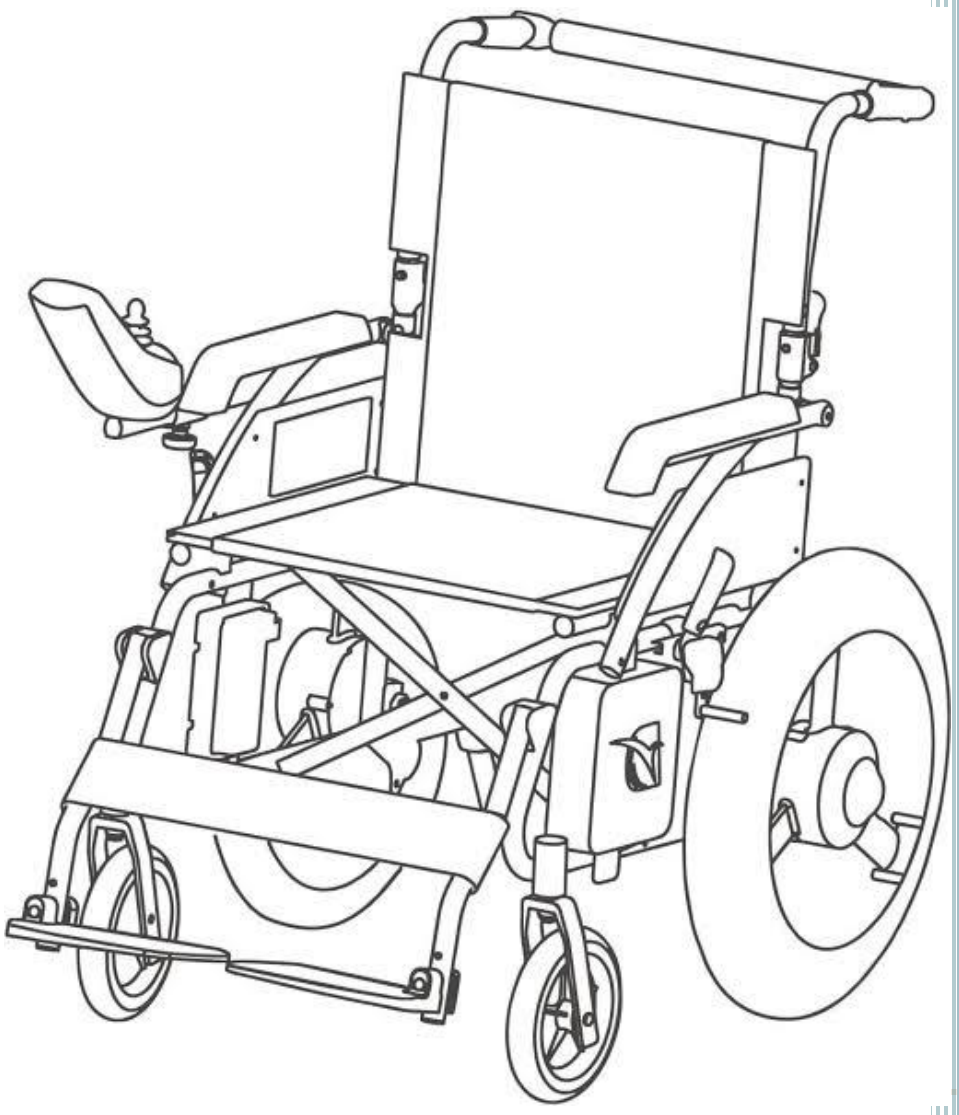
GROUP 26

ELECTRIC WHEELCHAIR



Raghav

GROUP 26

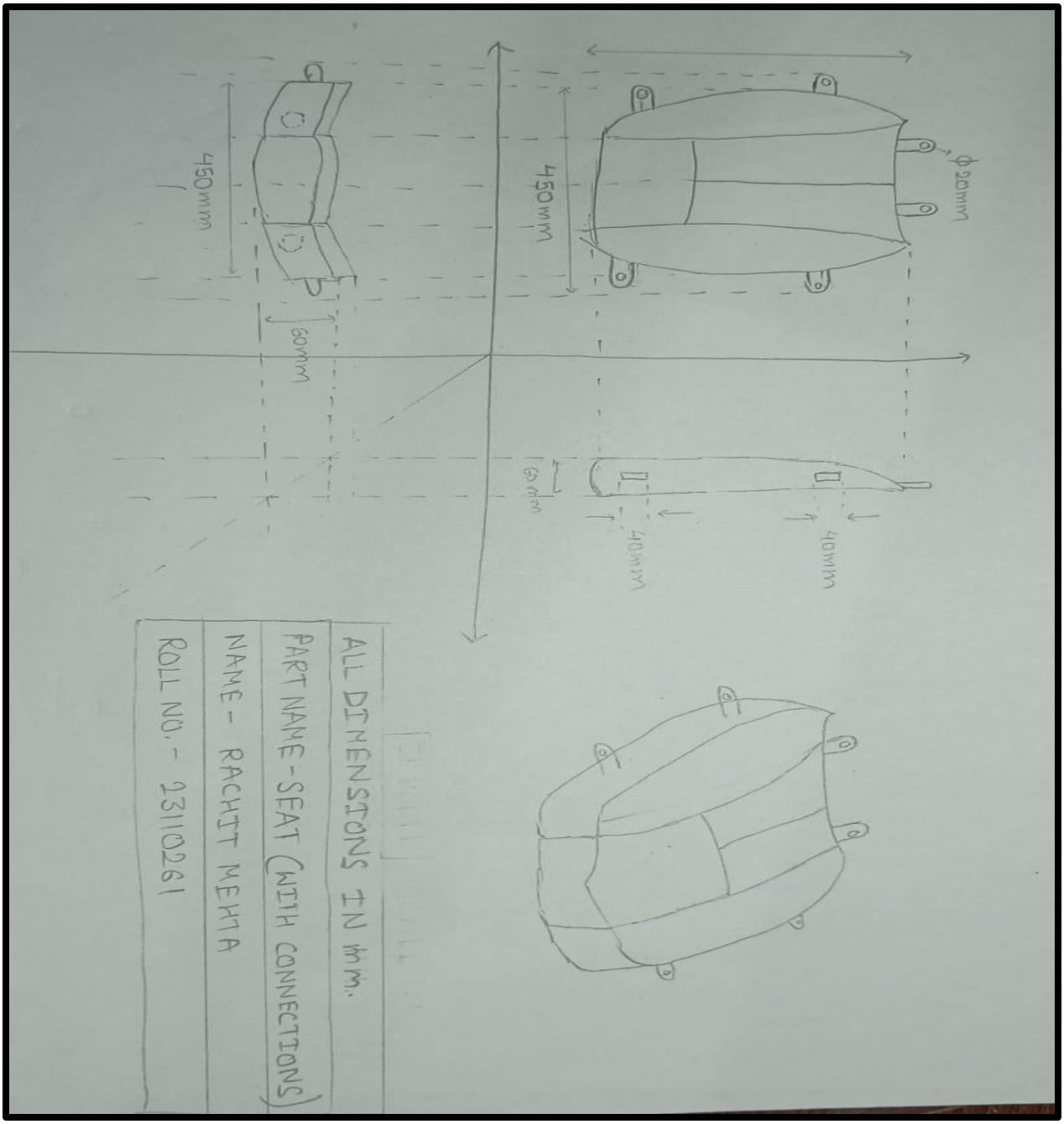
General Modifications:

Some modifications have been made with the aim of enhancing the look and better synchronisation of the parts so that the device works more effectively. The parts which we listed before are now given a bit more precise details, which provide clarity and are now comparable to real-life models of the same. The primary modification made is in regard to dimensions. Going through the wheelchairs offered and designed by various companies and individuals. We streamlined ourselves with that after choosing the one the entire group liked the most. So, accordingly, we have allotted the dimensions to our parts, but the sketches of the parts have been scaled down. Initially, the seat was not given much thought and was rather placed, but we considered it to be fitted and established some seat connections with the frames, which sounds more sensible. As per the feedback, analysing and accepting that brakes are a bit more complex part, we reallotted it to one of the team members, and we gave him this as the only part so we can work more effectively on it. Additionally, the controller was simply defined as a joystick, but more details have been added regarding the buttons and the charging port below it, which makes it appear more realistic. Also, we were facing a challenge to fix the anti-tip wheel with the frame. To establish the objective, we have worked to add two extensions supporting it. We had some parts which appeared to be a bit simpler. So, we have worked on some of them to add some details to them, making a good-looking part to add to our proposal. We have considered the feedback, changed our citation style, and tried to work on formatting better to enhance the look of our proposal, and finally, ensure that the working model of the device we are making works with more clarity, has more functions and appears realistic.

Name: Rachit Mehta

Roll No.: 23110261

1) Seat



Reasoning For Dimensions:

The seat part has complex dimension settings, as we have decided to make it curved and thick with varying radius of curvature. As shown in the diagram, there is two right and left inward curvature in the middle, which supports the user's hips and two right and left outward curvature to secure the fitting of the user (as the seat must be specifically designed to prevent slipping). My seat part is designed such that it is thicker from the front part, and its thickness gradually decreases till the back leg. This enables the user to sit comfortably inside the electric wheelchair without worrying about slipping down. While making seats good-looking, I have also taken care of easy entry and exit of users.

I have also handled seat connections with other parts, such as the side frame, armrest, rear wheel and backrest. In the shown sketch for connecting elements, I have added six parts for inserting screws to link to other components. We can also make threading inside them to make them adequately locked. The two threaded holes at the back side of the seat are to support the backrest. The two threaded holes at each side are to help the side frame.

The length and width of the seat are proportional to the original ones. The above curvatures will be determined by the height ratios. The threaded holes' dimensions are also taken in proportion with the length and breadth of the seat and other respective parts attached to it.

Materials Used:

The material selection for the seat is significant while considering comfort, support, safety, durability, washability, etc. While crafting a wheelchair, various materials can be used to achieve this goal.

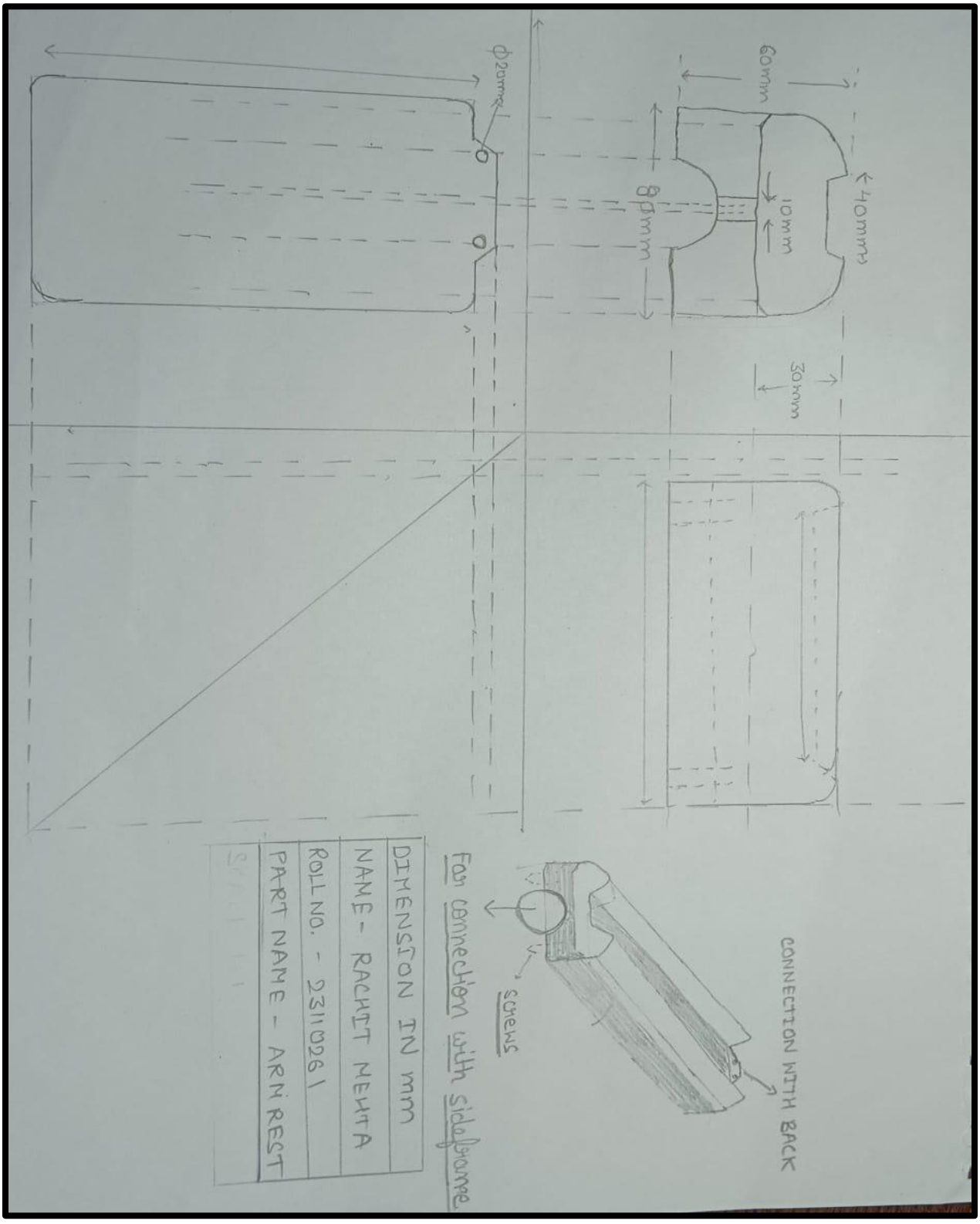
1. Aluminium frame: For making this part lightweight yet robust, we can use Aluminium for covering the seat and making connections for the centre.

2. Cushioning material: We can use high-density memory foam to accommodate the whole body of the user inside the chair. We can also use newly developed gel-infused cushions, providing extreme comfort and pressure relief.

3. Upholstery fabric: to cover the soft cushioning, we can use durable nylon fibre which ensures both comfort and longevity.

4. Other bolts, screws and adjustments: they can be made of stainless steel preventing corrosion and maintaining structural integrity

2) Armrest


Φ20mm
60mm
40mm
10mm
80mm
30mm
For connection with sideframe
SCREWS
CONNECTION WITH BACK
DIMENSION IN mm
NAME - RACHIT MEHTA
ROLL NO. - 2311026
PART NAME - ARM REST

Reasoning For Dimensions:

The armrest part of the electric wheelchair has complex dimension settings, as we have decided to make an inward and an outward curve to provide full comfort to the user. The curvature is such that it provides full comfort to the user's forearm. In the sketch's front view, you can see space given to accommodate the side frame's metal rod component. Its base part is made of different materials so that it can be fixed tightly on the wheelchair. In its front view, it can be seen that proper space is provided to accommodate other parts, such as the joystick and charging port. In the given sketch, length and breadth are decided to allow the person to rest his/her arm completely. The length, Breadth and height are decided in proportion to other parts.

Materials Used:

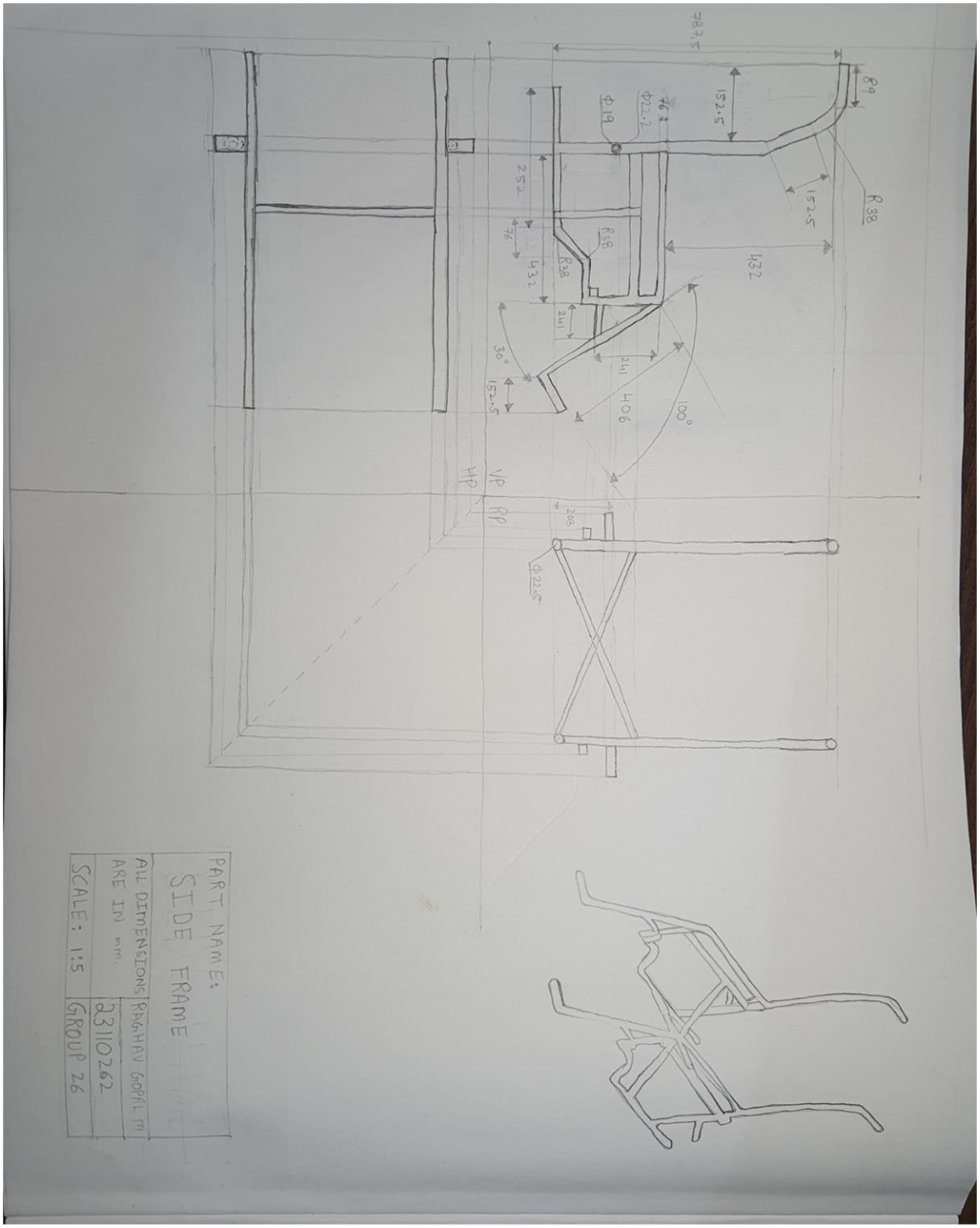
For designing the armrest part of the wheelchair, the material used should be carefully selected to ensure comfort, durability, and functionality. Common materials used are as follows:

1. Foam padding: high-density foam padding is used to provide comfort
2. Vinyl upholstery: vinyl is a very frequent choice for covering armrests as it is easy to clean and wash.
3. Leatherette: this material is used to provide a luxurious appearance to the armrest
4. Neoprene: this material is also used as soft cushioning material
5. Aluminum or steel: frames and side covering can be made of aluminium and steel

Name: Raghav Gopal Mudigonda

Roll No.: 23110262

Side frame



Reasons For Dimensions:

The side frame of a wheelchair is a crucial component. Since the side frame houses all components, it was dimensioned so that the other parts fit in or to it. The dimensions were chosen by carefully analysing the following:

1. User comfort: This was the most crucial aspect that was taken into consideration. The seat width, depth and height of the backrest were designed so the user doesn't feel discomfort. These factors helped us arrive at the shape of the side frame.

2. Posture of the user: Since many wheelchair users use their wheelchair for prolonged time together, the wheelchair should enable the user to maintain a healthy seated posture. Proper positioning can prevent discomfort and any musculoskeletal issues.

3. Accessibility and Mobility: The width of the side frame was designed in such a way to not only allow the user easy passage through narrow doorways or tight spaces but also give easy access to the wheelchair seat.

4. Load on the wheelchair: For this wheelchair to be considered safe, the side frame must balance the load on the wheelchair and distribute it equally to both wheels. It should also ensure that the load is equally distributed through the structure of the side frame so as not to overstress and risk failure.

5. Transportability: For most wheelchair users, the wheelchair has to be portable. It should be able to fold or be disassembled easily. The length of the side frame was arrived upon such that it allows the wheelchair to be folded and fit into the boot of most modern cars.

6. Wheel size: The wheelchair we're designing has bigger rear wheels and small front castors. So, the side frame was dimensioned according to the radius of the wheels.

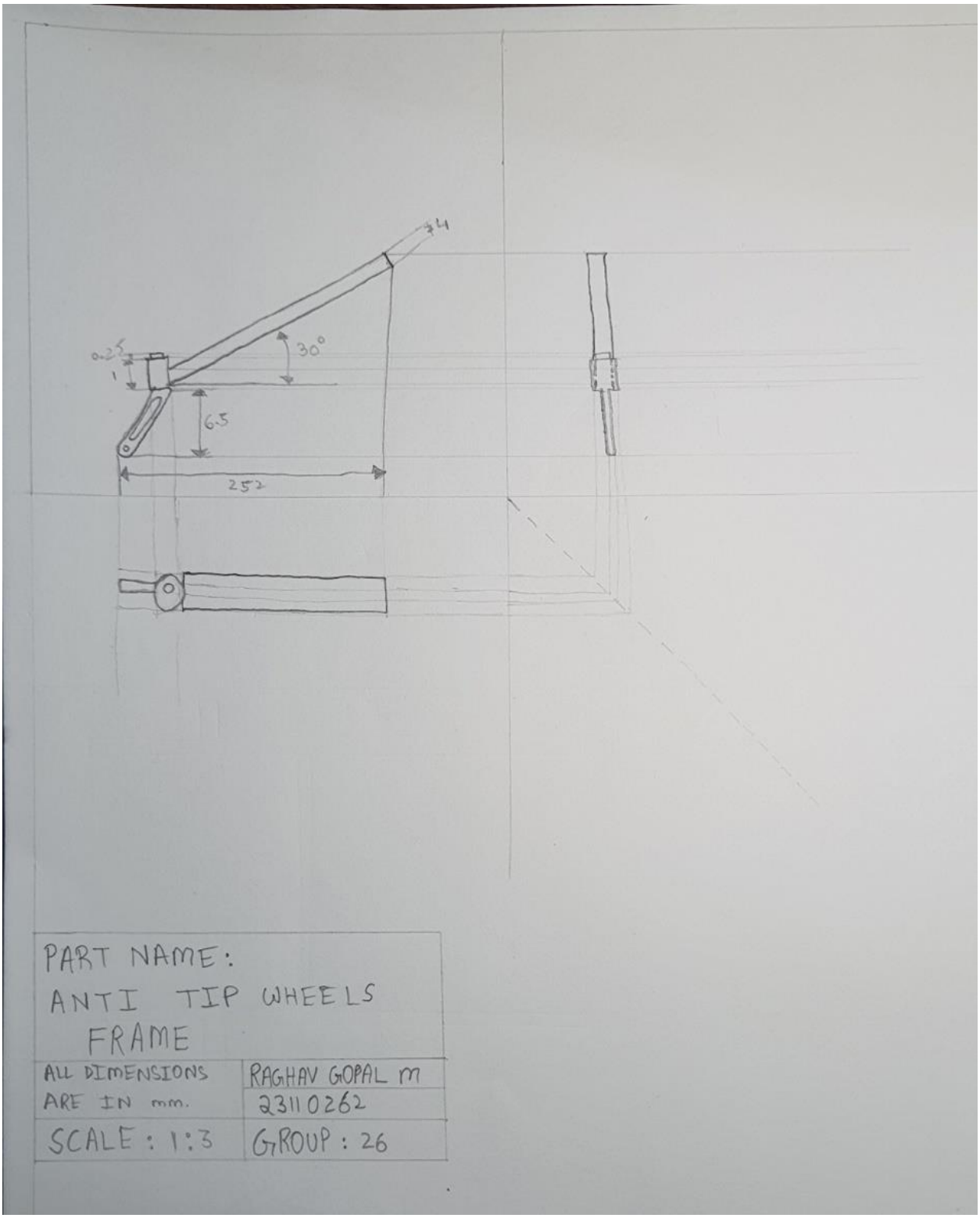
7. Handle: The handle was designed to allow the user to be pushed around by another person. The handle has the perfect shape not to cause much discomfort to the hands of the person who is pushing the user around in the wheelchair.

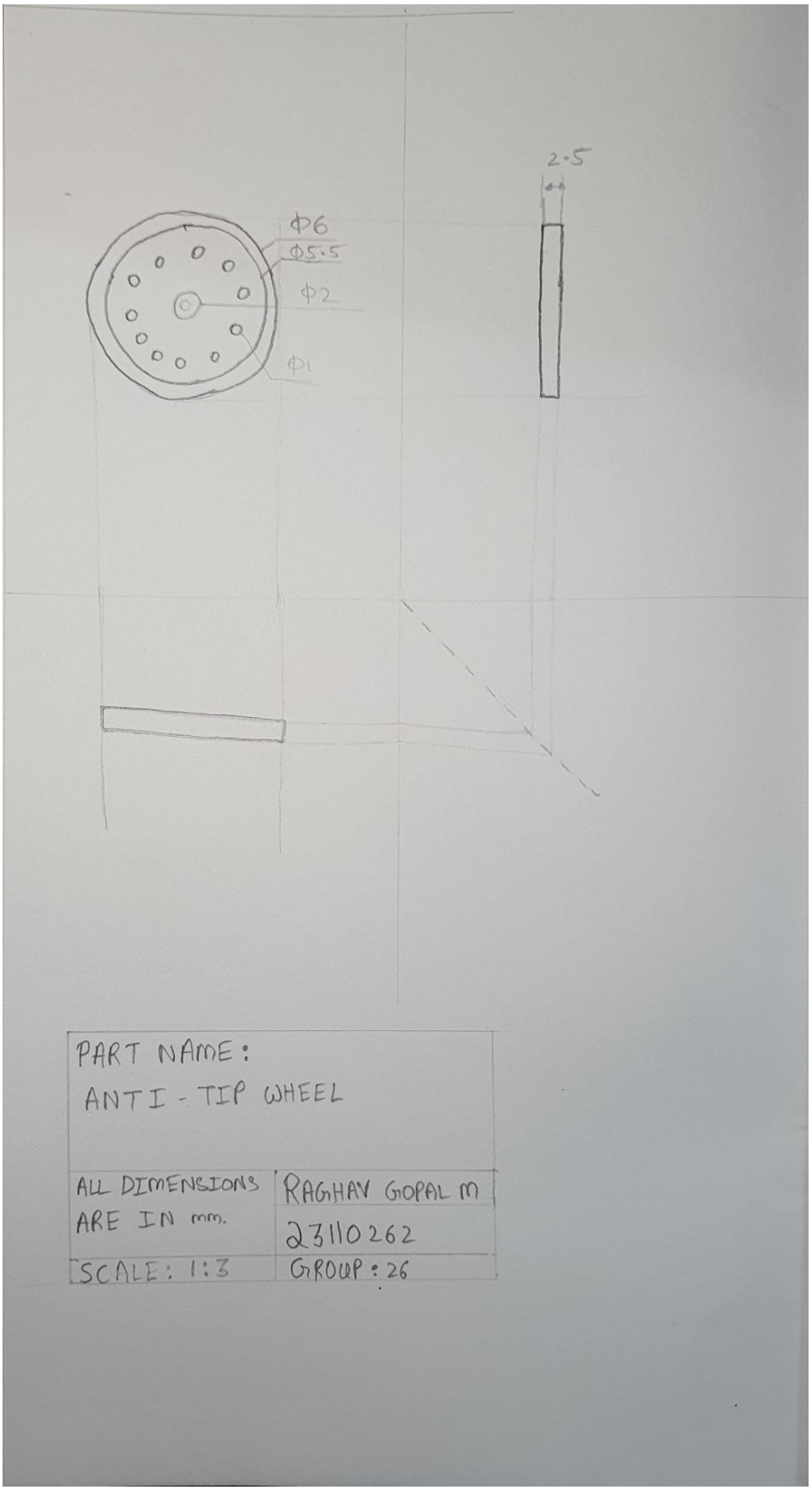
Materials Used:

The choice of materials for making the side frame of a wheelchair is essential. Different materials have different attributes. We agreed on the following materials for the side frame.

1. Aluminium: After considering various other materials, such as steel and titanium, we decided to make most of the side frame with aluminium since it perfectly balances weight and cost. While steel is cheaper than aluminium, it does add more weight to the wheelchair. In contrast, titanium is corrosion-resistant and is the best material for a wheelchair if not for the cost. Titanium is much more expensive than aluminium; hence, it is not employed in this design.

Anti-tip wheels


4
0.25
1
30°
6.5
252
PART NAME:
ANTI TIP WHEELS
FRAME
ALL DIMENSIONS
ARE IN mm.
RAGHAV GOPAL M
2311 0262
SCALE : 1:3
GROUP : 26


2·5
Φ6
Φ5·5
Φ2
Φ1
PART NAME:
ANTI - TIP WHEEL
ALL DIMENSIONS ARE IN mm.
RAGHAV GOPAL M
23110262
SCALE: 1:3
GROUP: 26

Reasons For Dimensions:

Unlike the side frame, the factors deciding the dimensions of the anti-tip are only a few.

· The wheels shouldn't touch the ground during the normal orientation of the wheelchair, reducing friction.

· The wheels should be at such an angle that they touch the ground when the wheelchair is on uneven terrain and is at risk of toppling.

Materials Used:

1. Polyurethane: The tire part of the anti-tip wheels is made from polyurethane, as it offers excellent wear resistance and grip on many surfaces. This material is also known for its longevity.

2. Nylon: The wheel's hub is made of Nylon, as it can withstand the weight of the anti-tip wheels. Nylon is also resistant to abrasion.

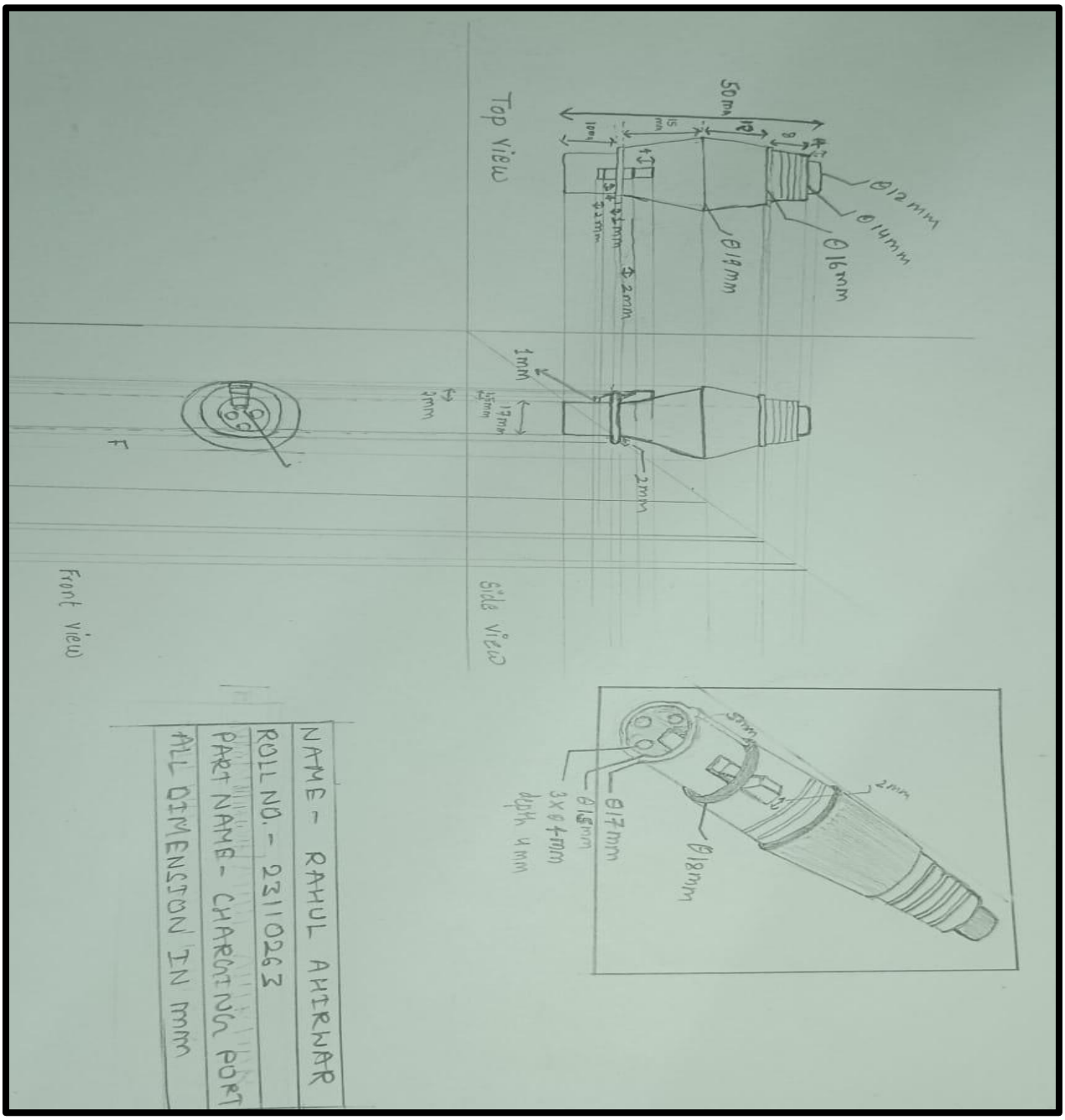
3. Aluminium: The frame or the bracket that holds the wheels is made of aluminium, offering a high strength-to-weight ratio and corrosion resistance. Since these wheels prevent the wheelchair from toppling, they must have the strength to bear the weight of the wheelchair and the user to avoid any failures or fractures.

4. Steel: Steel is used in the manufacture of ball bearings. It allows for smooth and efficient rotation. The ball bearing connects the axle of the wheel to the hub of the wheel.

Name: Rahul Ahirwar

Roll No.: 23110263

Charging Port



Reasoning For Dimensions:

It is one of the primary components of a wheelchair. To charge the battery at any time, we approach a charger containing a charging port. I kept this thought in mind and decided that the dimension of the charging port should be small, which provides many advantages to the user. Here are some benefits of the small size of the charging port:

1. Small charging ports are lightweight and can be easily carried and transported. It is more compact. It is primarily used for portable electronic devices.
2. Its small size takes less place in the device, allowing manufacturers to add new features and more compact gadgets.
3. A minor charging port can be compatible with a wide range of accessories and adapters. This ability to adapt can be crucial for consumers with various devices with different charging port standards.
4. Smaller charging ports are strengthened and more durable because they have less surface area to get any potential damage, which can increase the life of devices.
5. The maintenance of a small charging port is accessible. It can be safer against environmental factors such as water and dust. It becomes helpful in going outdoors.
6. The small charging port can be made or designed with greater energy efficiency in mind, which can be necessary for devices containing batteries aiming to maximize their runtime.
7. It can be more user-friendly because of its small size and less chance of obstruction or interference. Users can more easily connect and disconnect cables. It increases the overall user experience.
8. Small charging ports can be easily manufactured at low expense due to reduced material and requirements. This cost-saving can give profit to users and also Improve a company's profit margins.

Materials Used:

The material used in manufacturing this component is critical in ensuring the reliability, durability, and safety of these essential components. Charging ports can withstand different environmental conditions, stress, and frequent plugging and unplugging. Here are some materials used in manufacturing: -

1. Metal Alloys: - charging ports feature metal components, like the outer housing or connectors. Stainless steel and Aluminium are used because of their corrosion resistance and mechanical strength.
2. Plastics: - it is commonly used for insulating and protecting from environmental conditions such as water and dust. The popular choices are ABS (acrylonitrile Butadiene

styrene) and polycarbonate due to their high-impact electric insulation properties and lightweight nature.

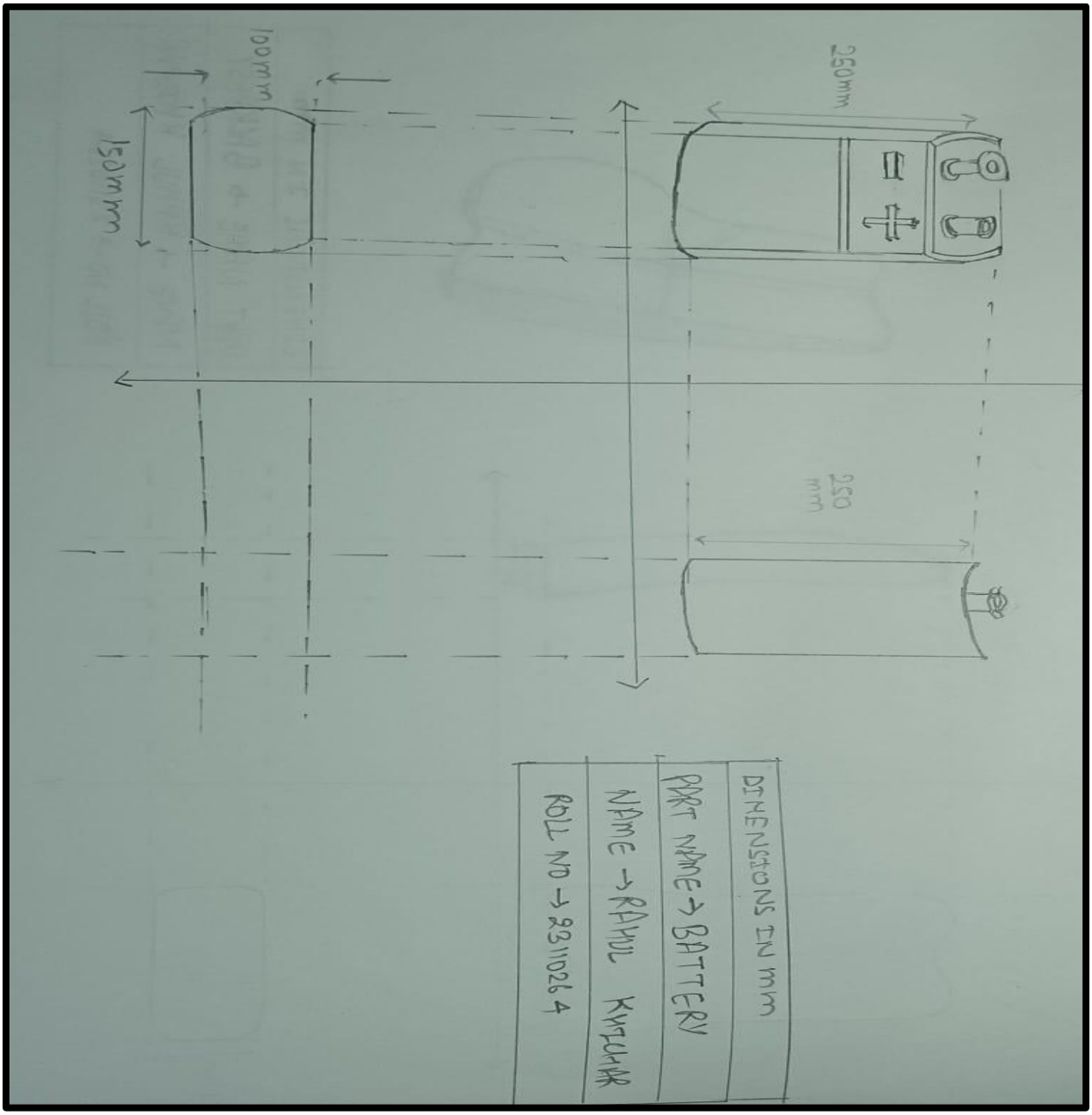
3. Copper and Copper Alloys: - the internal system of connectivity and conductive elements are made of Copper. It provides excellent conductivity, which enhances crucial charging and discharging of the battery.
4. Rubber or Silicon seal: - Used to provide water and dust resistance.
5. Thermoplastics: - Thermoplastic polyurethane (TPU) is used for cable insulation. It can withstand repeated bending and flexing without cracking.
6. Gold or Silver plating: - Used to improve electrical conductivity and enhance corrosion resistance.
7. Fire-Resistance Materials: - It minimises the risk of overheating or electrical fires.

The mentioned material enhances the longevity of the charging port.

Name: Rahul Khichar

Roll No.: 23110264

Battery



Reason For Dimensions:

The battery of the wheelchair does not have a more complicated external structure. But when we define the dimensions of the battery, we should keep something in mind, like the position of the anode and cathode, the position of the charging plug, the size of the base, etc. The size of the battery depends on the dimensions of the wheelchair. The battery of the wheelchair is mostly designed in cubic or cuboid shape. Our battery is in a cuboid figure. This shape is better for wheelchairs.

Material Used:

We can use various materials depending on the battery type and purpose. Mainly used materials are as follows:

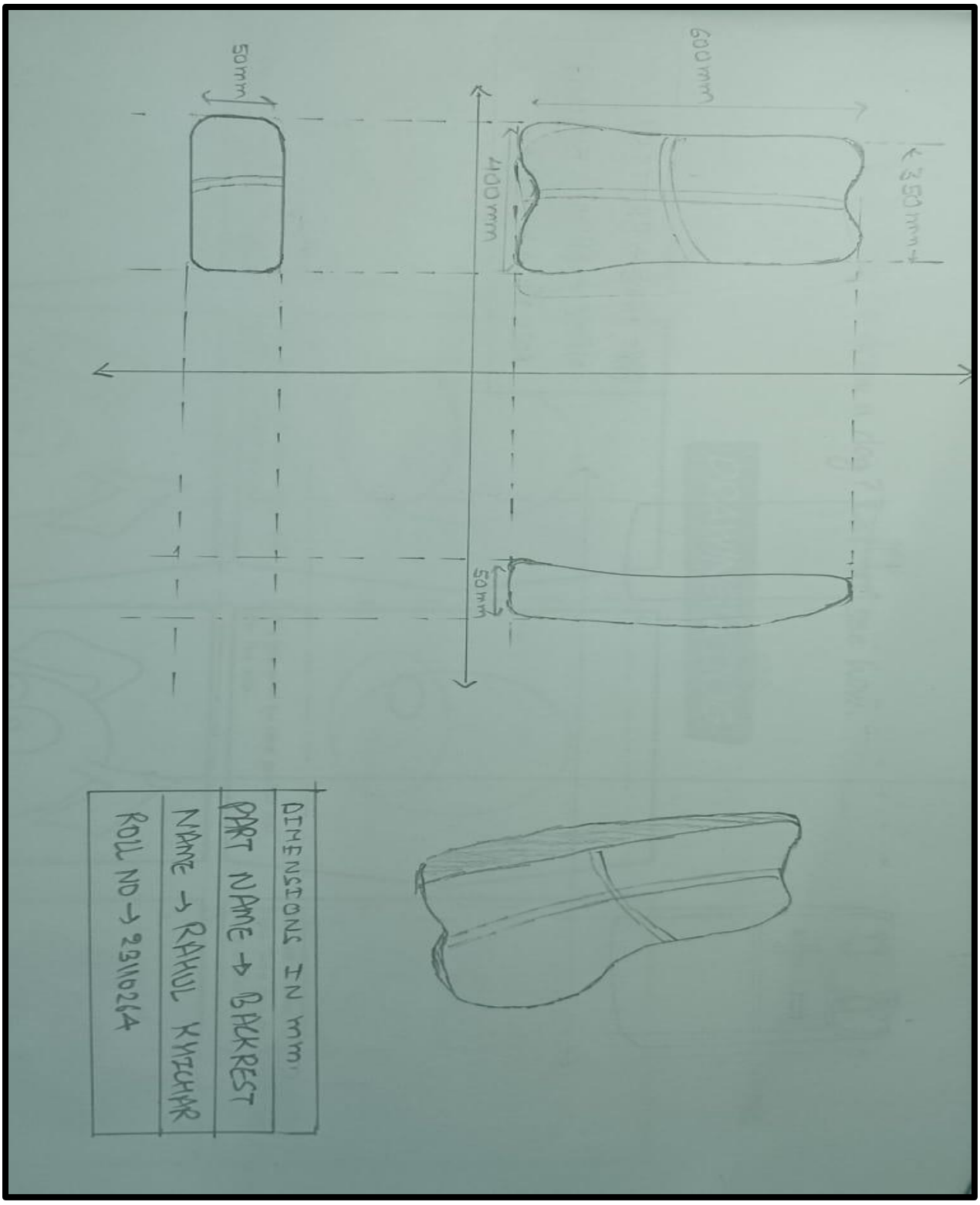
1. Cathode: Most cathodes are made of Manganese dioxide, compounds of nickel, graphite and cadmium. In lead acid batteries, the cathode is made of lead dioxide. In nickel-cadmium batteries, the cathode is made of nickel oxide and hydroxide. In lithium-ion batteries, the cathode of lithium batteries is made of lithium cobalt oxide or lithium iron phosphate.

2. Anode: The most common materials used for anode include zinc, lithium and graphite. However, all these materials depend on the chemistry of the battery. In lead acid batteries, the anode is made of sponge lead. In nickel cadmium batteries anode is made by cadmium. In lithium-ion batteries, the anode is made of graphite.

3. Electrolyte: In batteries, the electrolyte can be a liquid or solid. In common household batteries, potassium hydroxide is mostly used electrolyte. In alkaline batteries, potassium hydroxide is used as an electrolyte. In lead acid batteries, sulfuric acid is used as an electrolyte. In lithium-ion batteries, lithium salt is dissolved in a solvent used as an electrolyte. In lithium iron phosphate batteries, lithium salt is used as an electrolyte.

4. Separator: It is situated in the middle of electrodes. It can be made of various materials like nylon, polyester and cardboard.

Backrest



Reason For Dimensions:

The Backrest provides a comfortable zone to the user. It contains a curved face on the side. It is designed as the format of our back. Therefore, the thickness of the upper part of the backrest made it much thicker, and its width is also similar to this. Here are some other reasons for designing:

1. Support: The dimensions of the backrest are designed in such a way as to comfort the lower part of the user's back.

2. Safety: It is a major concern for users. The backrest should give support to the users with freedom for comfortable movement.

Material Used:

The backrest contains various materials according to its various parts.

1. Steel and aluminium: Steel and Aluminum are used in the main frame of the backrest that is built by welding the metal rods. These rods also provide connectivity to the other parts of the wheelchair.

2. Foam: As a foam in the backrest, many polymers are used, like polyurethane, polystyrene, polyethylene, polyvinyl chloride, ethylene vinyl acetate and latex. The foam contains some gases for flexibility.

3. Nylon, vinyl and PVC: These materials also are used in the internal structure of the backrest.

4. Plastic: It is a very light material. It is a litre alternative to steel. It is used in the internal parts of the main frame.

5. Gases: Many gas bubbles are trapped in the foam, which provides extra flexibility to the backrest. It provides a long life to foam. The most used gases are carbon dioxide, nitrogen, hydrocarbons, ammonia, CFC, etc.

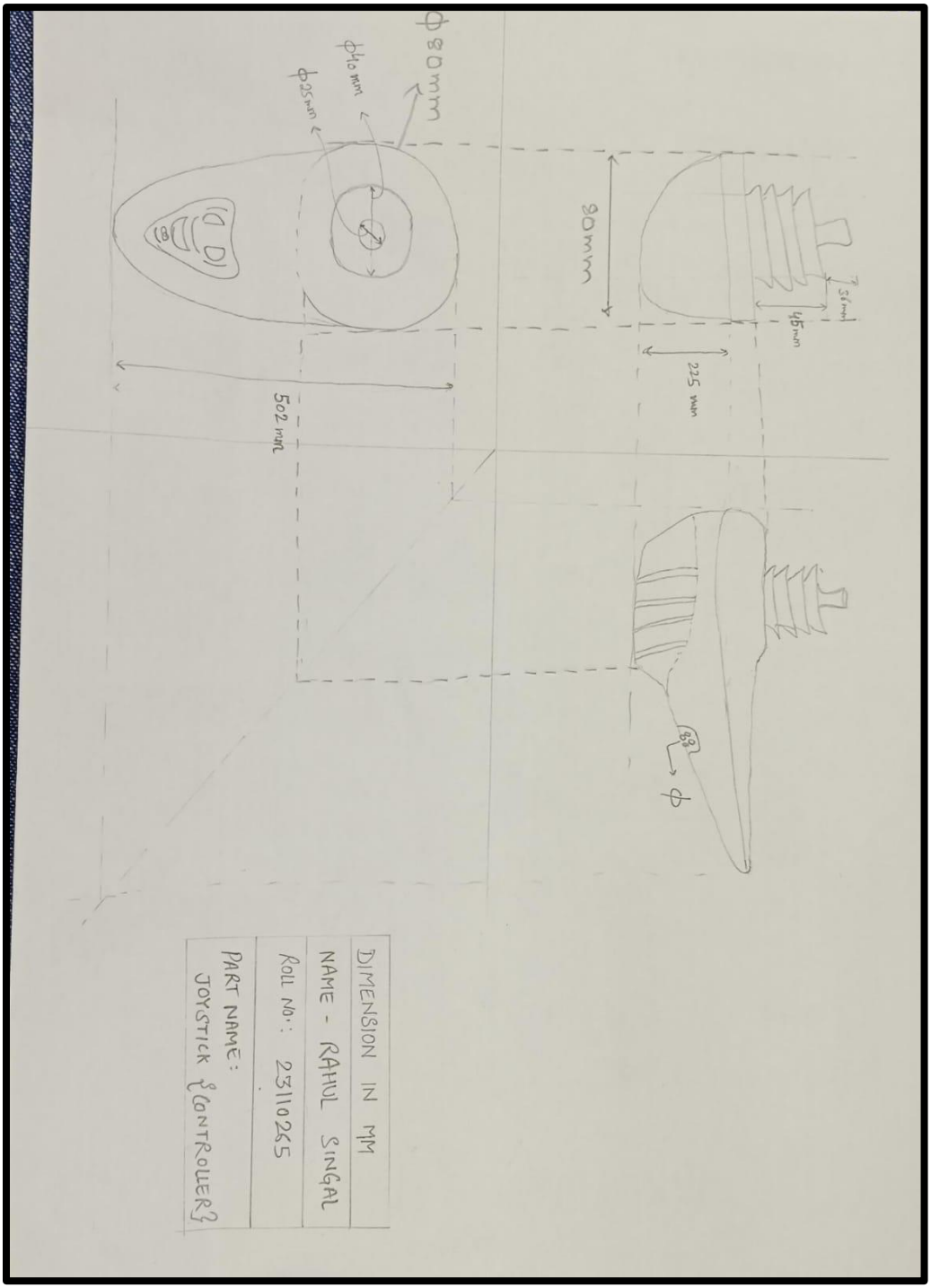
6. Leather: we use it to design the cover of the backrest. Mostly full grain leather, top grain leather, corrected grain leather, bonded leather, faux leather and suede are used in designing the cover of the backrest.

7. Wood: Sometimes, as a light alternative to steel or Aluminium, we can use wood in the design of the main frame.

Name: Rahul Singal

Roll number: 23110265

Joystick (Controller)



Dimensions-cum-Reason for selected dimensions:

The joystick, the major component of the controller, is quite a fascinating part of a motorised wheelchair and is the main accessory in motorised wheelchair as compared to a normal wheelchair.

The device/machine we are making is already meant for physically disabled people. So, we aim to provide the maximum possible comfort and accessibility to them. So, accordingly, we select the dimensions of all the parts of our machine. The joystick's height is kept to 81mm, considering that the user must be able to have a firm grip over its handle, and its springy base is given a diameter of 40mm, such that the joystick can be easily bent along its axis. Moreover, the joystick is held nearer to the user than the other buttons present in the controller. The entire controller's length is kept to be 502mm, keeping in mind that it is not so short that there is some hindrance in accessing any of the buttons and not too long that it creates problems for the user in resting his arm on the armrest. Other than that, the buttons are given an optimum height of 12.5mm such that the user does not be in dilemma if the button has been pressed or not. Also, he / she should not feel that the button is too long to press. The entire idea revolves around how we can design the device to be more and more user-friendly. Also, we have a plug port below the controller, with the purpose of charging our controller as it is an electronic device.

Material used:

Primarily, the controller is made of the ABS material (Acrylonitrile butadiene styrene). It is one of good quality plastic. It is a thermoplastic polymer and is well known for its structural stability, strength, corrosion resistance, great thermal resistance, and abrasion resistance. Sometimes, going for a premium ABS also provides the additional property of being waterproof and anti-corrosion.

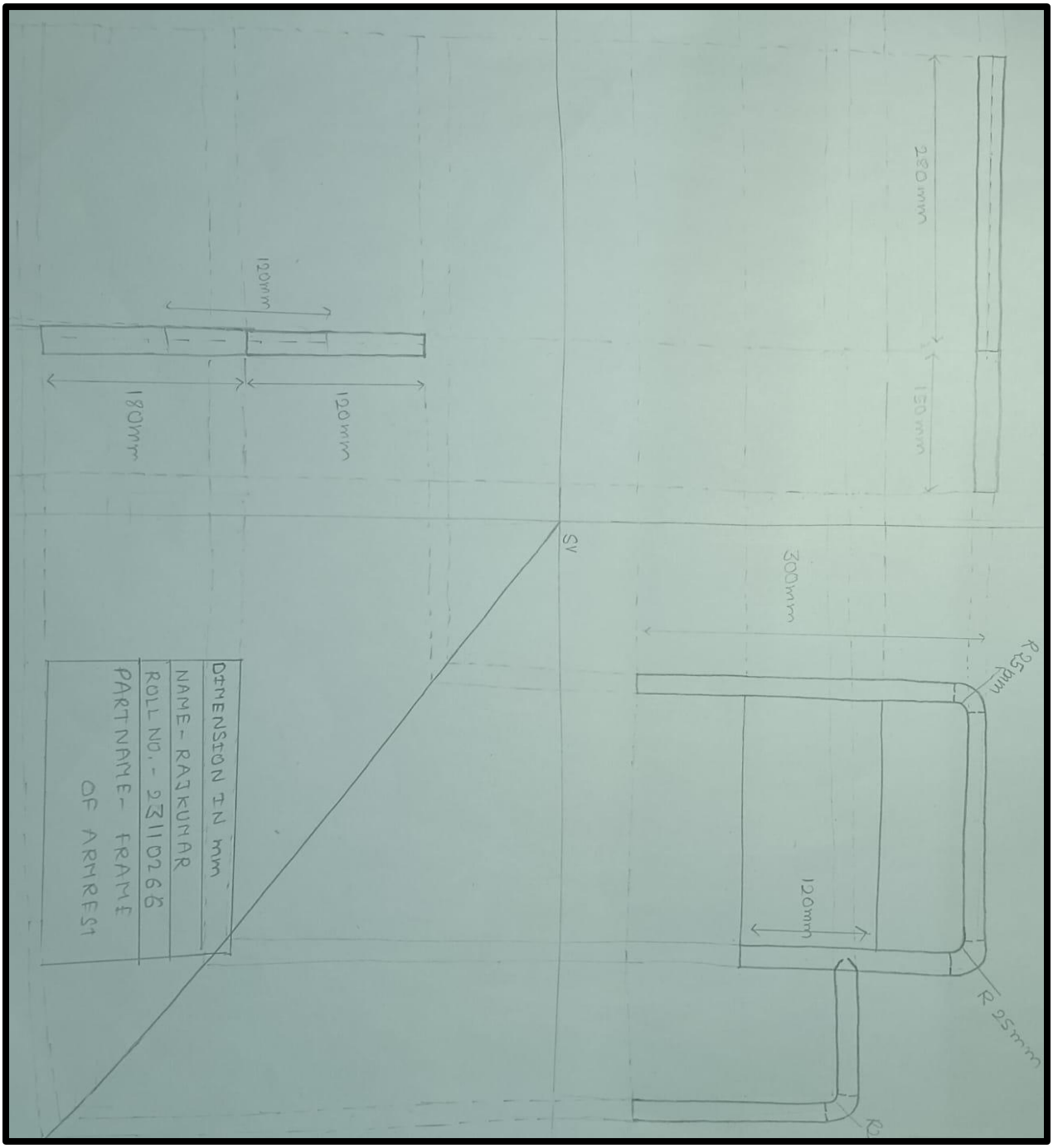
Since it is an electronic device, a wheelchair will be used vigorously. There are high chances of the device being heated. Hence, we need to ensure that it repels external heat and releases internal heat.

We naturally would love such a material to be used in our device, as this will increase the life of the part/device.

Name: Raj Kumar

Roll No.: 23110266

Frame Of Armrest



Reasoning For Dimensions:

There is a simple reason for choosing these dimensions. As we all know, the height of a man is 6 feet. When a handicapped person or a person who needs a wheelchair sits on it, then he or she can easily sit on the electric wheelchair. An electric wheelchair is made with the dimensions that we have chosen, and he or she can easily rest his or her hand on the armrest. When an electric wheelchair is made with a frame of armrest with the dimensions that we have chosen, the person definitely feel comfortable and can do some tasks or the needed tasks very easily such as writing something, reading something like books, newspapers etc or can drink something like tea, coffee etc.

Basically, the main role of giving comfort to the person who uses a wheelchair is of the armrest, but the frame of the armrest gives the base for the armrest. Generally, the length of the hand of a person is almost the same as the dimension that we have chosen. So, the frame of the armrest with this dimension gives the proper dimension for the armrest to choose so that the person can feel relaxed in the wheelchair.

Materials Used:

To make an armrest for the electric wheelchair, the material used must be of a type that is not so heavy. So, aluminium, steel and titanium are used to make the frame of the wheelchair. Actually, the specific forms that are lightweight are used, such as aluminium grade 6, etc.

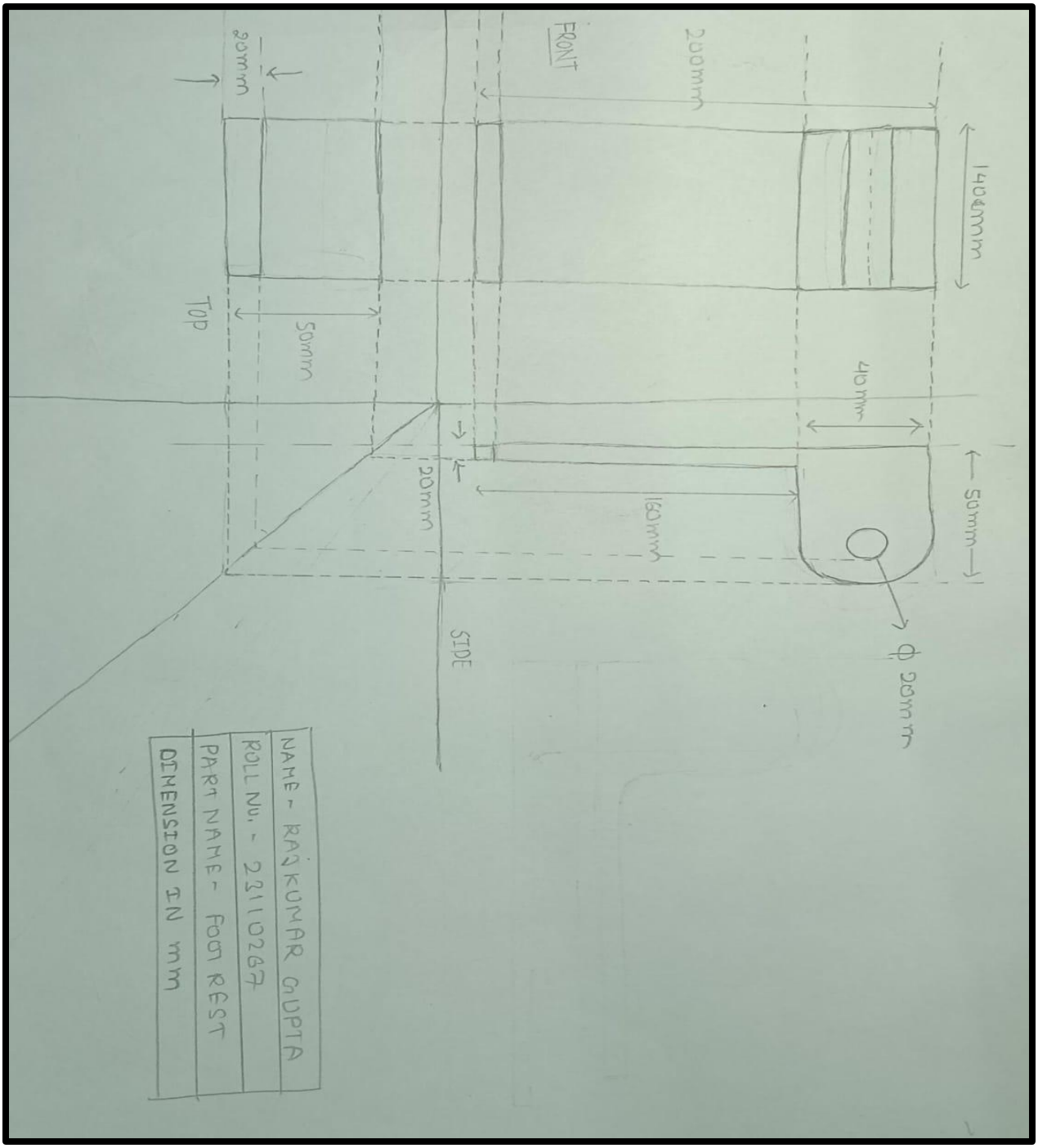
The reason for choosing the material is very simple. See, the person is handicapped or whatever who needs a wheelchair. He is already in need of help from others. If we choose such type of material that is heavy, then after having an electric wheelchair, he or she does not feel comfortable, but it increases his / her struggle or difficulties. An electric wheelchair provides comfort for the needed person. It makes him / her independent. It makes him / her confident, not at all a person who is dependent on others and always waits for others to help. So, looking at the comfort and mobility of the person, we have chosen a material that is not heavy to make the frame of the armrest. If we choose this type of material to make the frame of the armrest that

is lightweight, the overall weight of the wheelchair will be reduced, and it will become very easy to drive the wheelchair. The wheelchair will be easily drivable. He never needs others to help. He can do his / her daily tasks very easily. He is able to go almost wherever he wants to go.

Name: Raj Kumar Gupta

Roll No.: 23110267

1) **Footrest**



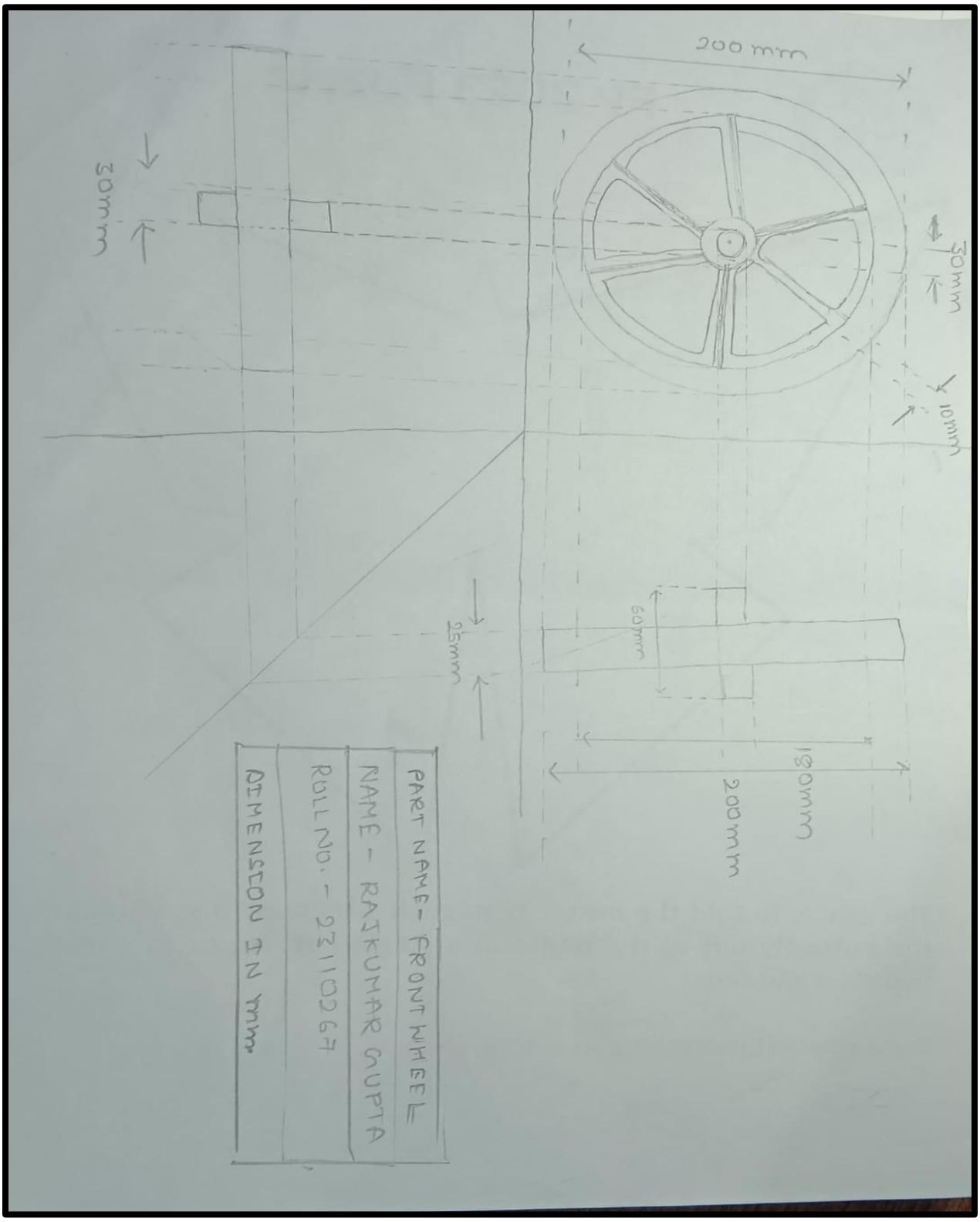
Reason for dimensions:

The device we are building targets to provide aid to people with disabilities in the lower part of the body, mainly the legs. Hence, the footrest is a vital part. The footrest is kept in pairs rather than being just a single long panel. As it is, where the user would be resting his / her foot. So, the dimension of the footrest is chosen such that it is long and wide enough to be comfortable for the user to rest his feet on. The base of the footrest is kept thick so that it is capable of being rigid and sturdy enough while handling the weight.

Material Used:

The core of the footrest is some metal alloy plate to provide the rigidity. The outer part of the footrest may be covered with some sort of plastic covering, depending on the user's demand and the various companies manufacturing them.

Front-wheel


200 mm
30mm
10mm
20mm
25mm
60mm
180mm
200mm
PART NAME - FRONT WHEEL
NAME - RAJKUMAR GUPTA
ROLL NO. - 2211022 67
DIMENSION IN mm

Reason for dimensions:

The front wheels are more of a supportive part and add to the mobility. These are relatively smaller in size as compared to the rear wheels. The front wheels usually have less than ten spokes. The dimensions for the wheels originally came from the normal wheelchairs, where the wheelchair had this difference in order to reduce the efforts of the user to move the wheelchair. As the rear wheel diameter is greater, giving it some force produces greater torque and, henceforth, provides a motion forward. Now, the friction acting on the frontal wheel creates an anti-torque, but this torque is created on a wheel of a smaller radius and, hence, is much smaller in magnitude, enhancing the mobility of the wheelchair. However, this phenomenon and its application are still helpful in motorised wheelchairs as it reduce electric power consumption. The diameter of the wheel is kept to be 200mm. The thickness of the wheel is kept to 25mm, and the diameter of the axle in between is kept to 60mm so that it does not deform.

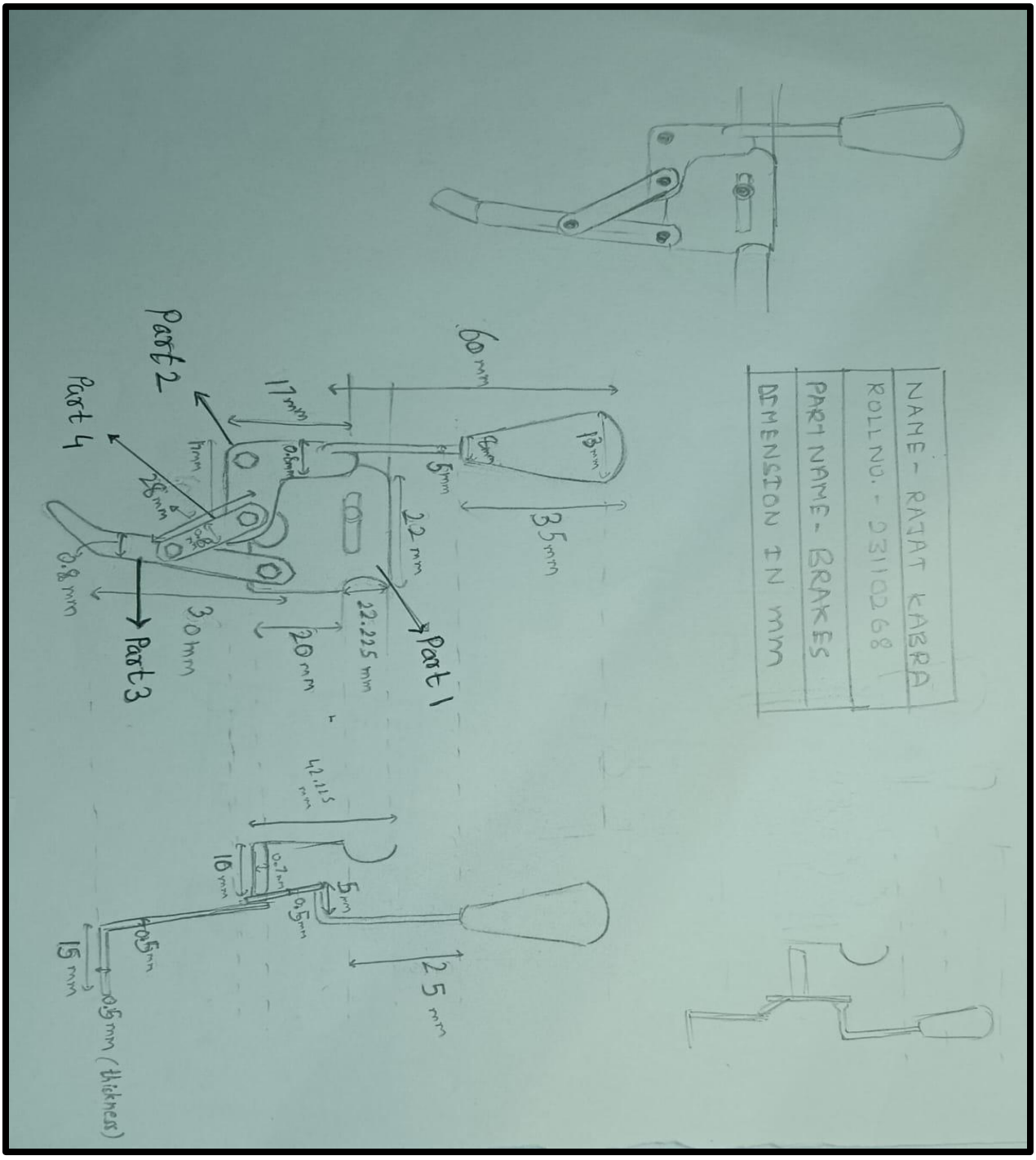
Material used:

The main tube over the rim is of rubber, as obviously it is widely used in tyres, for its essential properties of less weathering, providing a rigid structure, bouncy move, and finer circular boundary, ideal for rolling of a wheel. The important factors to consider when selecting the appropriate type of wheels are their weight and the environment in which you will be using them. The rims are often made of durable, lightweight material such as aluminium or sometimes some synthetic material as an alternate.

Name: Rajat Kabra

Roll no.: 23110268

Brakes



Reasoning for Dimensions :

In electric wheelchairs, the brakes that are used mainly are the electromagnetic brakes. These brakes operate on the principle of electromagnetic force. When the brakes are applied, the magnetic field generated because of electromagnetic force attracts a disc that is attached to the wheels. This way the brakes are applied.

The brakes shown in the figure are mostly used as backup braking systems. These are of utmost importance when the wheelchair is moving on slopes. These brakes prevent the wheelchair from toppling. These brakes are to be applied manually. These are situated above and near the rear wheels so that whenever needed, the user can pull the lever, and the lower blade gets struck into the grip of the tyre, thereby stopping the motion of the wheels. The whole body on which the brake frame (Part 1) is situated is the frame or the skeleton of the wheelchair. The diameter of the rod on which the brake frame is rested is 22.225 mm. The lever which the user pulls or pushes to apply the brakes is connected with an 'L' shaped structure (Part 2). The length of the lever is about 60 mm. That's a decent size, neither too big nor too small. i.e., it can be easily accessed by the user. The user will not have to bend down and look for the lever.

The 'L' shaped structure is connected to Part 3 via a straight flat rod (Part 4), which has the main role in applying brakes. The length of part 3 is about 30 mm. This flat rod is a connecting mechanism between Part 2 and Part 3. When the lever is pressed, the flat rod, in return, forces Part 3 to act as an obstruction in the movement of the rear wheel by getting struck into the grip or treads of the tyre.

Materials Used:

Since these brakes are accessories more than inbuilt features, they have to be hard enough to be able to stop the motion of the wheelchair.

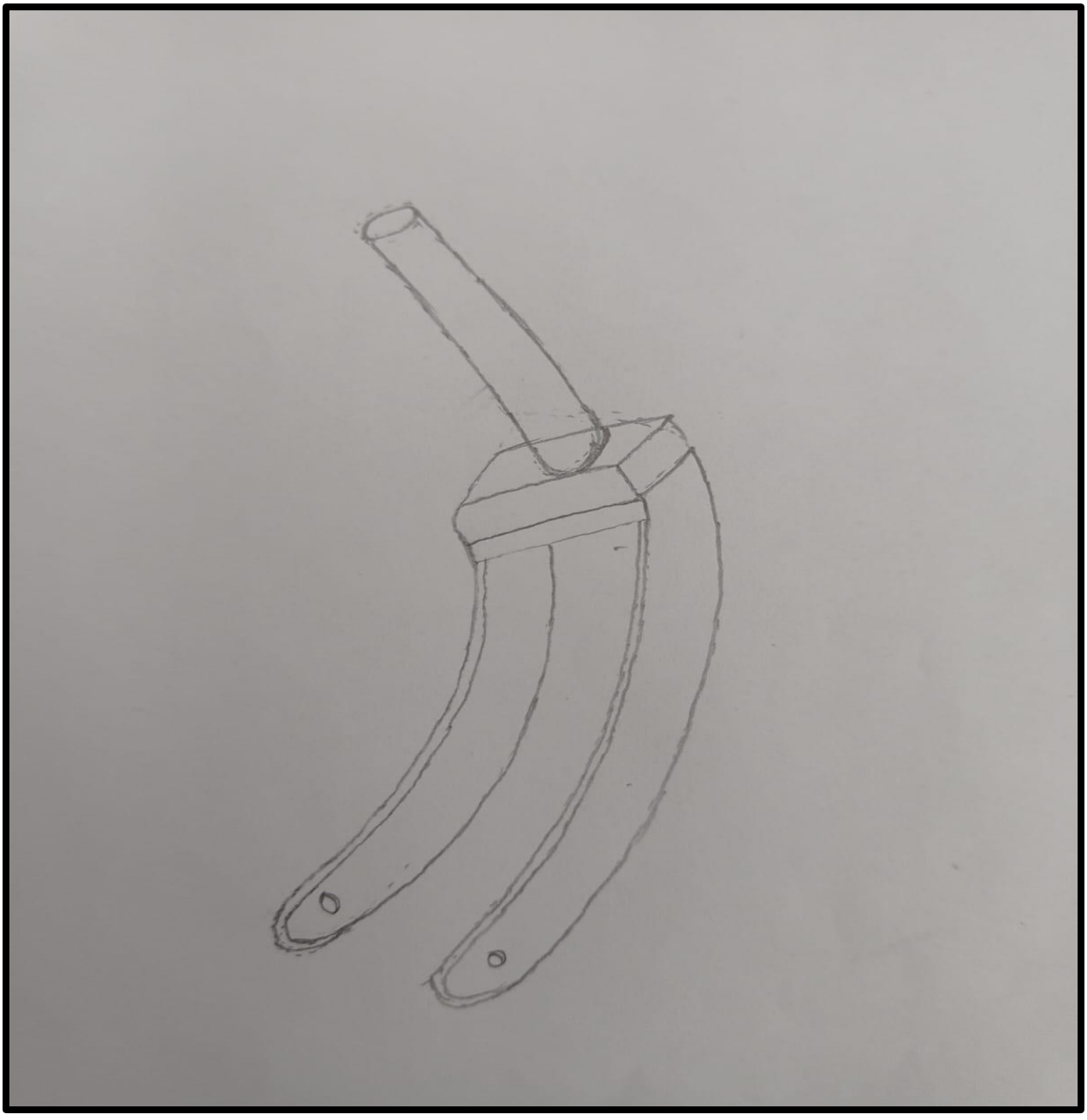
Brake systems in wheelchairs commonly use durable and heat-resistant materials like stainless steel or aluminum for their brake levers and mechanisms. These materials ensure longevity and reliable braking performance, allowing wheelchair users to easily engage and disengage the

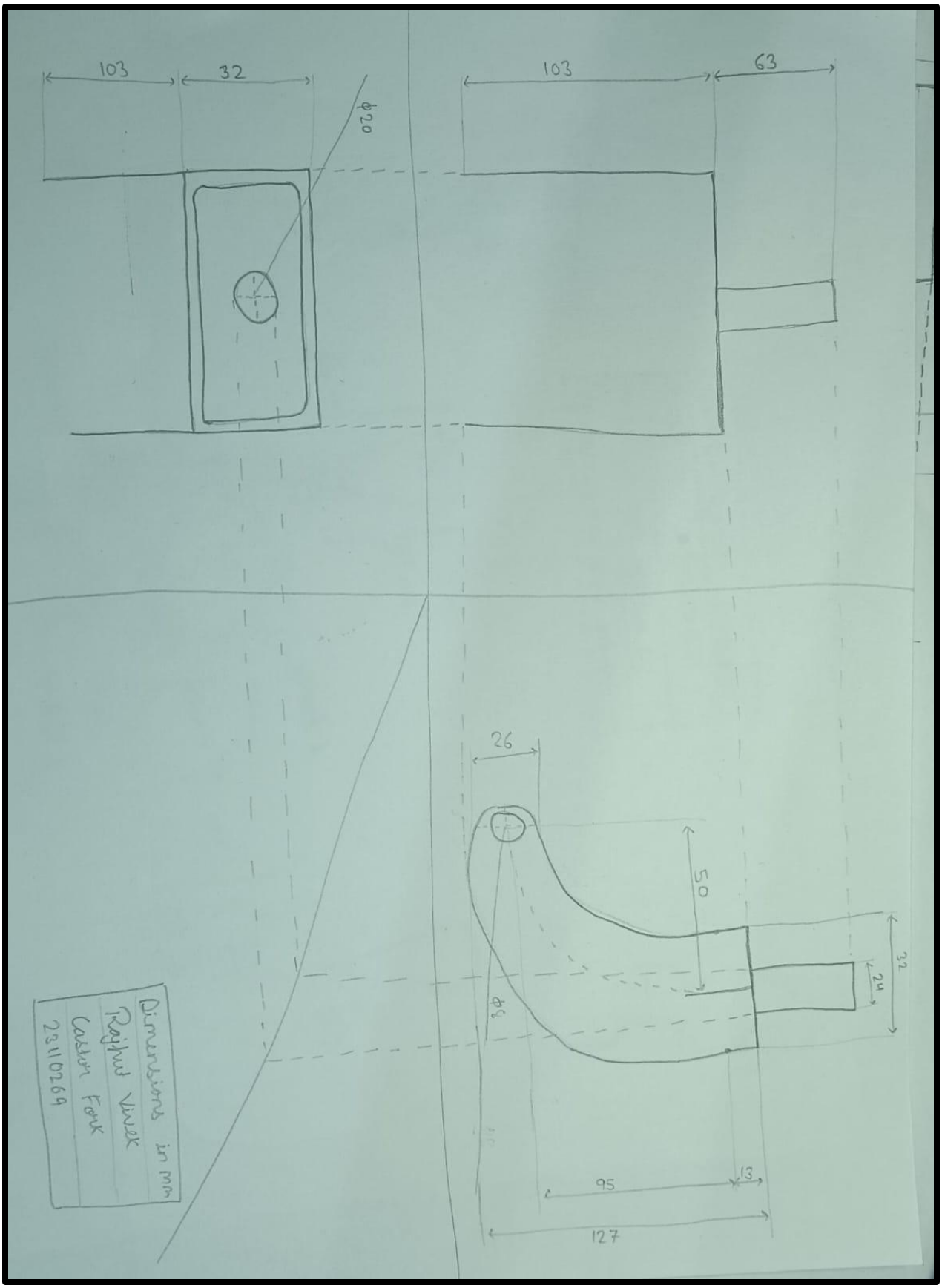
brakes for stability and safety, even during prolonged or heavy use. Other smaller parts like nut bolts and screws can be made of stainless steel, provided that it is perfectly galvanised to prevent rusting and corrosion. This would increase the structural integrity of the wheelchair.

Name: Rajput Vivek

Roll No.: 23110269

Castor fork

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32
24
ϕ8
95
13
127
Dimensions in mm
Rajhud Vivek
Caster Fork
23110269

Reasoning For Dimensions:

The measurement of the castor fork has the leading role in different aspects of stability, flexibility, durability, and safety for the person who placed it in the wheelchair. We have mentioned the things that helped us to determine the dimensions of the Castor fork below:

The size of the wheel of the wheelchair has been a deciding factor in dimensions. When we use the larger castor, wheel size provides more stability and can take over rough areas more efficiently, but there can be reduced flexibility in tight spaces. On the other hand, when we work with the smaller castor wheel size, it is more flexible but has the limitation outdoors. Therefore, we keep it to accommodate the chosen wheel size.

The space or width between two castor wheels is said to be a wheelbase. This can give us easy turns in corners and better stability for a person. A wider wheelbase furnishes more strength but may cause difficulty in turning corners. A narrower wheelbase increases flexibility but may result in stability.

The distance between the ground and the lowest part of the castor fork tells the wheel's ground clearance. When we measure higher ground clearance, it is needed for outdoor or uneven areas to save wheelchairs from being damaged and to prevent the person who is sitting in the wheelchair. The Castor angle is the angle that is mounted about the vertical axis. This angle also impacts the measurement of the castor fork. It must be on that angle at which it can handle more stability and flexibility. A greater angle provides centre-tracking and better equilibrium. In comparison, a smaller angle gives more flexibility.

The castor fork dimensions should be designed so that a person's weight distribution is evenly across the wheels. It should be according to the user's needs and aspects. For instance, it should be made with higher ground clearance, a giant caster wheel, and a wider wheelbase for better stability, long-lasting durability, protection, and flexibility.

Material Used:

The material used in the wheelchair should be appropriate to the user in terms of strength, durability, overall performance, and ensuring safety and protection. There are some factors for consideration and reasoning in selecting the materials below:

Strength and Durability

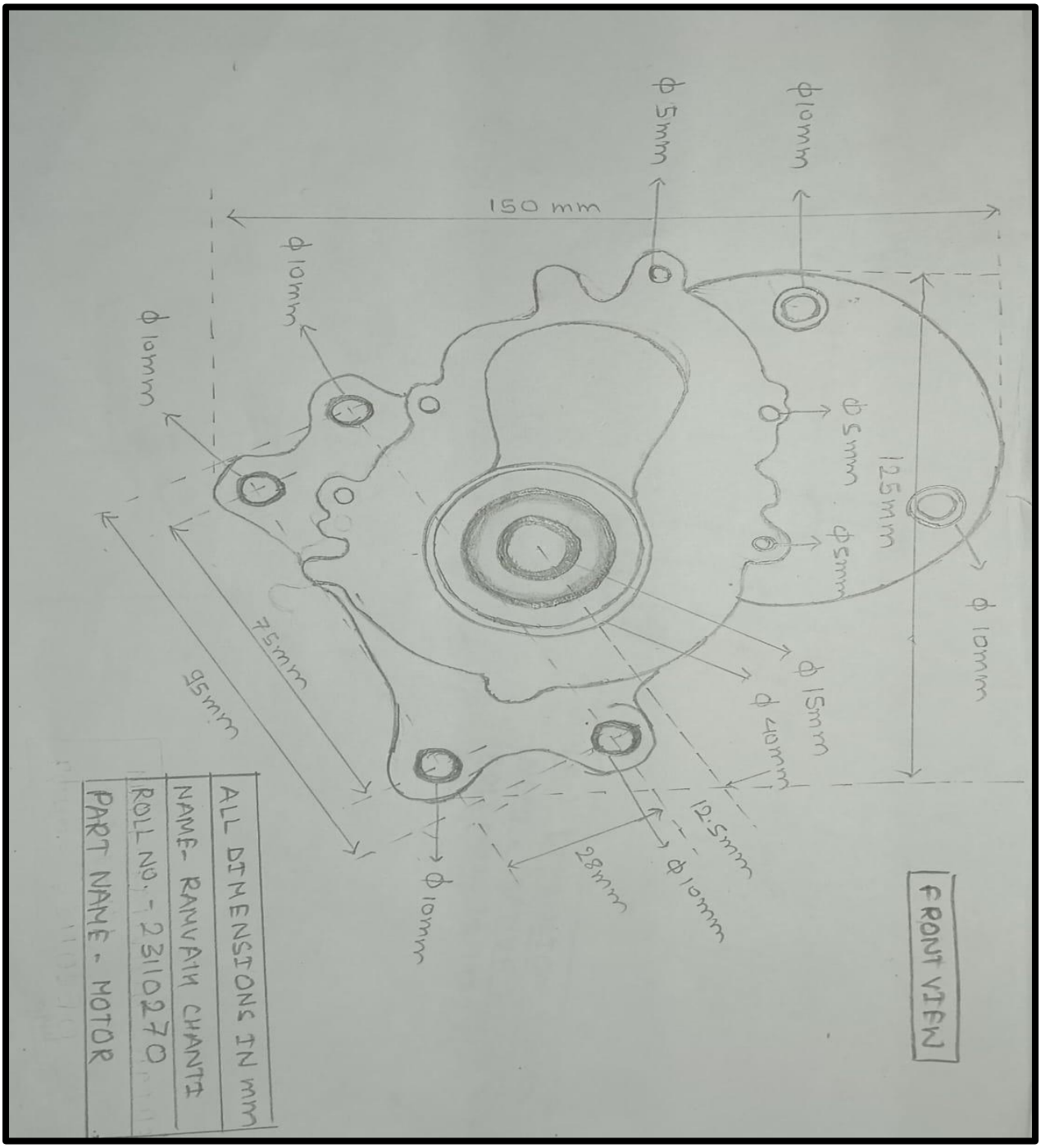
The Castor fork has primary components supporting the front wheels to withstand the pressure and weight of the user. Steel is commonly used for its strength and longevity, handled heavyweight and resists deformation. Aluminium is lighter than steel but still has the capacity to provide good strength and durability. Stainless Steel or Aluminium must be used by protecting the coating on the castor fork to prevent rust. The Castor fork materials should require minimal maintenance to clear and repair.

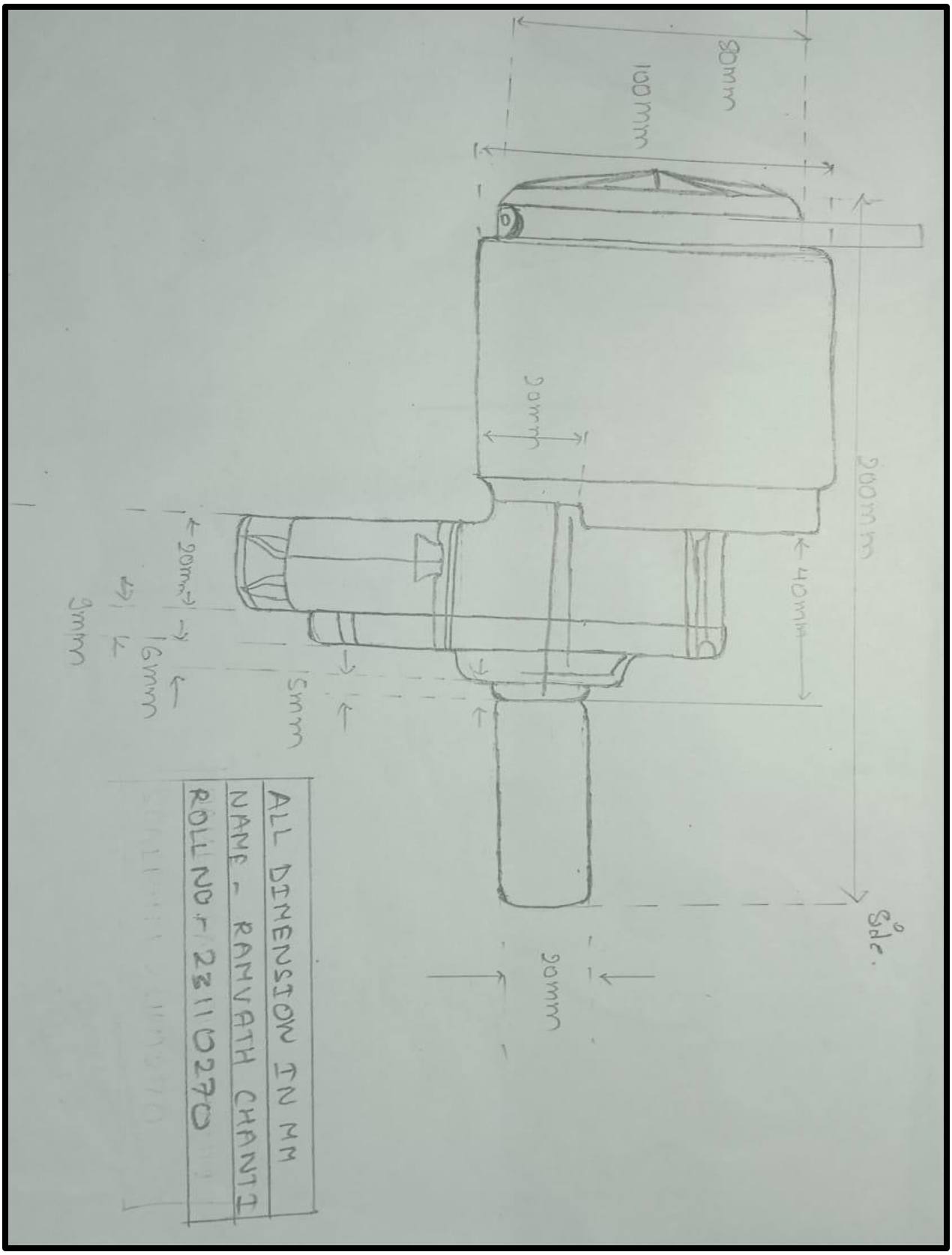
In short, the materials of the Castor Fork of a motorised wheelchair should have good strength, low maintenance, corrosion resistance, and overall performance. The dimensions of the castor fork should be with higher ground clearance, a giant caster wheel, and a wider wheelbase for better stability, long-lasting durability, protection, and flexibility.

Name: Ramavath Chanti

Roll No.: 23110270

Motor




80mm
100mm
30mm
200mm
40mm
Side.
30mm
20mm
15mm
9mm
9mm
ALL DIMENSION IN MM
NAME - RAMVATH CHANTI
ROLL NO : 2311D0270

Reasoning For Dimensions:

To guarantee the complete functioning and performance of the wheelchair, choosing the proper proportions for a wheelchair motor is essential. The user's unique needs and requirements, the type of wheelchair, and the planned application should all be considered when determining the motor's dimensions. Here are some essential factors to take into account when choosing a wheelchair motor's dimensions:

The motor must deliver sufficient torque and power to support the user's weight comfortably, and the importance of any attached equipment or accessories. Assisted manual wheelchairs may have smaller, lighter motors, whereas electric wheelchairs need a more sturdy and robust engine. Consider the kind of surface the wheelchair will be utilised on. The motor dimensions can vary depending on whether it will be used extensively on smooth surfaces or outdoors on rugged terrain. Typically, more challenging motors are needed for outdoor use. To provide adequate range and performance in electric wheelchairs, the motor's size must match the battery capacity. A balance must be struck because a more potent engine can drain the battery more quickly. Wheel Size: The motor's dimensions must match the size and style of the wheelchair's wheels. For larger wheels to maintain a sufficient speed and performance, more potent motors may be necessary. Depending on the wheelchair's overall size, weight, and mobility, some users may have particular preferences for the motor's proportions. To satisfy these desires, customisation could be required. The proportions of the motor should provide simple disassembly or folding to fit into a car or storage space if the wheelchair needs to be travelled regularly. Ensure that the motor size you choose for your wheelchair meets any applicable legal and safety standards in your area.

A thorough evaluation of the user's needs, the planned use, and any necessary customisation should be used to determine the wheelchair motor's final proportions. It's frequently a good idea to speak with wheelchair manufacturers, medical professionals, or mobility specialists to ensure the chosen engine is suitable for the person's requirements and preferences.

Materials Used:

The material chosen for the motor is crucial. Depending on the type and use of the motor, a variety of materials can be used to create electric motors. Typical substances include:

1. Copper Wire: Due to its great electrical conductivity, copper is frequently utilised for motor windings.
2. Iron or Steel: The stator or core of the motor is made of iron or steel, which serves as a magnetic route for the electromagnetic fields.

3. Permanent Magnets: A magnetic field is produced in some motors using permanent magnets comprised of elements like neodymium.
4. Insulation Materials: The components of the motor are shielded and insulated using a variety of insulating materials, including varnishes, resins, and ceramics.
5. Bearings: For less friction and smoother component rotation, bearings are often composed of steel or ceramics.
6. Housing: Depending on the size and intended use of the motor, the casing might be made of aluminum, steel, or plastic.
7. Cooling Materials: In motors that produce a lot of heat, cooling fins or heat sinks may be made of heat-resistant materials like aluminum or copper.

MEETING DETAILS

Meeting 1:

Date: 01/Sep/2023

Duration: 70 minutes

Absent: Rahul Singal, Rachit Mehta(Online present), Vivek Rajput(Online present)

Topics discussed: Ideation and brainstorming.

Meeting 2:

Date: 04/Sep/2023

Duration: 80 minutes

Absent: Ramavath Chanti

Topics discussed: Start of proposal preface and gathered info and required dimensions for our model.

Meeting 3:

Date: 10/Sep/2023

Duration: 100 minutes

Absent:

Topics discussed: Allotted parts to team members.

Meeting 4:

Date: 11/Sep/2023

Duration: 3 hrs

Absent: Rahul Singal

Topics discussed: Everyone drafted their part of the report.

Meeting 5:

Date: 13/Sep/2023

Duration: 2.5 hrs

Absent:

Topics: Created the introduction for the proposal.

Meeting 6:

Date: 14/Sep/2023

Duration: 4 hrs

Absent:

Topics: Final compilation, proofreading and submission.

Meeting 7:

Date: 26/Sep/2023

Duration: 1.5 hrs

Absent: Raj Kumar

Topics: Discussing dimensions changes in the proposal.

Work Distribution

Proposal

- Cover page and signatures: Rahul Singal.
- Illustration on the cover page: Rachit Mehta.
- Writeup for introduction and contributions: Rachit Mehta and Raghav Gopal M.
- Proposal editing and compiling: Rachit Mehta, Raghav Gopal M, Rahul Singal.
- Sketches: Chanti and Raj Kumar Gupta.

Report containing sketches

- Template made by: Vivek and Rachit.
- General modification done by: Rahul Singal
- Sketching done by: Each member did sketching for their parts.
- Content in each part written by: Each member wrote content for their part.
- Help in sketching provided by: Rachit.
- Meetings details page done by: Raghav and Rachit.
- Work distribution page done by: Raghav and Rachit.
- Formatting done by: Vivek and Rachit.

ACKNOWLEDGEMENT

We would like to thank Professor Sameer Patel for providing us with the opportunity to work together and collaborate on this project. We are thankful to Professor Kaustubh Rane for providing us with his valuable feedback and guiding us throughout the project. Lastly, all ten of us are grateful to each other for showing mutual support and a collaborative attitude. Overall, it was a great team effort till now and will be an amazing learning experience. Altogether, while making parts in Autodesk Inventor.