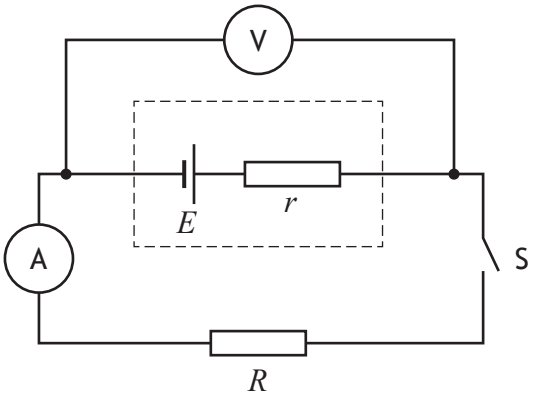
12. (a) A student sets up the circuit shown.



When switch S is open the reading on the voltmeter is 1·5 V.

Switch S is now closed.

The reading on the voltmeter is now 1·3 V and the reading on the ammeter is 0·88 A.

(i) State the EMF E of the cell. **1**

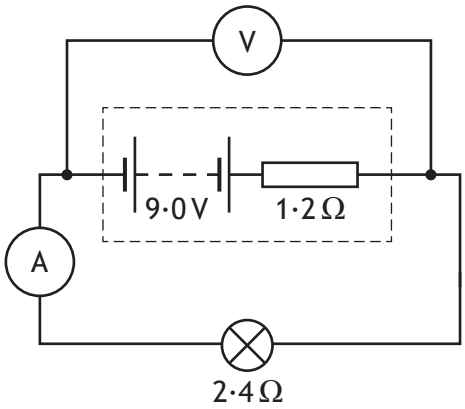
(ii) Calculate the internal resistance r of the cell. **3**

Space for working and answer

(iii) Explain why the reading on the voltmeter decreases when the switch is closed. **2**

12. (continued)

(b) A battery of EMF 9·0 V and internal resistance 1·2 Ω is connected in series with a lamp. The lamp has a resistance of 2·4 Ω.



(i) Determine the current in the lamp. **3**

Space for working and answer

(ii) Calculate the power dissipated in the lamp. **3**

Space for working and answer