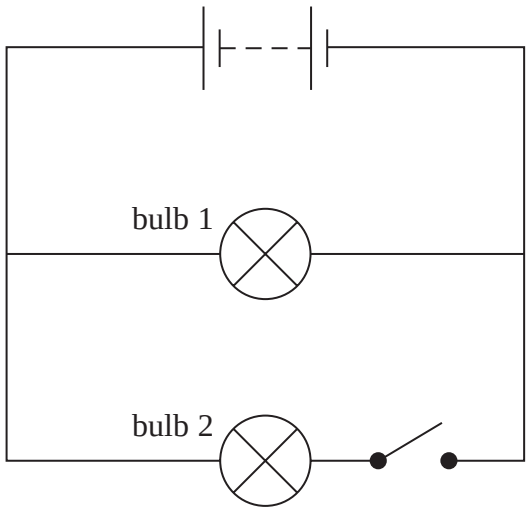
2 A battery has an e.m.f. of 12 V and an internal resistance of 0.50 Ω. The battery is connected into a circuit, as shown.



Each bulb has a normal working power of 40 W when a potential difference (p.d.) of 12 V is applied.

(a) Initially the switch is open.

Calculate the terminal p.d. of the battery when bulb 1 is lit. Assume that the resistance of the bulb has its normal working value.

(4)

Terminal p.d. of battery = ...

(b) Explain how the brightness of bulb 1 changes when the switch is closed. No further calculations are necessary.

(3)

(Total for Question 2 = 7 marks)