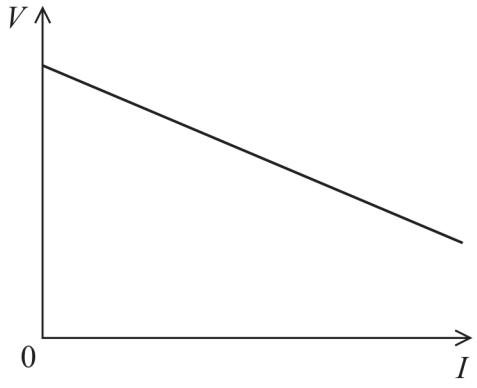
12 A student carries out an experiment to determine the e.m.f. ε and internal resistance r of an electrical cell, using a circuit containing an ammeter and a voltmeter.

(a) Draw a diagram of a circuit that can be used for this experiment.

(3)

(b) The student plotted a graph of the terminal potential difference V of the cell against the current I in the cell, as shown.



Explain how ε and r for the cell can be determined from this graph.

(4)

(Total for Question 12 = 7 marks)