

Second Newton's law :

$$\begin{cases} OX: \frac{mv^2}{R} \cos(\alpha) + mg \sin(\alpha) = F_{fr} = \mu N & (1) \\ OY: mg \cos(\alpha) = N + \frac{mv^2}{R} \sin(\alpha) & (2) \end{cases}$$

$F_{fr} = 4000 \text{ N}$ – friction force

μ – coefficient of friction

v – maximum speed

$R = 300 \text{ m}$ - radius of curvature

$\alpha = 5 \text{ degrees}$

m – mass of the car

N – force of normal reaction of the surface

$\frac{v^2}{R}$ – centripetal acceleration

g - free fall acceleration

The input data given is not enough to solve this problem. Let we assume that the mass of the car m is given.

Then, from equation (1)

$$v = \sqrt{\frac{F_{fr} - mg \sin(\alpha)}{m \cos(\alpha)} R}$$

The average mass of the car is about $m = 1500 \text{ kg}$. Then

$$v = 23,3 \frac{m}{s}$$

Answer:

$$v = \sqrt{\frac{F_{fr} - mg \sin(\alpha)}{m \cos(\alpha)} R}$$

For $m = 1500 \text{ kg}$ \Rightarrow $v = 23,3 \frac{m}{s}$