

- 7 A battery of electromotive force (e.m.f.) 9.6V and negligible internal resistance is connected in series with two fixed resistors and a thermistor, as shown in Fig. 7.1.

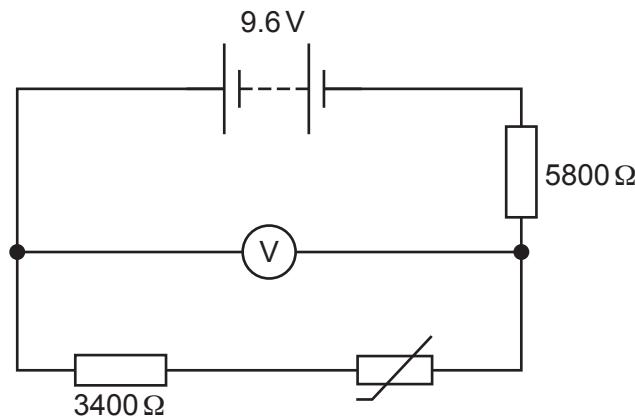


Fig. 7.1

The fixed resistors have resistances of 3400Ω and 5800Ω . The reading on the voltmeter in the circuit is 6.0V.

- (a) Calculate the current in the resistor of resistance 5800Ω .

$$\text{current} = \dots \text{A} [2]$$

- (b) Calculate the resistance of the thermistor.

$$\text{resistance} = \dots \Omega [2]$$

- (c) The initial energy stored in the battery is $2.6 \times 10^4 \text{ J}$.

Assume that the e.m.f. of the battery is constant.

Determine the final energy stored in the battery after a charge of 330 C has moved through it.

$$\text{final stored energy} = \dots \text{ J} \quad [2]$$

- (d) The environmental conditions change causing an increase in the resistance of the thermistor.

State whether there is a decrease, increase or no change to:

- (i) the temperature of the thermistor

..... [1]

- (ii) the current in the thermistor

..... [1]

- (iii) the potential difference across the thermistor.

..... [1]