

The current flowing past a point in a wire is described by the expressions given below for different situations. Find the total amount of charge that has flowed past the point in the time between 0 and 1.5 s? How many electrons does that represent? ( $N$  is the number of electrons.)

a)  $i(t) = 1.5 \text{ mA}$  :  $Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

b)  $i(t) = (4 \text{ A/s})t + 2 \text{ A}$  :  $Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

c)  $i(t) = (10 \text{ mA}) \exp\left(\frac{-t}{2 \text{ s}}\right) + (5 \text{ mA/s}) \cdot t$

$Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

d)  $i(t) = (2 \text{ A}) \sin\left(\frac{2\pi}{3 \text{ s}} \cdot t\right)$  :  $Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

e)  $i(t) = (50 \text{ mA}) \cos\left(\frac{2\pi}{0.75 \text{ s}} \cdot t\right)$

$Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

Write your answers — and whatever work will fit — on this sheet. Staple any sheets with additional work behind.