Answer on Question55211 - Physics / Mechanics — Kinematics — Dynamics - for completion

October 1, 2015

A car with $D = 80cm$ diameter wheel starts from rest and accelerates uniformly to a velocity of $v_1 = 20m/s$ in $t_1 = 9.0s$. Find the angular acceleration in rad/s^2.

Solution

The angular velocity of the wheel after the acceleration is:

$$\omega_1 = \frac{v_1}{R} = \frac{2v_1}{D}$$

where R is the radius of the wheel.
The angular acceleration:

$$\varepsilon = \frac{\omega_1}{t_1} = \frac{2v_1}{Dt_1} = \frac{2 * 20m/s}{0.8m * 9s} \approx 5.6rad/s^2$$