(c) A car component of mass 0.0460 kg rattles at a resonant frequency of 35.5 Hz.

Fig. 4.1 shows how the amplitude of the oscillation varies with frequency.

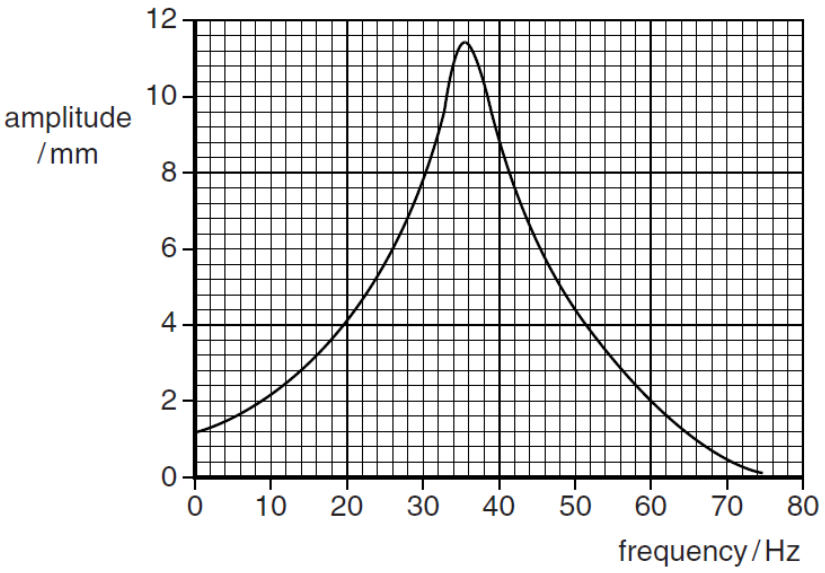

Fig. 4.1

(i) Calculate the magnitude of the maximum acceleration of the component when oscillating at the resonant frequency.

magnitude of maximum acceleration = ... m s^{-2} [2]

(ii) On Fig. 4.1, draw a line to show the effect of supporting the component on a rubber mounting.

[2]

5 The variation with temperature of the resistance R_T of a thermistor is shown in Fig. 5.1.

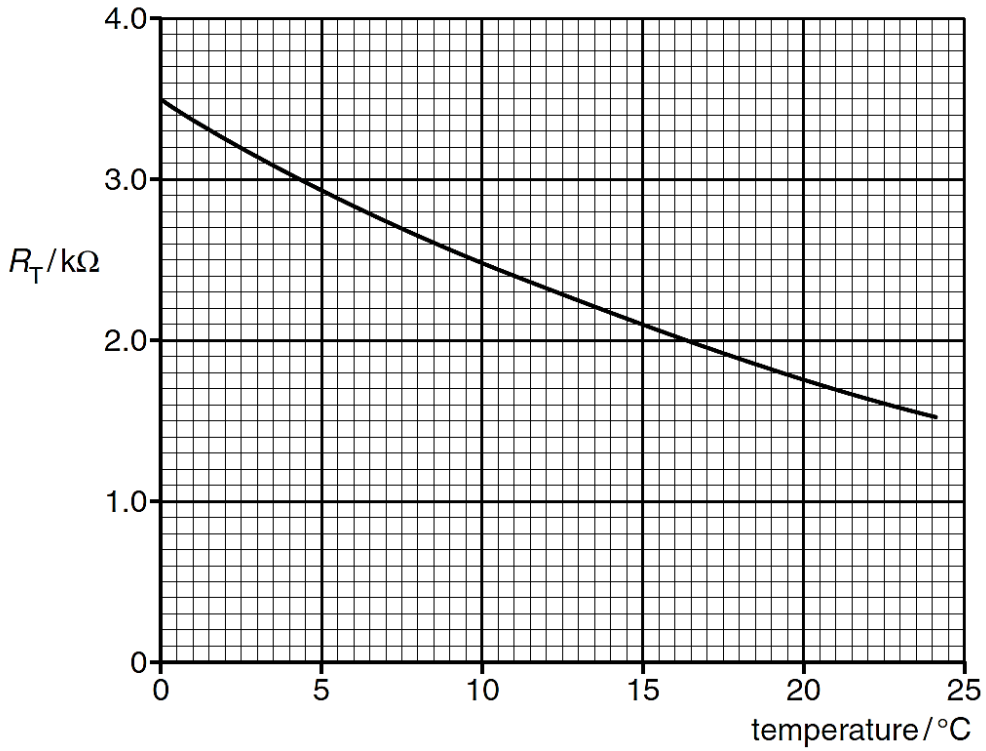

Fig. 5.1

The thermistor is connected into the circuit of Fig. 5.2.

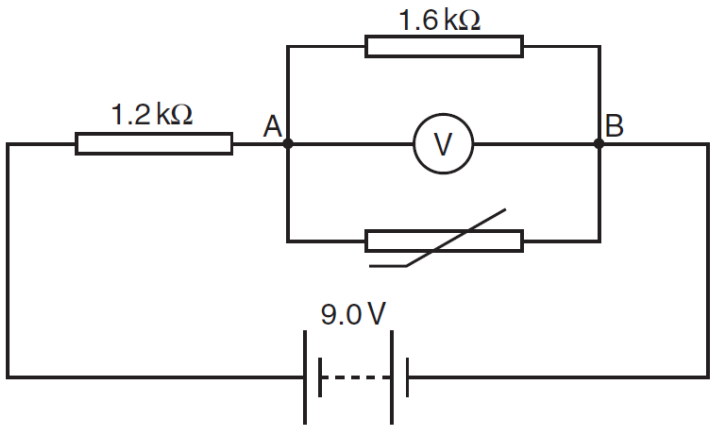

Fig. 5.2

The battery has e.m.f. 9.0 V and negligible internal resistance. The voltmeter has infinite resistance.

(a) For the thermistor at 22.5 °C, calculate

(i) the total resistance between points A and B on Fig. 5.2,

resistance = ... Ω [2]

(ii) the reading on the voltmeter.

voltmeter reading = ...V [2]

(b) The temperature of the thermistor is changed. The voltmeter now reads 4.0 V. Determine

(i) the total resistance between points A and B on Fig. 5.2,

resistance = ... Ω [2]

(ii) the 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. 5.2 with this voltmeter for the measurement of temperature in the range 0 °C to 25 °C.

1.……
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2.……………………………………………………………………………………………
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[2]