Homework - 6

(12)

a) Gear ratio = 1:120.

Diameter = 65mm.

Circumference of wheel $\zeta = \pi D$

$= 204.203mm.$

To travel 1meter in straight line.

$1m = 1000mm.$

1 rev of wheel $= 204.203mm$

$? = 1000$

no. of rev. wheel revolutions for 1m travel $= \frac{1000}{204.203} = 4.89$ revolution

no. of motor revolutions for 1m travel

$= 4.89 \times 120$

no. of motor revolutions $\zeta = 587.65 \simeq 588$ revolutions.

b) Encoder ticks = 8 ticks / rev

For 2 meters distance.

The no. of revolutions of the wheel = $\frac{2000}{\pi D}$.

$= \frac{9.79}{\text{rev}}$

1 wheel rev = 120 motor rev

1 motor rev = 8 ticks of encoder.

$\therefore$ 1 wheel rev = $120 \times 8 = 960$ ticks.

9.79 wheel revs = ?

no. of ticks = 9.79×960

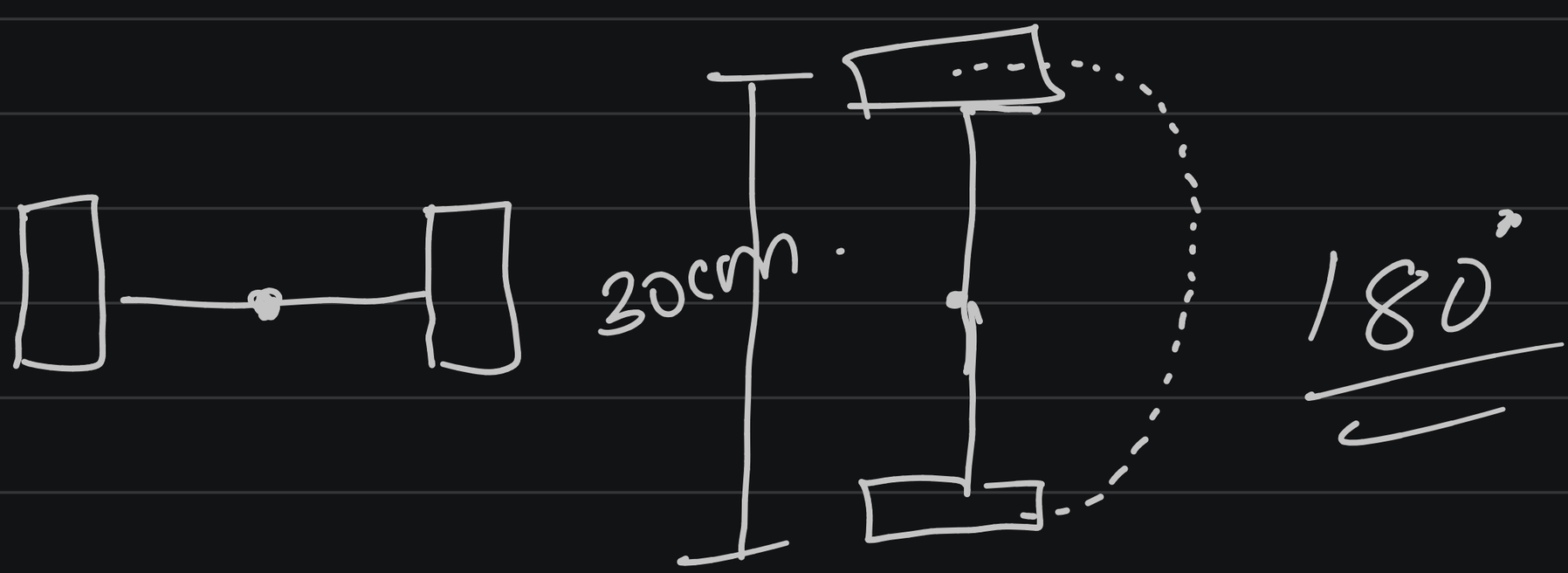
$= 9398.4 \simeq 9399$ ticks

(03)

Gear ratio = 1:53.

Diameter of wheels = 14cm.

width of robot = 30cm.



30cm - semicircle

Diameter of the semicircle = 30cm.

Circumference of semicircle = $\frac{\pi D}{2}$

= 47.12 cm

1 wheel revolution covers. = π x dia of wheel

= π x 14

= 43.98cm.

1 wheel rev = 43.98

? = 47.12.

no. of wheel revolutions = 47.12
43.98

= 1.07

1 wheel revolution = 53 motor revolutions.

1.07 = ?

no. of motor revolutions = 1.07 x 53

= 56.71

= 57