29 What is a possible charge on a particle?

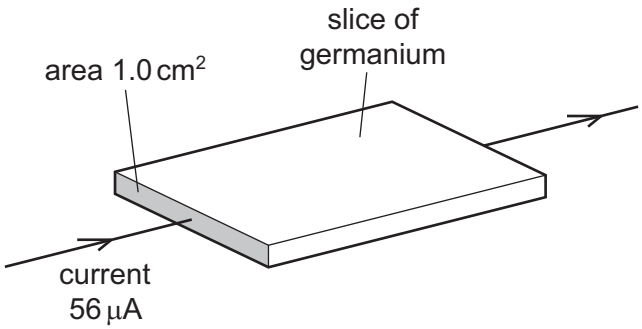
A $6.40 \times 10^{-20}\,\text{C}$

B $4.00 \times 10^{-19}\,\text{C}$

C $1.12 \times 10^{-18}\,\text{C}$

D $9.11 \times 10^{-18}\,\text{C}$

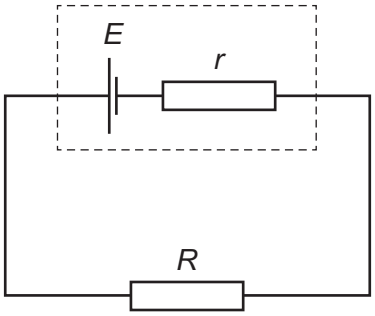
30 A slice of germanium of cross-sectional area $1.0\,\text{cm}^2$ carries a current of $56\,\mu\text{A}$. The number density of charge carriers in the germanium is $2.0 \times 10^{13}\,\text{cm}^{-3}$. Each charge carrier has a charge equal to the charge on an electron.



What is the average drift velocity of the charge carriers in the germanium?

A $0.18\,\text{m s}^{-1}$ **B** $18\,\text{m s}^{-1}$ **C** $180\,\text{m s}^{-1}$ **D** $1800\,\text{m s}^{-1}$

31 A cell of electromotive force (e.m.f.) E and internal resistance r is connected to an external resistor of resistance R, as shown.



What is the power dissipated in the external resistor?

A $\dfrac{E^2(R+r)}{R^2}$ **B** $\dfrac{E^2R}{(R+r)^2}$ **C** $\dfrac{E^2(R+r)}{r^2}$ **D** $\dfrac{E^2r}{(R+r)^2}$