

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

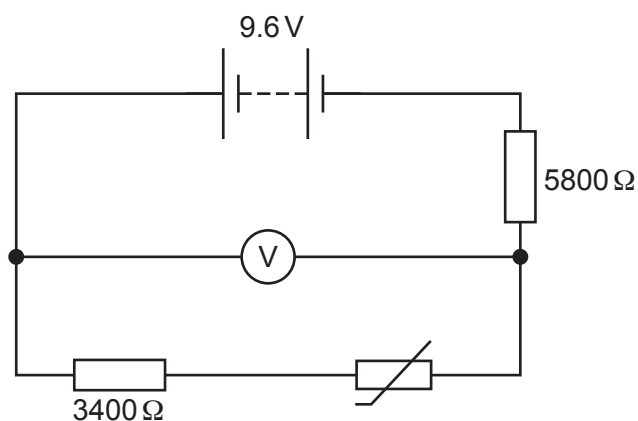


Fig. 7.1

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

- (a) Calculate the current in the resistor of resistance $5800\ \Omega$.

current =A [2]

- (b) Calculate the resistance of the thermistor.

resistance = Ω [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.

final stored energy = J [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]

[Total: 9]