

AS Level Physics A
H156/01 Breadth in Physics

Question Set 20

- 1 (a) A cell of electromotive force (e.m.f.) 1.4 V and internal resistance $0.62\ \Omega$ is connected to resistor **A** and wire **B** as shown in Fig. 23.1.

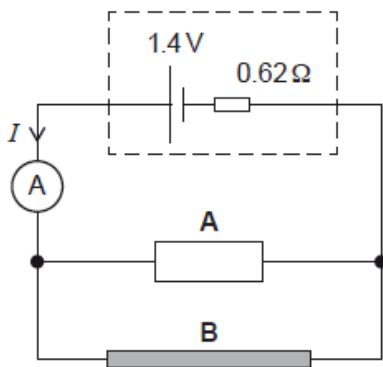


Fig. 23.1

The resistance of resistor **A** is $1.8\ \Omega$ and resistance per unit length of wire **B** is $9.5\ \Omega\text{m}^{-1}$.
The length of wire **B** is 40 cm.

- (i) Calculate the current I in the circuit. Write your value to an appropriate number of significant figures.

$I =$ _____ A [4]

- (ii) Calculate the ratio $\frac{\text{power dissipated in the internal resistance}}{\text{total power supplied by cell}}$.

[2]

- (b) This question is about two identical filament lamps. Fig. 23.2 shows the I - V characteristic of each lamp.

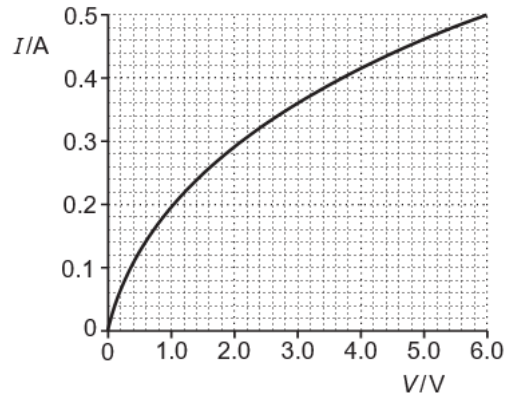


Fig. 23.2

The lamps are connected to a 6.0 V supply of negligible internal resistance in **series**, as shown in Fig. 23.3, and then in **parallel**, as shown in Fig. 23.4.

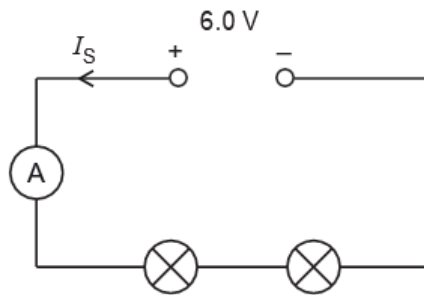


Fig. 23.3

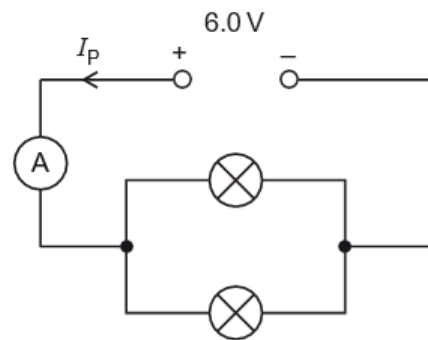


Fig. 23.4

The current from the supply in the series circuit is I_S and the current from the supply in the parallel circuit is I_P .

I_P is found to be almost 3 times greater than I_S .

Use Fig. 23.2 to explain why I_P is almost 3 times greater than I_S .

Show any calculations and your reasoning below.

Fig. 23.3

Fig. 23.4



[4]

Total Marks for Question Set 20: 10

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