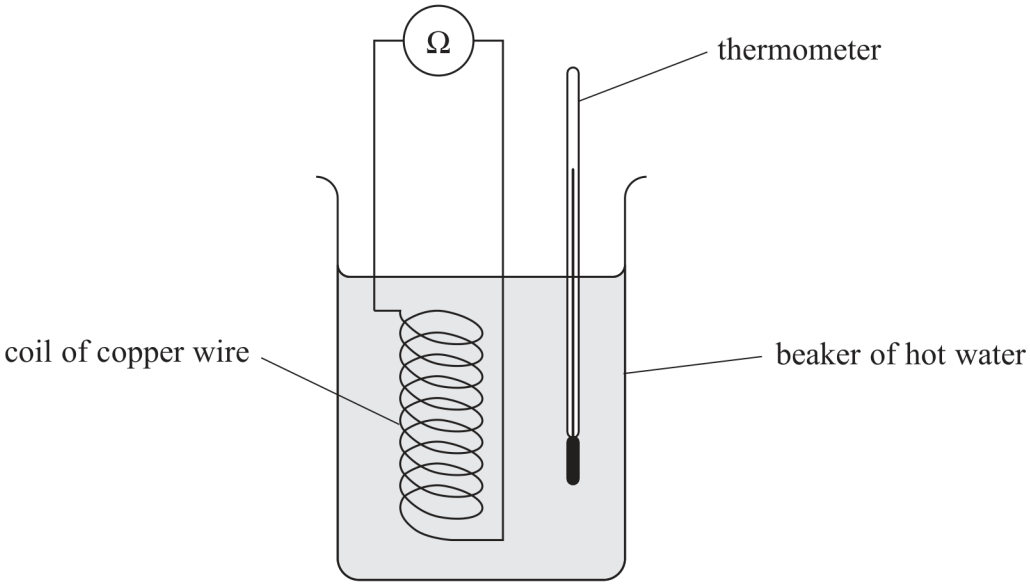
5 A student investigated how changing the temperature of a copper wire affects the resistance of the wire.

He placed a coil of the copper wire into a beaker of hot water, as shown.
The temperature of the water was measured using a thermometer with a resolution of 1 °C.
The resistance of the wire was measured using an ohmmeter with a resolution of 0.001 Ω.



The student recorded corresponding values for the temperature of the water and the resistance of the wire, as the water cooled. The results are shown in the table.

temperature / °C	resistance / Ω
69	0.347
62	0.34
55	0.331
38	0.312
33	0.31
22	0.294

(a) Criticise these results.

(2)

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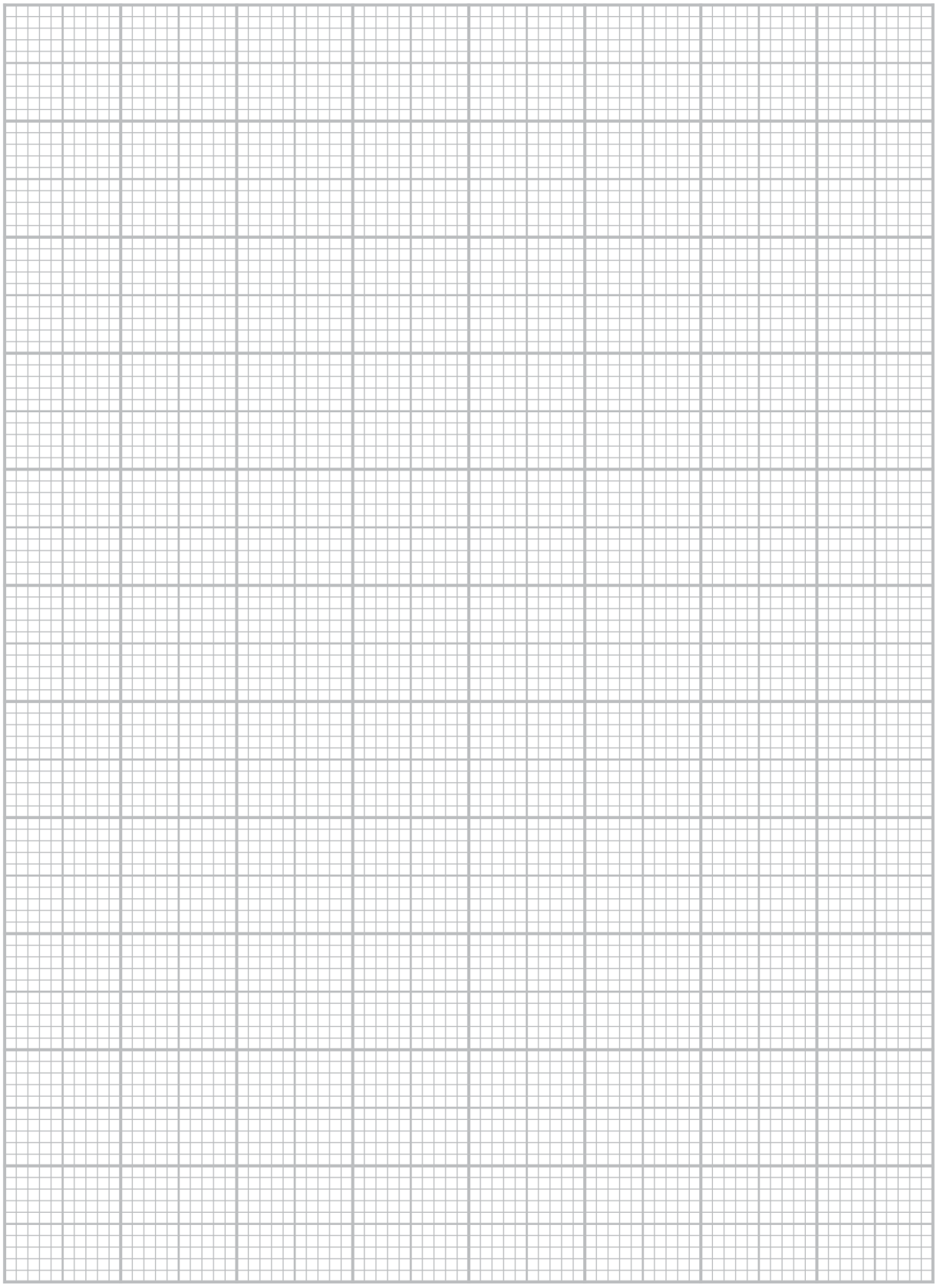
(b) Plot a graph of resistance on the *y*-axis against temperature on the *x*-axis.

(5)



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(c) The relationship between the temperature T and the resistance R of the copper wire is given by

$$R = \alpha R_0 T + R_0$$

where R_0 is the resistance of the wire at 0 °C
and α is the temperature coefficient of resistance.

Determine R_0 and α.

(6)

R_0 = ...

α = ...

(d) Explain one modification to this investigation that would improve the accuracy of the values of R_0 and α determined in (c).

(2)

(Total for Question 5 = 15 marks)