

- 1.16** The charge flowing into the box is shown in the graph in Fig. P1.16. Sketch the power absorbed by the box.

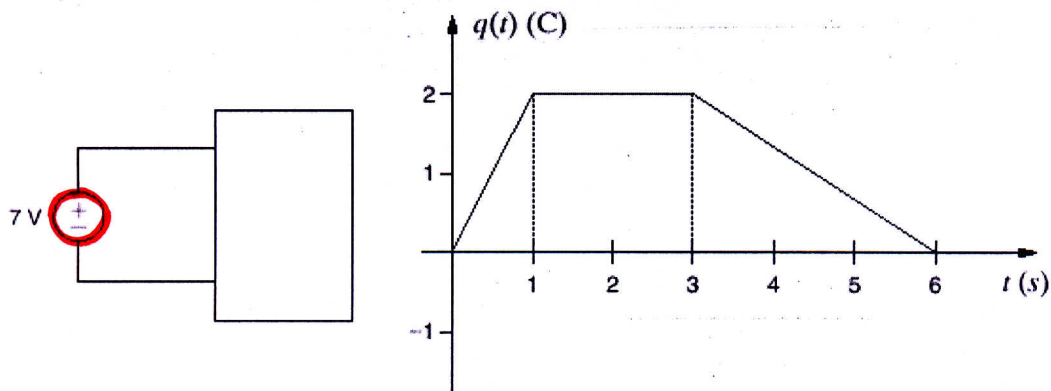


Figure P1.16

**SOLUTION:**

$$p(t) = v(t) i(t)$$

$$i(t) = \frac{dq(t)}{dt}$$

$$q(t) = m_1 t + b_1$$

$$m_1 = \frac{2-0}{1-0} = 2$$

$$q(t) = 2(t) + b_1$$

$$b_1 = 0$$

$$q(t) = 2t, \quad 0 \leq t \leq 1$$

$$q(t) = 2, \quad 1 \leq t \leq 3$$

$$q(t) = m_2 t + b_2$$

$$m_2 = \frac{0-2}{6-3} = -2/3$$

$$q(t) = -2/3 t + b_2$$

$$0 = -2/3(6) + b_2$$

$$b_2 = 4$$

$$q(t) = -2/3 t + 4, \quad 3 \leq t \leq 6$$

$$i(t) = \begin{cases} 2A & 0 \leq t \leq 1 \\ 0A & 1 \leq t \leq 3 \\ -2/3A & 3 \leq t \leq 6 \end{cases}$$

$$p(t) = \begin{cases} 14W & , 0 \leq t \leq 1s \\ 0W & , 1 \leq t \leq 3s \\ -\frac{14}{3}W & , 3s \leq t \leq 6s \end{cases}$$

