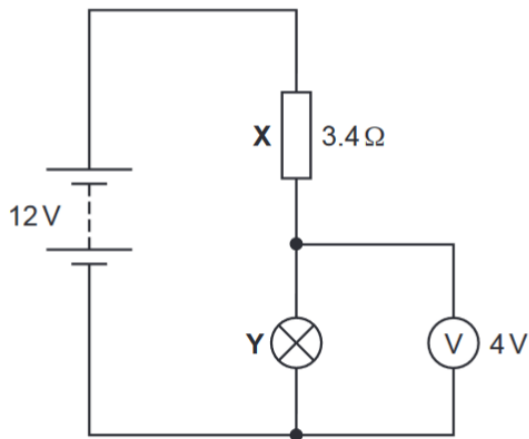


## **A level Physics B**

**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  $2\ \Omega$ .

[2]

- (ii) The bulb is broken and the diameter of the filament wire is measured. The diameter is found to be  $0.046 \pm 0.002\ \text{mm}$ .

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

$$A = \dots\dots\dots \pm \dots\dots\dots \text{m}^2$$

[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  $\sigma$  of the filament of the bulb stating any assumption(s) that you make.

$$\sigma = \dots\dots\dots \text{Sm}^{-1}$$

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  $6.9\ \Omega$ . A student calculates that the voltage across resistor **X** will now be  $6.0\ \text{V}$ .

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:**

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