

## 22-R-WE-JL-25

A racecar is travelling along a straight road at a constant speed of 80 km/h. The friction of the road with the wheels pushes 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  $v = 80 \frac{km}{h} = 22.22 \frac{m}{s}$

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

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

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

