

- 6** A metal wire in a circuit has a length of 1.8 m and a cross-sectional area of $1.5 \times 10^{-6} \text{ m}^2$. The total number of free electrons (charge carriers) in the wire is 2.3×10^{23} .

There is a current in the wire so that a charge of 172 C moves past a fixed point in the wire in a time of 2.5 minutes.

- (a)** Show that the number density of the free electrons in the wire is $8.5 \times 10^{28} \text{ m}^{-3}$.

[1]

- (b)** Calculate the average drift speed of the free electrons.

average drift speed = ms^{-1} [3]

[Total: 4]