

Answer to the question no 1:

Count = 24cm

Diameter = 15cm

Half kilometer = 50000cm

Now,

$$C = 2\pi r = 15\pi = 47.1$$

So, counts for half kilometer of travel is  $(50000 * 24)/47.12 = 25466.9$

Answer to the question no 2:

Electromagnet = 8

Teeth = 50

Now,

50 teeth for 360deg is  $360/50 = 7.2$  deg

For 8 stage 7.2 deg is  $7.2/8 = 0.9$ deg

Answer to the question no 3:

R1 = 5 ohm

R2 = 3ohm

Vin = 24

Now,

$$V_{out} = 24 * 3 / (5/3) = 9V$$

Answer to the question no 4:

If I u want to detect any obstacle in front of car automatically I need to use Ultrasonic sensor,

Electromagnet = 8 Teeth = 50 50 teeth for  $360^\circ$  1 teeth for  $360/50^\circ = 7.2^\circ$  For 8 stage  $7.2^\circ$   
Now, for 1 stage  $7.2/8 = 0.9$