

- 6 The variation with the potential difference  $V$  across a filament wire of current  $I$  is shown in Fig. 6.1.

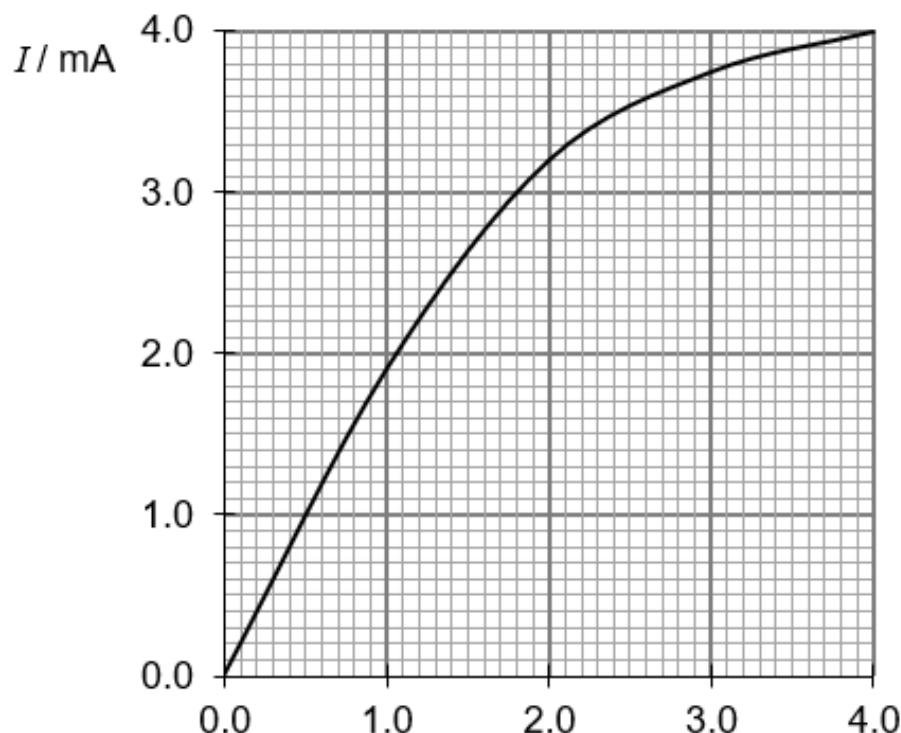


Fig. 6.1

- (a) Explain how Fig. 6.1 shows that the resistance of the filament wire increases with potential difference.
- .....  
.....  
.....  
.....  
.....

.....  
... [2]

- (b) Hence, or otherwise, use Fig. 6.1 to determine the minimum value of the resistance of the filament wire.

minimum resistance = .....  $\Omega$  [3]

- (c) The filament wire is 2.0 m long and has a diameter of 0.046 mm.

Determine the resistivity of the wire when  $V$  is 4.0 V.

resistivity = .....  $\Omega$  m [3]

- (d) When the filament wire is connected in series with an ideal ammeter and a cell with internal resistance  $0.50 \Omega$ , the ammeter reads  $1.0 \text{ mA}$ .

Determine the e.m.f. of the cell. Give your answer to 4 significant figures.

e.m.f. = ..... V [2]

[Total: 10]

