

RESUELTO

EXERCISE 2.3 - ELECTRIC SCOOTER

Input data:

Battery Nominal Voltage	42	V
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Battery capacity unknown

Starting from Battery SOH 75% and SOC 80%

Total weight: 98kg

Smooth cement road type.

No slope on the road.

1. What will be the energy needed in the battery in these conditions to be able to travel a distance of 10 km, traveling at 20 km/h and discharging the battery until 10%?
2. What was the battery nominal energy when it was new?

Use the excel tool to make the exercise

CASILLA G43 → 20 km/h

CASILLA G44 → 98 kg

CASILLA G45 → 0.034 ← Smooth cement road type

CASILLA G47 → 80% ← INITIAL SOC %

CASILLA G48 → 10% ← MINIMUM REACHING SOC %



CON ESTOS DATOS DETERMINAR

LA POTENCIA DE DESCARGA

DE LA BATERIA.

$$POTENCIA DE DESCARGA RESULTANTE = \underline{97'43W}$$

$$\begin{aligned} SOC \text{ INICIAL} &= 80\% \\ SOC \text{ FINAL} &= 10\% \end{aligned} \quad \Delta DOD = 70\%$$

$$\underline{e = v \cdot t} \rightarrow 10 \text{ km} = 20 \frac{\text{km}}{\text{h}} \cdot t'(\text{h})$$

$$t'(\text{h}) = 0'5 \text{ h.} \rightarrow \text{Tiempo en descargar la batería desde } SOC = 80\% \text{ hasta el } SOC = 10\%$$

$$\underline{E(\text{wh}) = P(\text{W}) \cdot t'(\text{h})} = 97'43 \text{ W} \cdot 0'5 \text{ h.}$$

$$E_{\text{DESCARGADA}} (\text{wh}) = \underline{48'715 \text{ wh}} \rightarrow \text{ESO ES UN } \Delta DOD \text{ DEL } 70\%$$

CON UN SOH 75% PERO TOTALMENTE

CARGADA \rightarrow

$$100\% \rightarrow x_1$$

$$70\% \rightarrow 48'715 \text{ wh}$$

DOD

$$x_1 = 69'6 \text{ wh} \rightarrow \text{ENERGIA TOTAL DE LA BATERIA PARA SOH} = 75\% \text{ Y SOC} = 100\%$$

CUANDO ES NUEVA \rightarrow S.O.H = 100% CUANTA
SEPA LA ENERGIA NOMINAL
(SOC 100%)

69'6 Wh \rightarrow S.O.H = 75%

X₂ \leftarrow S.O.H = 100%

$$\boxed{X_2 = 92'8 \text{ Wh.}}$$

ENERGIA NOMINAL DE
LA BATERIA DEL
SCOOTER NUEVA.

S.O.H = 100%
SOC = 100%