OCR
Oxford Cambridge and RSA

A level Physics B

H557/03 Practical skills in physics

Question Set 5

1 (a) A student uses the circuit shown in **Fig. 1** to investigate the characteristics of a filament bulb.

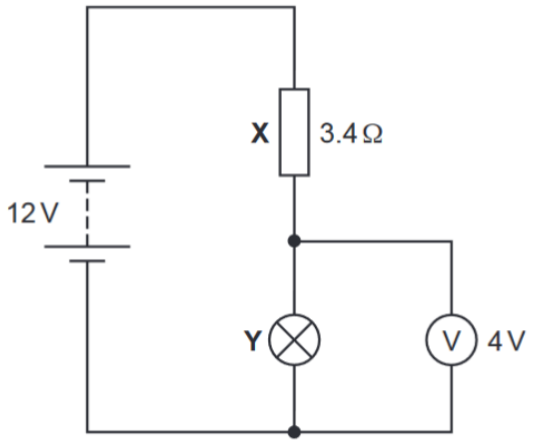

Fig. 1

(i) Show that the resistance *R* of the filament bulb **Y** in this circuit is approximately 2 Ω.

[2]

(ii) The bulb is broken and the diameter of the filament wire is measured. The diameter is found to be 0.046 ± 0.002 mm.

Calculate the cross-sectional area *A* of the wire and the uncertainty.

A = ... ±.....m^2

[3]

(iii) The filament is removed from the bulb housing and the length is measured to be 20 cm. Using your answer from **(a)(i)** calculate the conductivity σ of the filament of the bulb stating any assumption(s) that you make.

σ =..... Sm^{-1}

Assumption(s).....

[3]

(b)* A new working **identical** bulb is put in the circuit in Fig. 1. The resistor **X** is changed to one with a resistance of 6.9 Ω. A student calculates that the voltage across resistor **X** will now be 6.0 V.

Using ideas about current, temperature and the structure of metals explain whether or not the student is correct.

[6]

Total Marks for Question Set 14: