**6** An electric heater is to be made from nichrome wire. Nichrome has a resistivity of $1.0 \times 10^{-6}\,\Omega\,m$ at the operating temperature of the heater.
The heater is to have a power dissipation of 60 W when the potential difference across its terminals is 12 V.

**(a)** the heater operating at its designed power,

**(i)** calculate the current,

current = ..... A [2]

**(ii)** show that the resistance of the nichrome wire is 2.4 Ω.

[2]

**(b)** Calculate the length of nichrome wire of diameter 0.80 mm required for the heater.

length = ..... m [3]

**(c)** A second heater, also designed to operate from a 12V supply, is constructed using the same nichrome wire but using half the length of that calculated in **(b)**.
Explain quantitatively the effect of this change in length of wire on the power of the heater.

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.....[3]