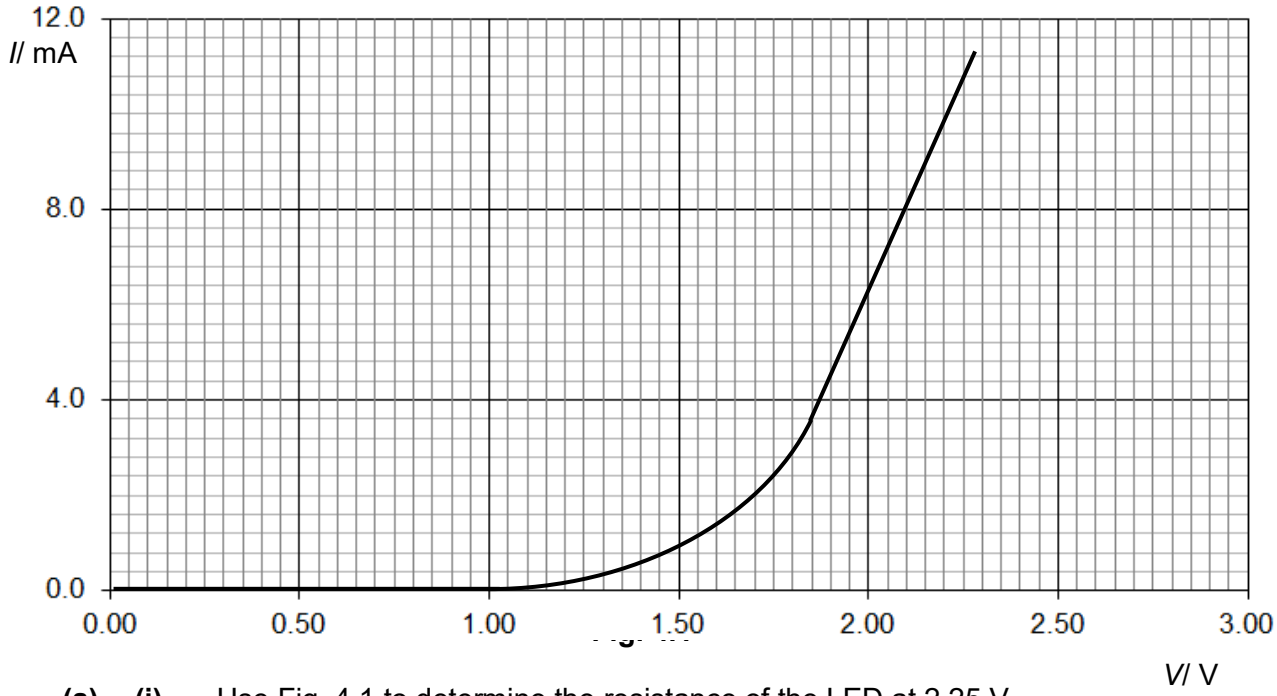
[1]

4 The variation with potential difference V of current I for a light emitting diode (LED) is shown in Fig. 4.1.



(a) **(i)** Use Fig. 4.1 to determine the resistance of the LED at 2.25 V.

resistance = ... Ω [1]

(ii) Shade in Fig. 4.1 the area that represent the increase in power dissipation in the LED if the potential difference across the LED is increased from 1.50 V to 1.75 V.

[1]

(b) Two of these LEDs are connected to a 3.0 V battery with negligible internal resistance and a 160 Ω resistor as shown in Fig. 4.2.

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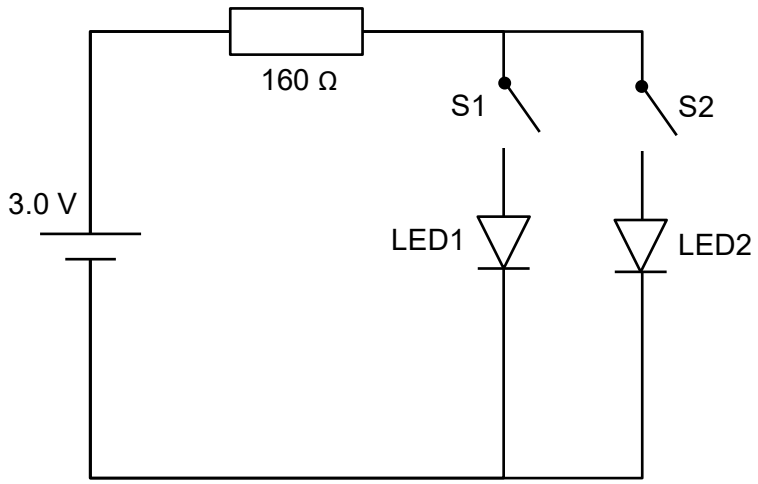

Fig. 4.2

(i) Draw in Fig. 4.1 the variation with potential difference of current for the 160 Ω resistor. Label the line **R**

[1]

(ii) Hence, or otherwise, determine the current in LED1 when switch S1 is closed and switch S2 remaining open. Show your working clearly.

current = ... mA [2]

(iii) Explain why LED1 becomes dimmer when S2 is also closed.

.....

.....

.....

.....

..... [3]

(c) It is possible for LED1 to have the same brightness regardless of whether S2 is open or closed with the addition of another 160 Ω resistor and rearrangement of the circuit in Fig. 4.2.

Draw this circuit in the space below.

[1]

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