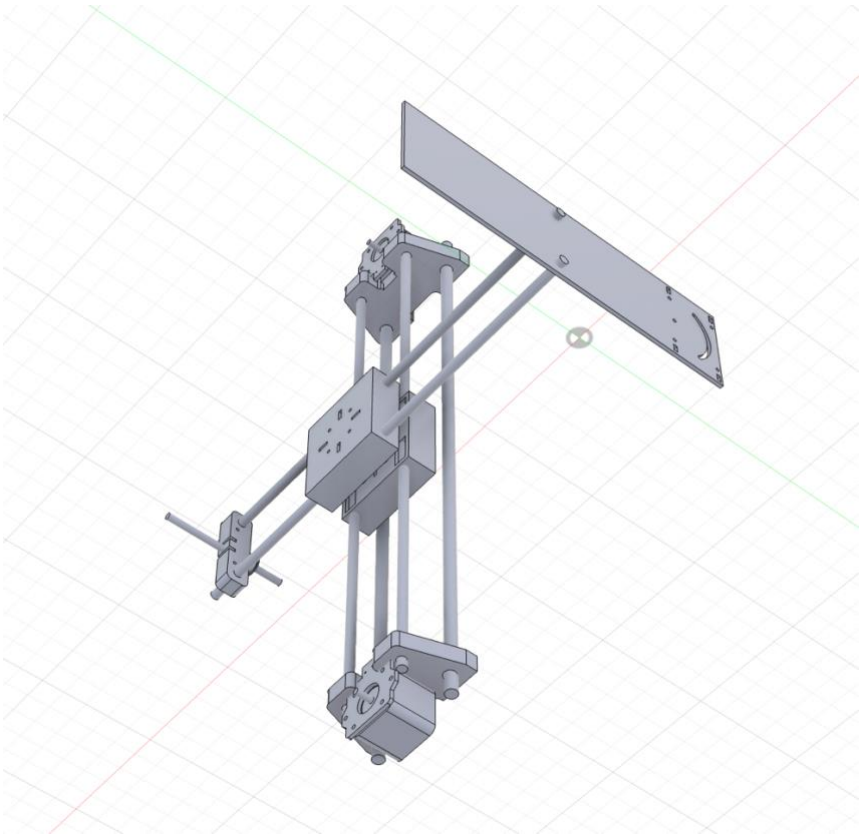
4) Improvements that can be made in the Project

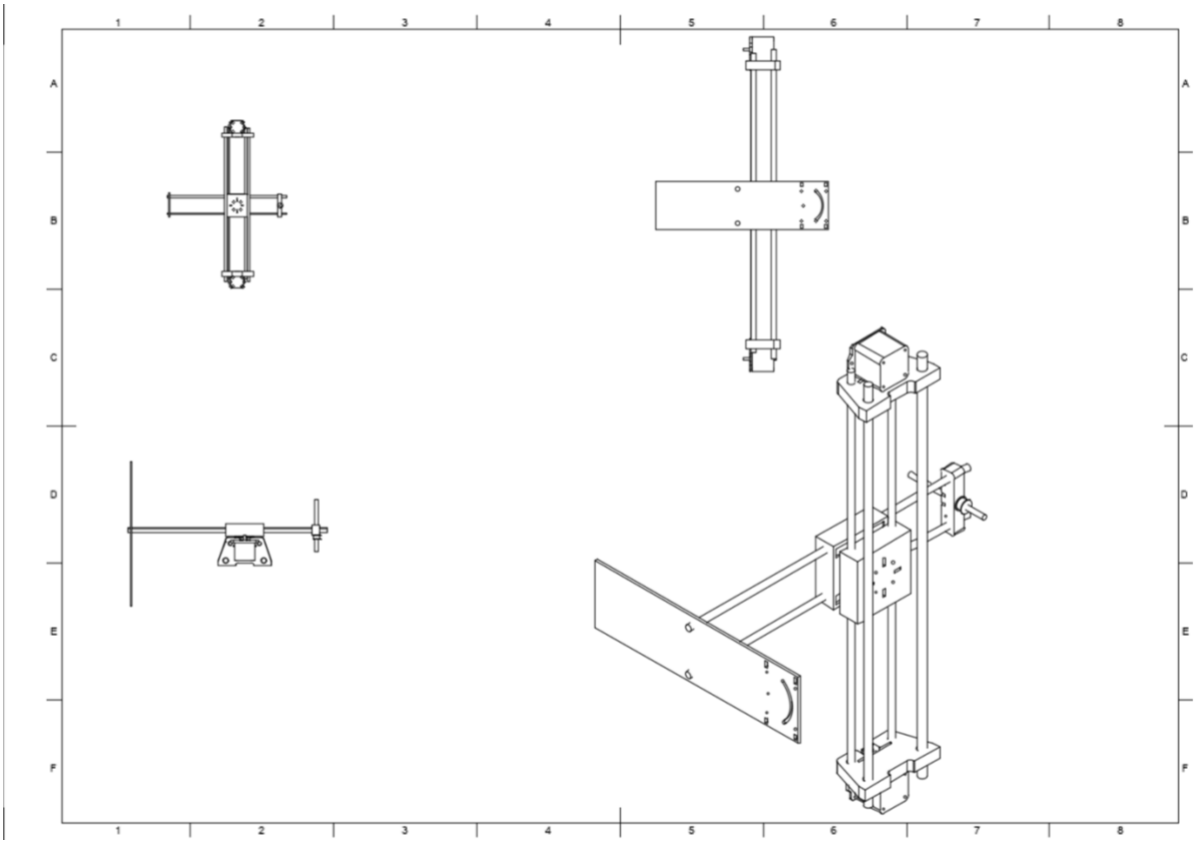
   - Movement of pen holder in z axis can be modified so that we can lift the pen and move to other place without drawing .
   - The pen holder can be made more professional

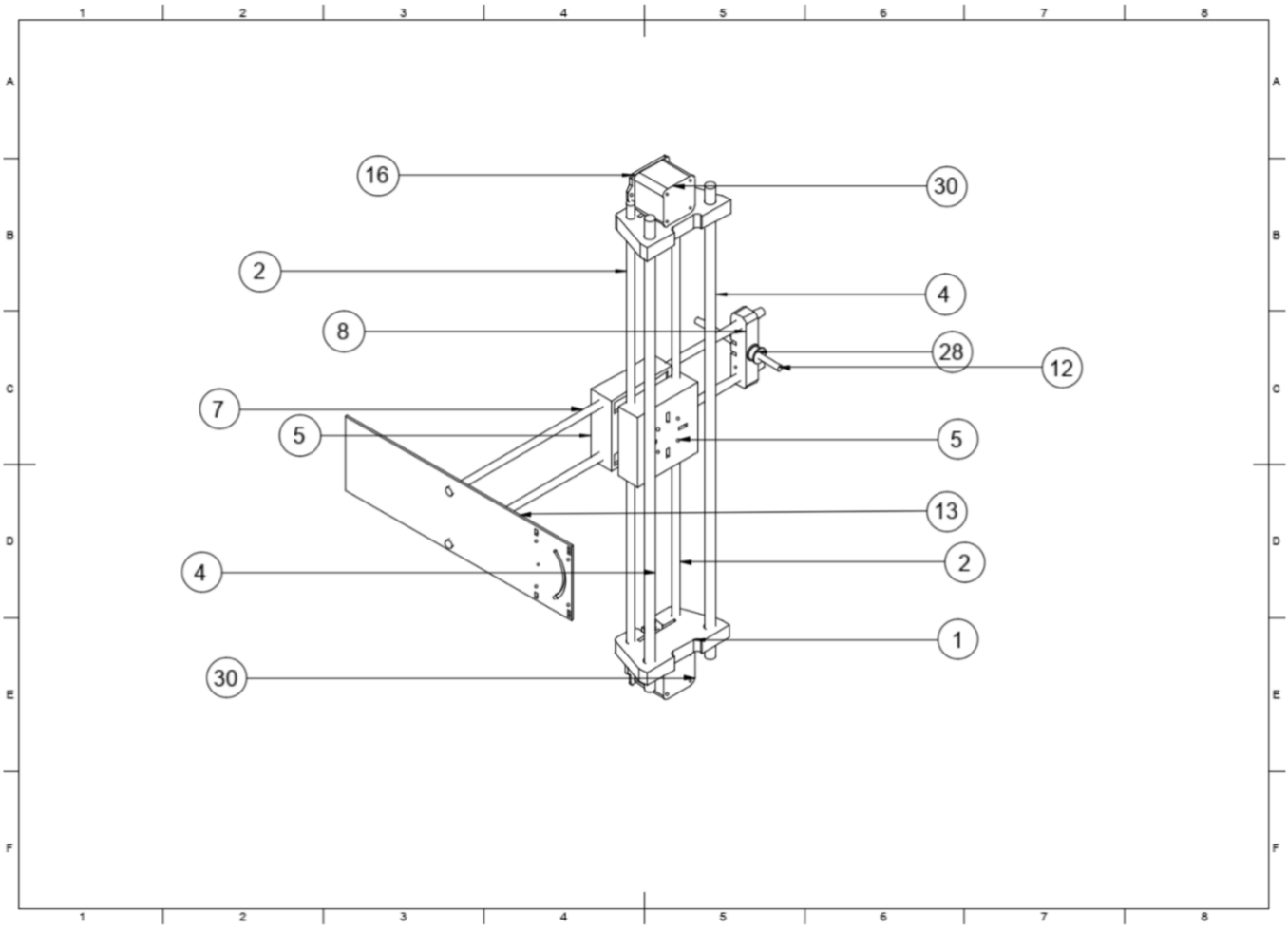
LIST OF PARTS

Sl. NO.	PARTS NAME	MATERIALS USED	MACHINING USED	QUANTITY	MANUFACTURE/ BOUGHT
1	Base Rods(8mm)	Mild Steel	Cutting, Turning, Filling ,	2	Manufactured
2	Slider Rods(6mm)	Mild Steel	Cutting, Turning, Filing	4	Manufactured
2	Sliders	Acrylic	Cutting, Milling	2	Manufactured
3	Side Anchors	Mild Steel	Cutting , Filling , Drilling	2	Manufactured
4	Stepper Motor	_____	_____	2	Bought
5	Stepper Motor Holder	Acrylic	Cutting, Drilling	2	Manufactured
6	Pulleys	_____	_____	5	Bought
7	6mm Stepper Belt	_____	_____	1	Bought
8	Bolts	_____	_____	30	Given
9	Motor Driver	_____	_____	1	Bought
10	Arduino	_____	_____	1	Given
11	Pen Holder	Wood	Cutting, Drilling	1	Manufactured
12	Rods for Pulley Holder	Mild Steel	Cutting, Turning	4	Manufactured
13	Servo Motor	____	_____	1	Bought

PERSPECTIVE VIEW OF CNC CURVE PLOTTER

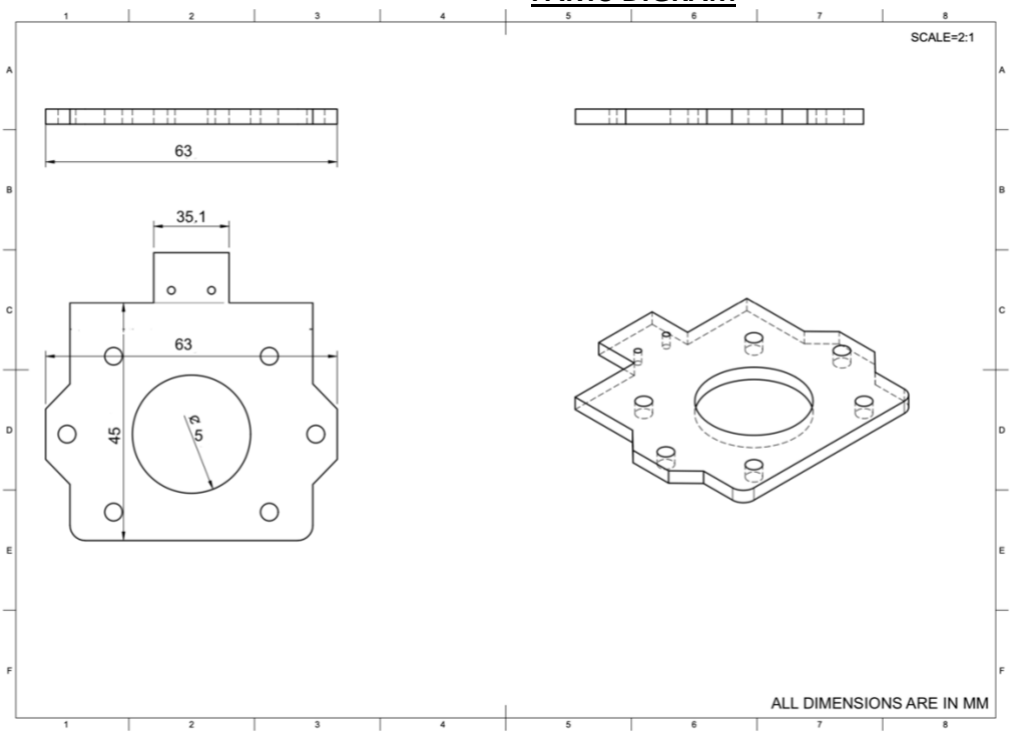




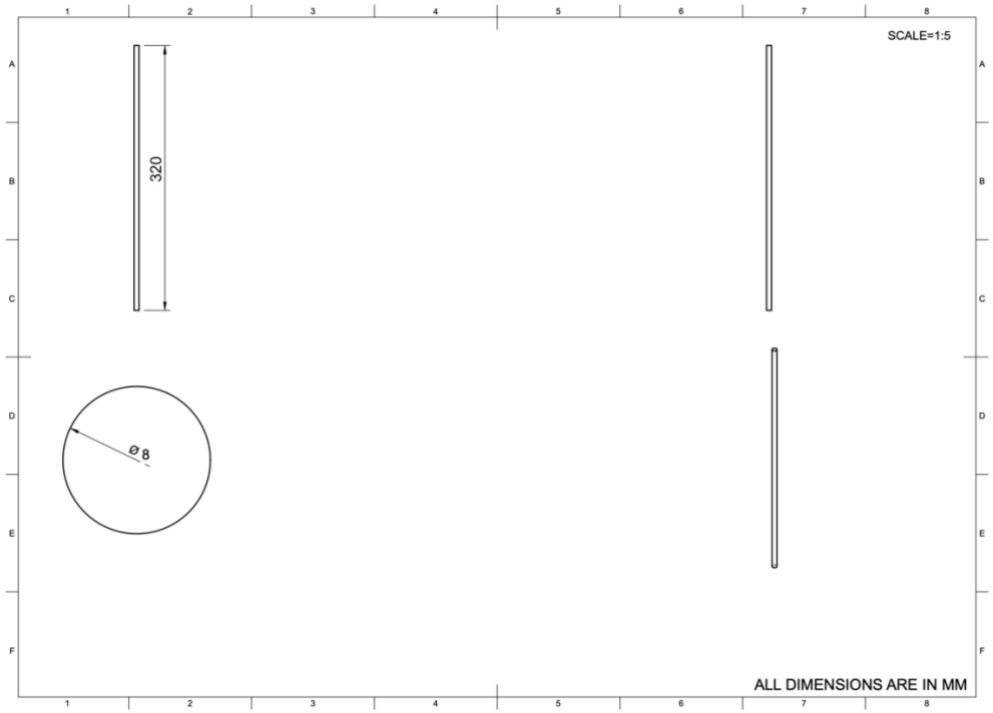


NUMBER ASSIGNED	PARTS NAME
1	SIDE ANCHOR
2	6MM RODS (X-AXIS)
4	8MM RODS(X-AXIS)
5	SLIDER
7	6MM RODS(Y-AXIS)
8	COUNTER WEIGHT
12	SUPPORT FOR PULLEY
13	PEN HOLDER
16	STEPPER MOTOR HOLDER
28	PULLEY
30	STEPPER MOTOR

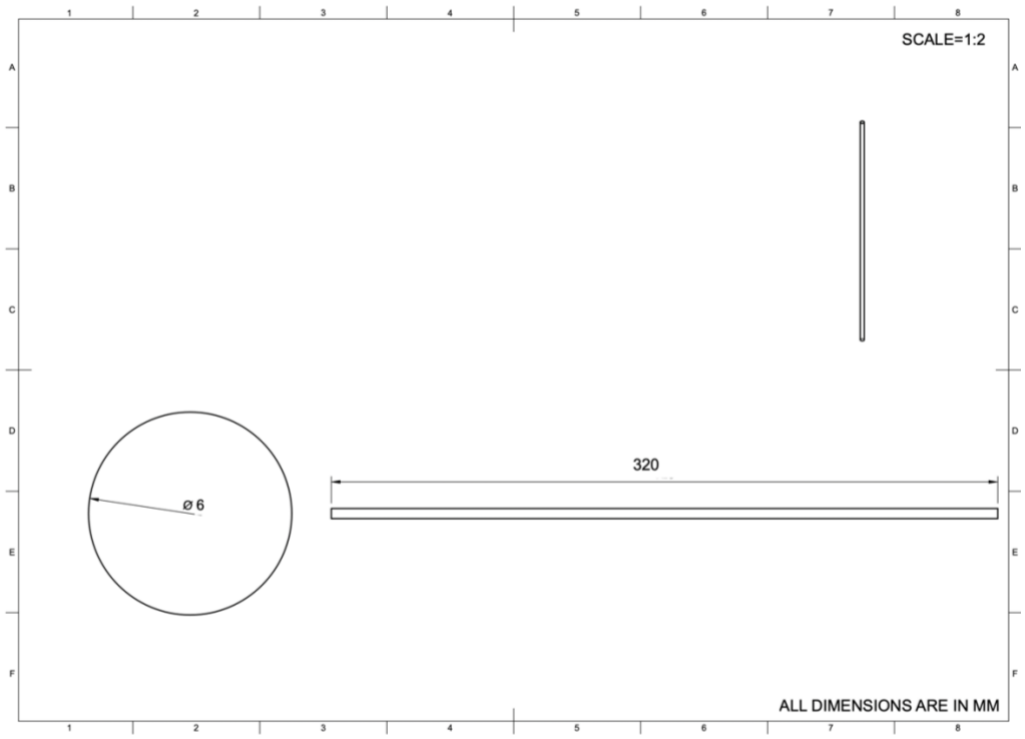
PARTS DIGRAM



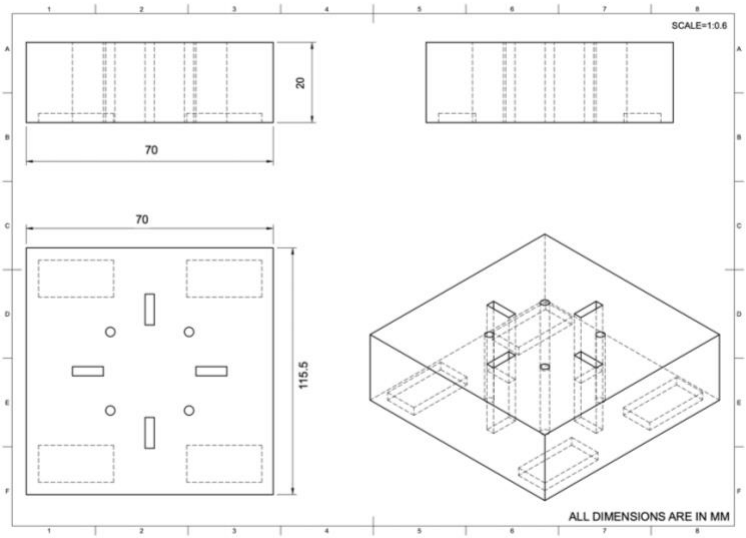
PARTS LIST (16)	PART NAME	MATERIAL USED	QUANTITY	MACHINING USED
	STEPPER MOTOR HOLDER	ACRYLIC	2	CUTTING , DRILLING
NAME – JNYANDEEP BEHERA				



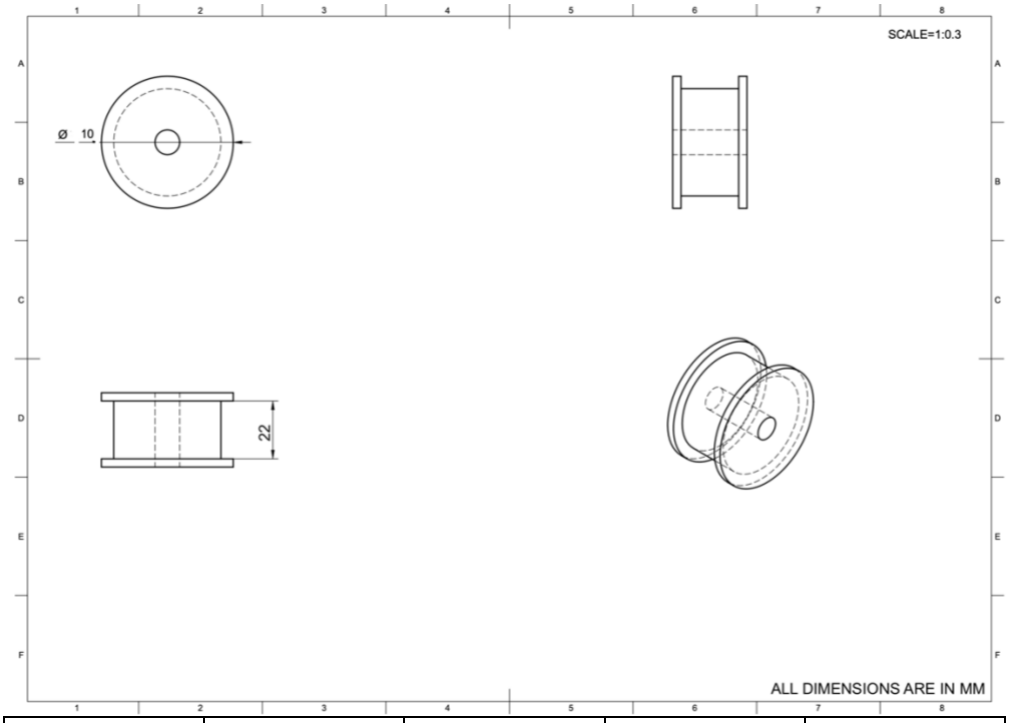
PARTS LIST (4)	PART NAME	MATERIAL USED	QUANTITY	MACHINING USED
	8MM RODS	MILD STEEL	2	CUTTING, FILING, TURNING
NAME – JNYANDEEP BEHERA				



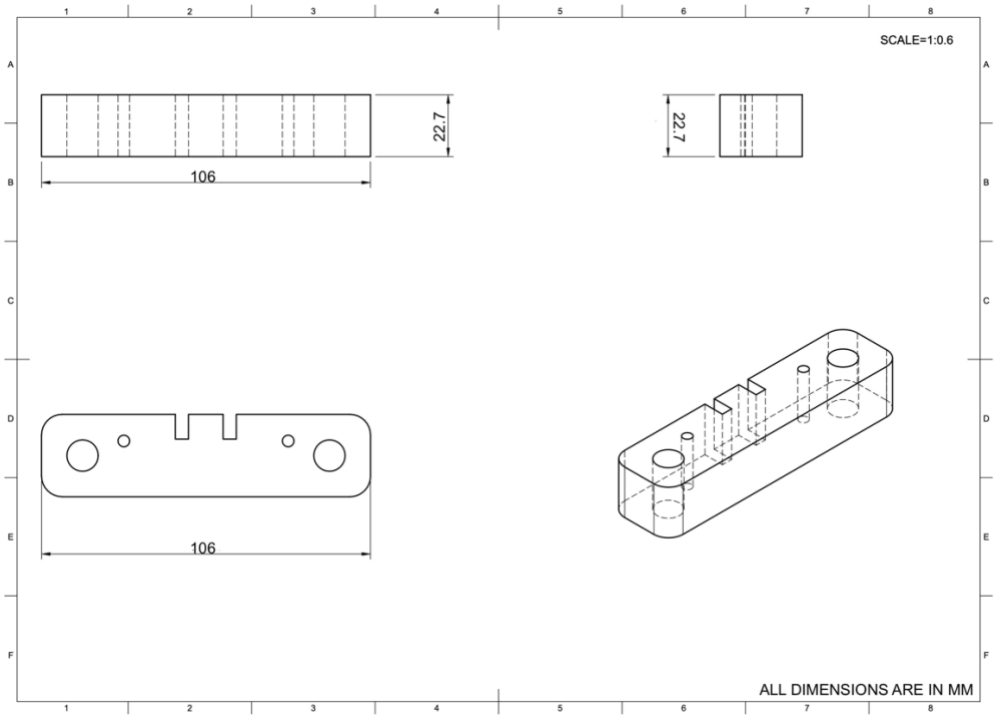
PARTS LIST (2)	PART NAME	MATERIALS USED	QUANTITY	MACHINING USED
	6MM RODS	MILD STEEL	4	CUTTING, FILING, TURNING
NAME – JNYANDEEP BEHERA				



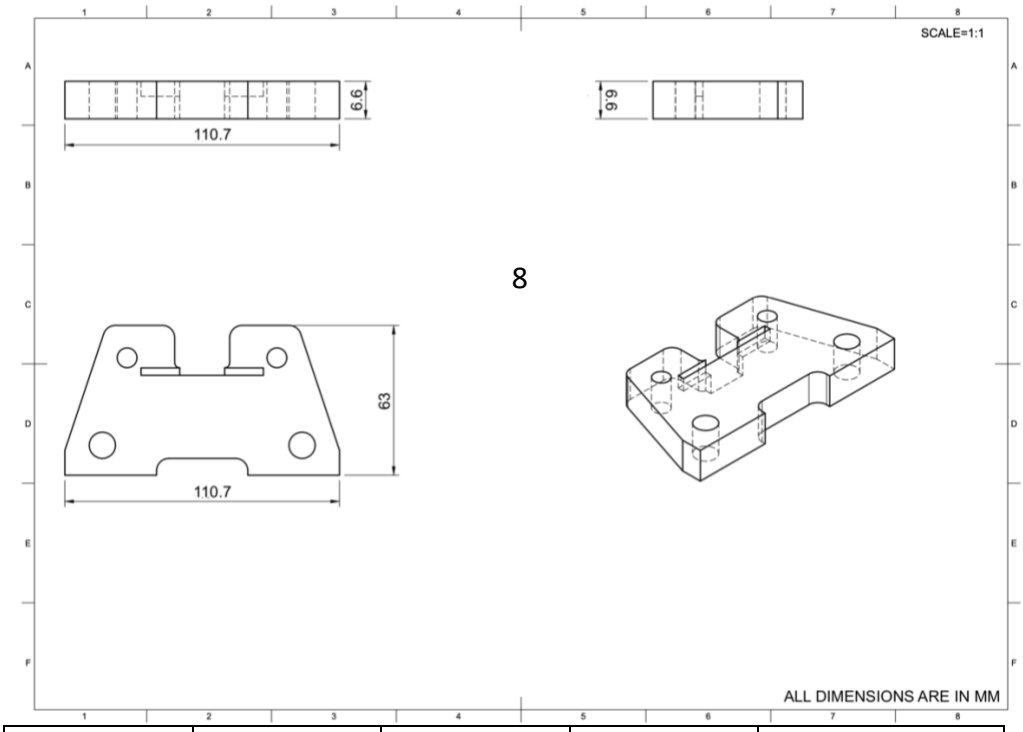
PARTS LIST (5)	PART NAME	MATERIAL USED	QUANTITY	MACHINING USED
	SLIDER	ACRYLIC	2	CUTTING, DRILLING, MILLING,TURNING
NAME – JNYANDEEP BEHERA				



PARTS LIST (28)	PART NAME	MATERIAL USED	QUANTITY	MACHINING USED
	PULLEY	_____	5	_____
NAME – JNYANDEEP BEHERA				



PARTS LIST (8)	PART NAME	MATERIAL USED	QUANTITY	MACHINING USED
	COUNTER WEIGHT	ACRYLIC	1	DRILLING, CUTTING
NAME – JNYANDEEP BEHERA				



PARTS LIST (1)	PART NAME	MATERIAL USED	QUANTITY	MACHINING USED
	SIDE ANCHORS	MILD STEEL	2	DRILLING , CUTTING, TURNING,FILING
NAME – JNYANDEEP BEHERA				

COST ANALYSIS

Object/Process	Amount/Time	Rate	Total Price
Mild Steel	2kg	100 Rs/kg	200 Rs
Acrylic	300 gm	200 Rs/kg	60 Rs
Plywood	0.05	45 Rs/sq.ft	2.25 Rs
Nut	30	130 Rs/kg	10 Rs
Drilling	10 hour	100 Rs/hr	1000 Rs
Milling	1 hour	450 Rs/hr	450 Rs
Turning	6 hour	350 Rs/hr	2100 Rs
Cutting	3 hour	60 Rs/hr	180 Rs
Stepper Motor	2	350 Rs/piece	700 Rs
Servo Motor	1	70 Rs/piece	70 Rs
6mm Stepper Belt	1(3 meter)	285 Rs/meter	855 Rs
5mm Bolt Pulley	6	45 Rs/piece	270 Rs
Stepper Motor Driver	1	100 Rs/piece	100 Rs
Electric Kit	1	1000 Rs	1000 Rs
Unskilled Labor	20 hour	650 Rs/Day8hr	13000 Rs
Skilled Labor	4 hour	800 Rs/Day(8hr)	3200 Rs
		TOTAL COST =	23197.25 Rs

AURDUINO CODE

```
#include <grblmain.h>


void setup(){
  startGrbl();
}


void loop(){}
```

GRBL is free, open source software for controlling the motion of machines that move, that make things, or that make things move, and runs on wide variety of microcontrollers. GRBL is used to power thousands of different CNC routers, lathes, mills, lasers and more. It is essentially the standard for open source CNC machines.

The Solution implements a library GRBL main to control the steppers and the commands are generated form an online open firmware.

CIRCUIT DIGRAM