AS Level Physics A

H156/02 Depth in physics

Question Set 12

1 Fig. 6.1 shows the *I*–*V* characteristics for two electrical components **X** and **Y**.

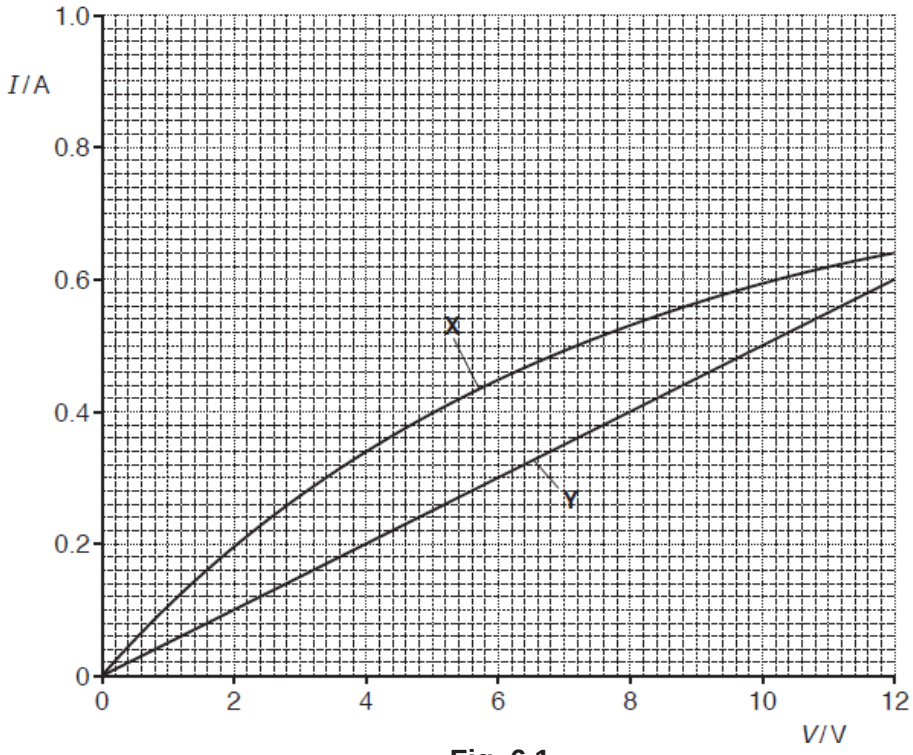

Fig. 6.1

(a) Suggest the two components **X** and **Y** that were used.

Name of component **X**

Name of component **Y**

[1]

(b) Fig. 6.2 shows components **X** and **Y** connected in parallel to a battery of e.m.f. 9.6 V and internal resistance *r*.

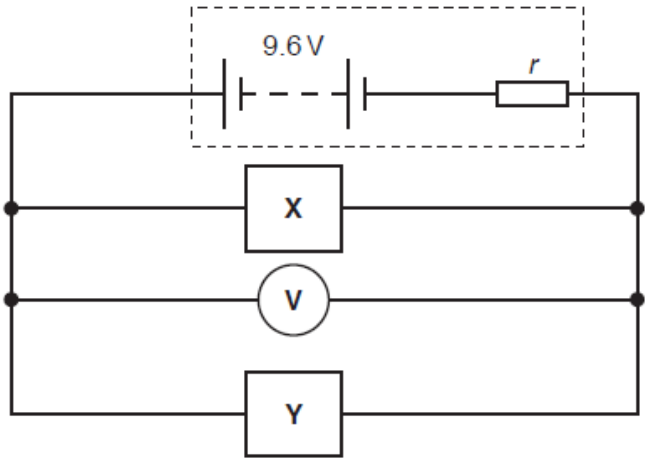

Fig. 6.2

The voltmeter reading is 7.2 V. Determine *r*.

r = Ω **[3]**

(c) A cable consists of 17 tightly packed copper wires, see Fig. 6.3.

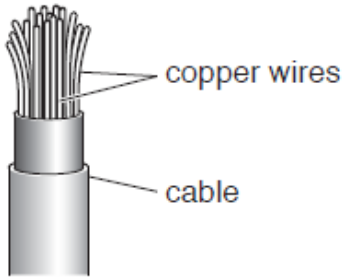

Fig. 6.3 (not to scale)

The student measures the diameter *d* of one of the copper wires as 0.12 ± 0.01 mm.

(i) Explain how the student should measure precisely the diameter of the wire.

[2]

The student measures the resistance *R* of the whole **cable** as 1.86 ± 0.02 Ω. The length *L* of the cable is 21.0 ± 0.1 m.

(ii) Determine the resistivity ρ of copper.

ρ = Ω m

[3]

Determine the percentage uncertainty in ρ.

percentage uncertainty = %

[2]

Total Marks for Question Set 12: 11