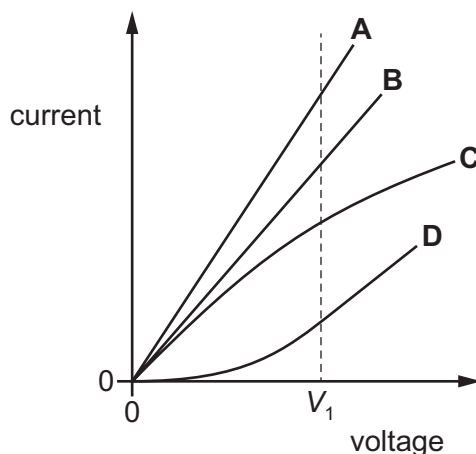


- 31 The I - V characteristics for four components, **A**, **B**, **C** and **D**, are shown.

Which component has the greatest resistance when the potential difference across it is V_1 ?



- 32 A cylindrical wire has cross-sectional area A and number density of free electrons n . The wire has current I and the free electrons have average drift speed v .

A second cylindrical wire has cross-sectional area $0.5A$ and number density of free electrons $2n$. In this wire, the free electrons have average drift speed $2v$.

What is the current in the second wire?

- A** $0.5I$ **B** I **C** $2I$ **D** $4I$
- 33 An electric current is formed by moving charge carriers.

What is **not** a possible charge on a charge carrier?

- A** $-4.8 \times 10^{-19} \text{ C}$
B $-2.4 \times 10^{-19} \text{ C}$
C $+1.6 \times 10^{-19} \text{ C}$
D $+3.2 \times 10^{-19} \text{ C}$
- 34 Which description of Kirchhoff's first law is correct?
- A** It considers the currents at a junction in a circuit and is a consequence of the conservation of charge.
B It considers the currents at a junction in a circuit and is a consequence of the conservation of energy.
C It considers the electromotive forces and potential differences in a circuit loop and is a consequence of the conservation of charge.
D It considers the electromotive forces and potential differences in a circuit loop and is a consequence of the conservation of energy.