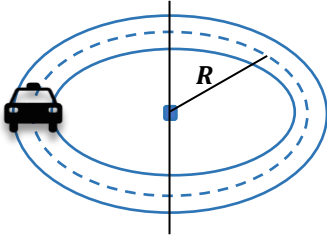


CONCEPT: FLAT CURVE

- When objects travel around horizontal (flat) curves, the force that keeps them in circular motion is _____.

EXAMPLE: Find the maximum speed that an 800kg car can have while driving around flat curve of radius 50m **without slipping** if the coefficient of static friction between the car and the road is 0.5.



CENTRIPETAL FORCES

- 1) Draw FBD
- 2) Write $\Sigma F_c = ma_c$
(rewrite $a_c \Rightarrow v^2/R$)
- 3) Solve

Circ. Motion / Centripetal Forces

$$a_c = \frac{v_T^2}{R} = \frac{4\pi^2 R}{T^2} = 4\pi^2 R f^2$$
$$T = \frac{1}{f} \Leftrightarrow f = \frac{1}{T}$$
$$v_T = \frac{C}{T} = \frac{2\pi R}{T} = 2\pi R f$$

PROBLEM: A truck can go around a flat curve of radius 150m with a maximum speed of 32m/s before slipping. Calculate the maximum speed it can go around a tighter curve of radius 75m.

- A) 32 m/s
- B) 515 m/s
- C) 3.8 m/s
- D) 22.7 m/s

CENTRIPETAL FORCES

- 1) Draw FBD
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$$\text{Flat Curve: } v^2 = gR\mu_s$$