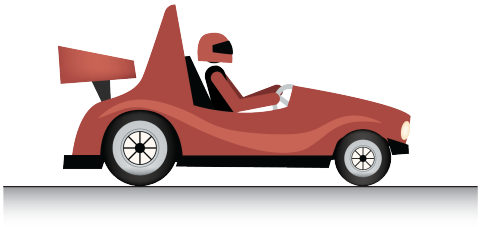
22-R-WE-JL-25



A racecar is travelling along a straight road at a constant speed of 80 km/h. The reaction force of the wheels and the axles pushes the axles (and thus the car) forward with a force of $F = 320$ N. Find the output power of the motor.

If the motor has an efficiency of $\eta = 0.4$, determine the input power of the motor.

Solution

The output power of the motor is found using $P_{out} = F\,v$.
First converting the speed into m/s we have $v = 80\frac{km}{h} = 22.22\frac{m}{s}$

$P_{out} = 320 \cdot 22.22 = 7.11$ [kW]

The using the efficiency, we can find the input power with $\eta = \frac{P_{out}}{P_{in}}$

$P_{in} = \frac{P_{out}}{\eta} = 17.78$ [kW]