

- 5 A cell of e.m.f. 6.0 V and internal resistance r is connected in series with a fixed resistor S and a variable resistor as shown in Fig. 5.1. Voltmeter X is connected across the cell while voltmeter Y is connected across the variable resistor.

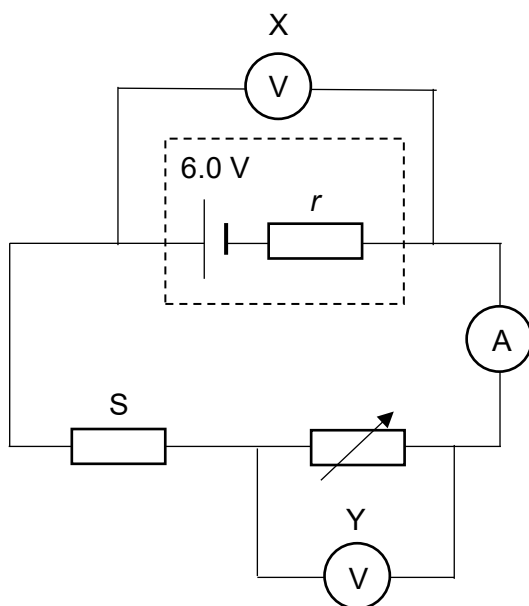


Fig. 5.1

- (a) State what is meant by *resistance* of a resistor.

.....
..... [1]

- (b) The resistance of the variable resistor is varied and the variations of the readings V on voltmeters X and Y with the reading I on the ammeter are shown in Fig. 5.2.

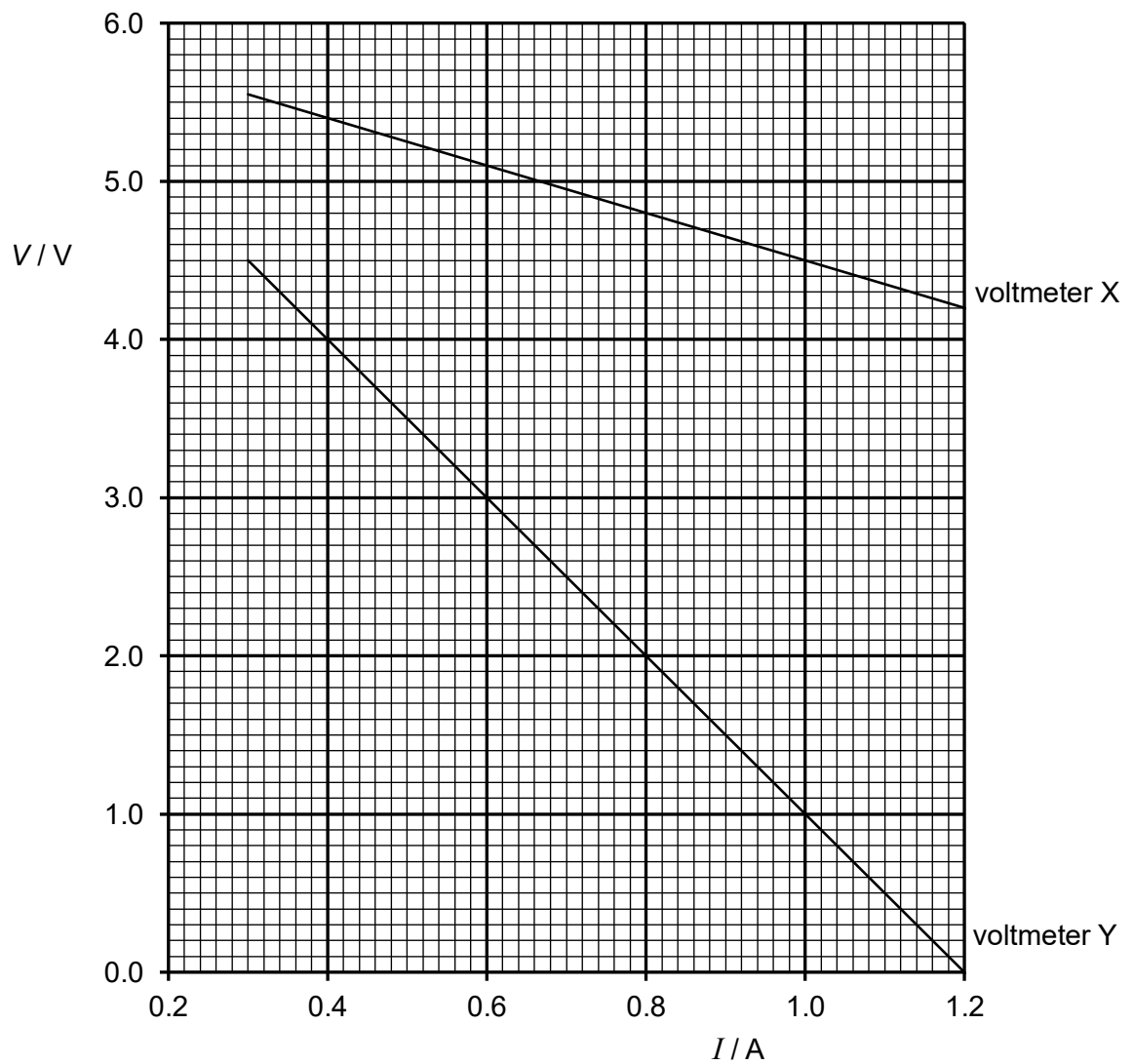


Fig. 5.2

- (i) Determine the internal resistance r of the cell.

$$r = \dots\dots\dots \Omega \quad [2]$$

(ii) Show that the resistance of resistor S is 3.5Ω .

[2]

(c) Explain why the current in the circuit cannot fall below 0.30 A .

.....

..... [1]

(d) The variable resistor is adjusted such that the reading on voltmeter X is 5.25 V .

Calculate the power dissipated in the variable resistor.

power = W [2]

- (e) (i) On Fig. 5.2, draw a graph of the variation of the potential difference across resistor S with I .

Label this graph Z.

[1]

- (ii) Hence or otherwise, state the value of I when the potential difference across resistor S and the potential difference across the variable resistor are equal.

I = A [1]

