MOTOR AND BATTERY SIZIZNG

🡪MOTOR SIZING:

DC motor for rolling the tape:

Mass of tape:300 grams= 0.3kg

Diameter of roller= 6cm

F in kg=m\*g

= (0.3\*9.8)/9.8

=0.3kg

Torque: T=FD/2n, where n=0.9

T= (0.3\*6)/2\*0.9

=1kg cm

Torque is multiplied by factor of safety, here factor of safety is 1.5

T=1kg cm\*1.5

=1.5kg cm.

Hence a DC motor of 60 rpm is to be used.

🡪 DC motor for rack and pinion:

Co-efficient of friction=0.9

Mass of rack and pinion gear and blade=200gm=0.2kg

Force (F)= co-efficient of friction \*W

= (0.9\*0.2\*9.8)/9.8

= 0.18 kg

Diameter of pinion is 3 cm

Torque = F\*d/2n, where n=0.9

= (0.18\*3)/2\*0.9

=0.3kg cm.

Factor of safety=1.5

Therefore, T =0.3\*1.5=0.45kg cm

Hence motor of 200 rpm is to be used.

🡪BATTERY SIZING

x/0.3=No. of hours(in ampere hours)

Minimum hours required is 3 hours

x/0.3=3

x=0.9Ah

Therefore X=900mAh

Hence 900mAh battery is required.