7 The electromotive force (e.m.f.) of a battery is 7.5 V.

(a) Define the term electromotive force.

.....

.....

..... [2]

(b) The battery is connected in series with a variable resistor and a 30 Ω resistor. The battery is made using 1.5 V cells.

(i) Draw a circuit diagram that shows all the 1.5 V cells connected to produce an e.m.f. of 7.5 V, the variable resistor and the 30 Ω resistor.

[3]

(ii) The resistance of the variable resistor can be varied from 0 Ω to a maximum resistance of 150 Ω.

Using the axes in Fig. 7.1, draw a graph to show how the current in the circuit varies with the resistance of the variable resistor as it increases from 0 Ω to 150 Ω.

Determine and label the value of the maximum current on the *y*-axis.

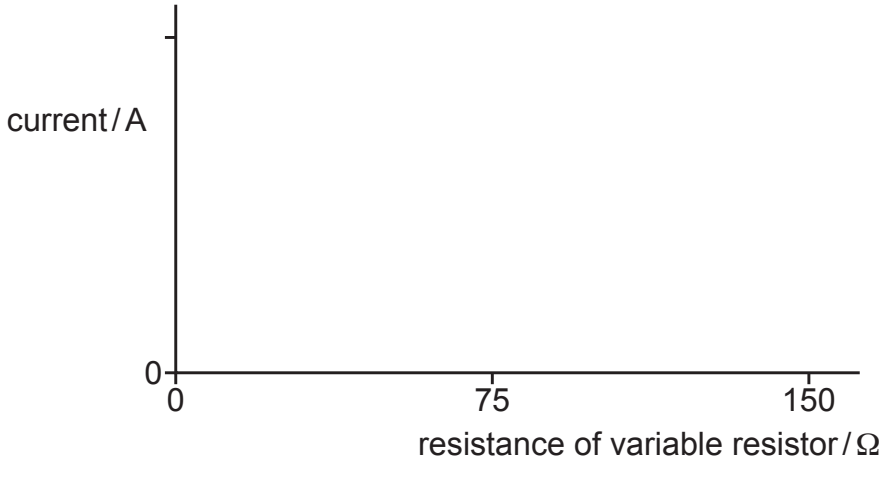

Fig. 7.1

[4]

[Total: 9]