

PP 1.3 The current flowing through an element is

$$i = \begin{cases} 4A & 0 < t < 1s \\ 4t^2 A & t > 1s \end{cases}$$

Calculate the charge entering the element from  $t=0$  to  $t=2s$ .

$$\begin{aligned} q &= \int i dt = \int_{t=0}^1 4 dt + \int_{t=1}^2 4t^2 dt = 4t \Big|_{t=0}^1 + \frac{4t^3}{3} \Big|_{t=1}^2 \\ &= 4(1-0) + \frac{4}{3}(8-1) \end{aligned}$$

$$\underline{\underline{q = 13.33 C}}$$