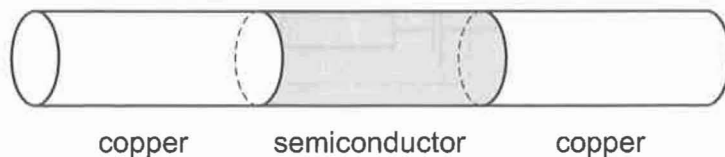


- 27** The electric current through a cylinder of semiconductor material is supplied by copper wires, as shown.



The charge carriers in the semiconductor material are electrons. The semiconductor material and the copper have the same cross-sectional area.

The table gives details of the number of free electrons per cubic metre in each material.

	copper wire	semiconductor
number of free electrons per cubic metre	$8.6 \times 10^{28}$	$4.3 \times 10^{21}$

The mean speed of electrons through the copper wire is  $0.58 \text{ mm s}^{-1}$ .

What is the mean speed of electrons through the semiconductor material?

- A**  $2.9 \times 10^{-6} \text{ m s}^{-1}$
- B**  $2.9 \times 10^{-3} \text{ m s}^{-1}$
- C**  $1.16 \times 10^4 \text{ m s}^{-1}$
- D**  $1.16 \times 10^7 \text{ m s}^{-1}$