

P7.8-2) A 1200-kg electric vehicle is brought to rest from a speed of 55 km/h on level ground in the span of 10 seconds by its regenerative braking system. If the regeneration process has an efficiency of 60%, determine the average power that must be absorbed by the battery during this braking event.

Given:

Find:

Solution:

Method 1

Calculate the work required to bring the vehicle to rest.

$U =$ _____

What is the power required for braking?

$P_{braking} =$ _____

What is the power absorbed by the battery?

$P_{absorbed} =$ _____

Method 2

Draw a free-body diagram of the vehicle.

Determine the vehicle's acceleration.

$$a = \underline{\hspace{10em}}$$

Calculate the braking force.

$$F = \underline{\hspace{10em}}$$

What is the power required for braking?

$$P_{braking} = \underline{\hspace{10em}}$$

What is the power absorbed by the battery?

$$P_{absorbed} = \underline{\hspace{10em}}$$