5   Two resistors of resistance 1.2 kΩ and 1.6 kΩ, and a thermistor are connected to an ideal cell of electromotive force of 9.0 V.

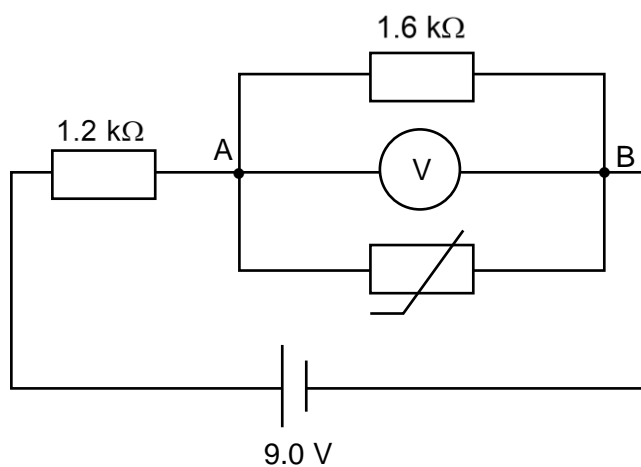An ideal voltmeter is placed between points A and B of the circuit, as shown in Fig. 5.1.

Fig. 5.1

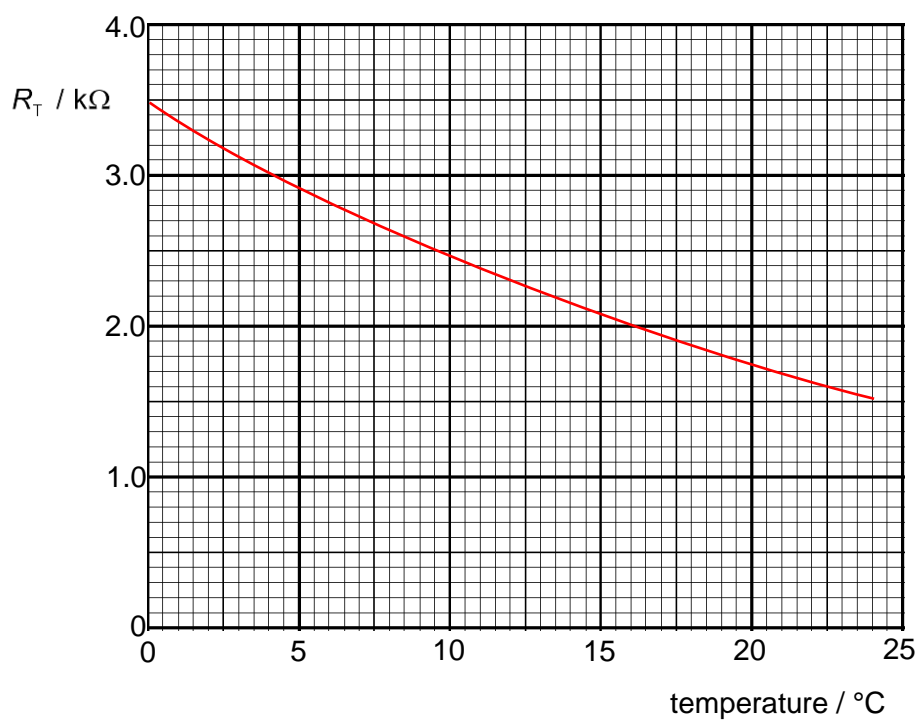The variation with temperature of the resistance R_T of the thermistor is shown in Fig. 5.2.

Fig. 5.2

(a) The thermistor has a current temperature of 22.5 °C. Determine the

    (i) total resistance between points A and B,

resistance = ……………………………… Ω [2]

    (ii) reading on the voltmeter,

voltmeter reading = ……………………………… V [2]

(b) The temperature of the thermistor is now changed. The new voltmeter reading is now 4.0 V.

  Find the
    (i) total resistance between points A and B,

resistance = ……………………………… Ω [2]

    (ii) temperature of the thermistor.

temperature = ……………………………… °C [2]

(c) A student suggests that the voltmeter, reading up to 10 V, could be calibrated to measure temperature.

Suggest two disadvantages of using the circuit of Fig. 5.1 with this voltmeter for the measurement of temperature in the range 0 °C to 25 °C.

1. ....

....

2. ....

.... [2]

[Total: 10]