11 A "metre bridge" is a circuit which can be used to measure an unknown resistance accurately. The metre bridge includes a metre length of nichrome wire.

(a) Calculate the resistance of a 1.00 m length of the nichrome wire.

(3)

resistivity of nichrome = 1.12×10^{-6} Ωm
diameter of wire = 4.00×10^{-4} m

Resistance = ...

(b) This metre length of wire, labelled AB, is connected to a 1.50 V cell of negligible internal resistance and a switch as shown.

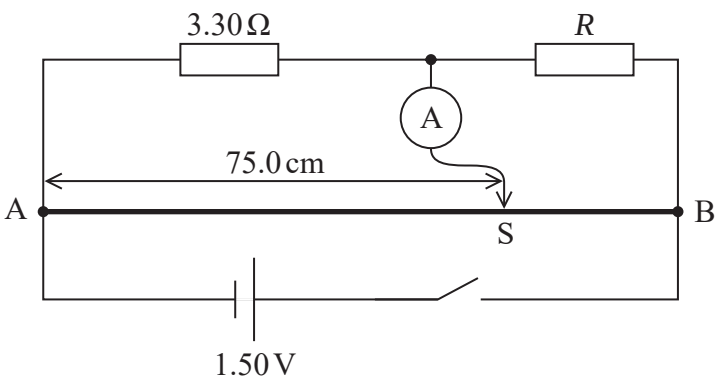
(i) Explain how the potential along this wire varies with distance from A when the switch is closed.

(2)

(ii) Show that the potential difference between A and a point 75.0 cm along the wire from A is about 1.1 V.

(2)

(c) The metre bridge circuit is shown. The circuit includes a resistor of resistance 3.30 Ω, a very sensitive ammeter and a resistor of unknown resistance *R*.



A metal slider S can be moved along the nichrome wire and pressed firmly against it to make an electrical connection.

When the switch is closed and S is 75.0 cm along the nichrome wire, the ammeter reads 0 A because the potential difference across the ammeter is zero.

Calculate *R*.

(2)

R = ...

(Total for Question 11 = 9 marks)