6 **(a)** **(i)** State what is meant by an *electric current*.

.....

.....[1]

(ii) Define *electric potential difference*.

.....

.....[1]

(b) The variation with potential difference V of the current I in a component Y and in a resistor R are shown in Fig. 6.1.

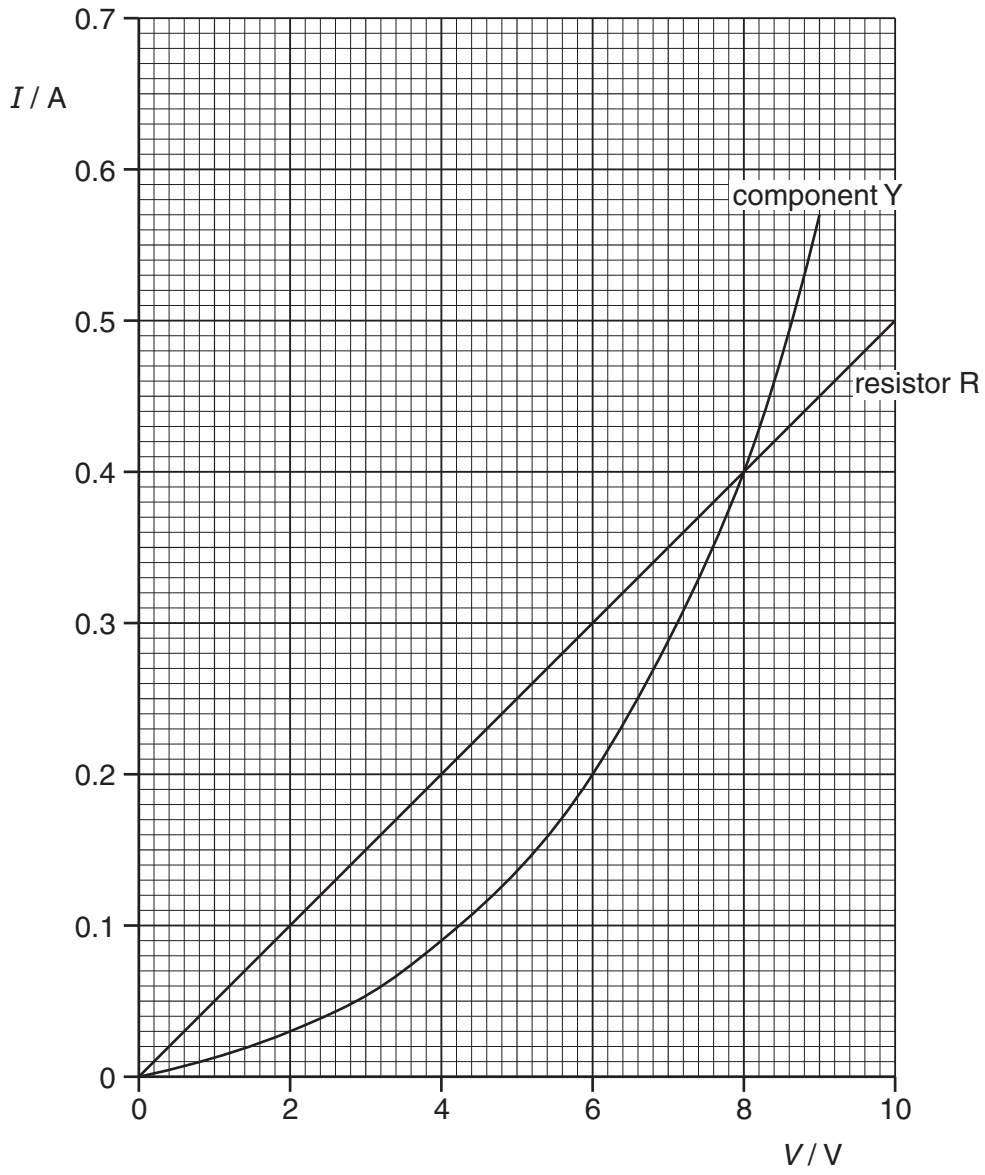

Fig. 6.1

Fig. 6.1 to explain how it can be deduced that resistor R has a constant resistance of 20 Ω.

.....

.....

.....[2]

(c) The component Y and the resistor R in **(b)** are connected in parallel as shown in Fig. 6.2.

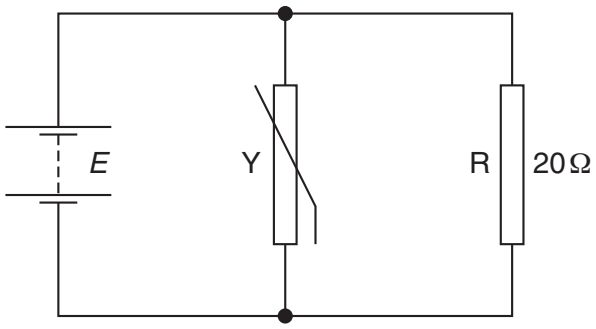

Fig. 6.2

A battery of e.m.f. *E* and negligible internal resistance is connected across the parallel combination.

data from Fig. 6.1 to determine

(i) the current in the battery for an e.m.f. *E* of 6.0 V,

current = ...A [1]

(ii) the total resistance of the circuit for an e.m.f. of 8.0 V.

resistance = ... Ω [2]

(d) The circuit of Fig. 6.2 is now re-arranged as shown in Fig. 6.3.

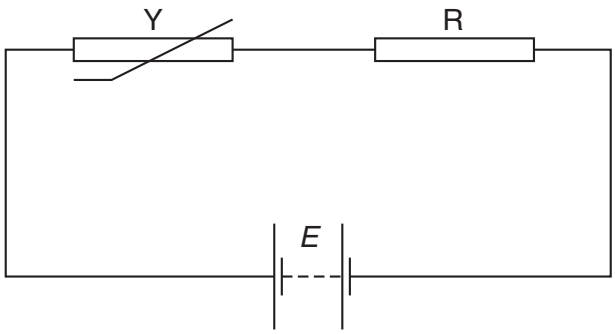

Fig. 6.3

The current in the circuit is 0.20 A.

(i) Fig. 6.1 to determine the e.m.f. *E* of the battery.

E = ...V [1]

(ii) Calculate the total power dissipated in component Y and resistor R.

power = ...W [2]