6 A battery connected in series with a resistor R of resistance 5.0 Ω is shown in Fig. 6.1.

For Examiner's Use

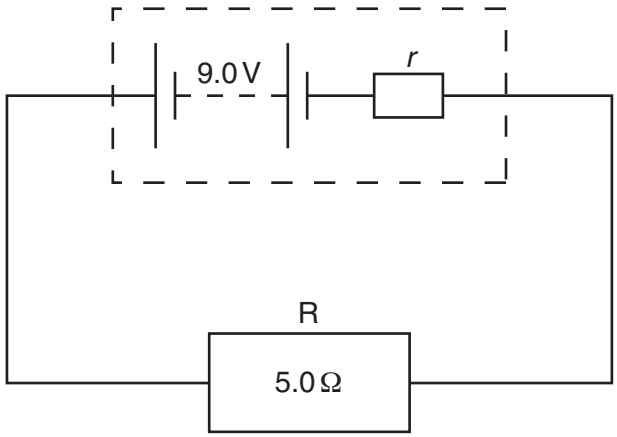

Fig. 6.1

The electromotive force (e.m.f.) of the battery is 9.0 V and the internal resistance is *r*.
The potential difference (p.d.) across the battery terminals is 6.9 V.

(a) Use energy considerations to explain why the p.d. across the battery is not equal to the e.m.f. of the battery.

.....

.....

.....[2]

(b) Calculate

(i) the current in the circuit,

current = ... A [2]

(ii) the internal resistance *r*.

r = ... Ω [2]

(c) Calculate, for the battery in the circuit,

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(i) the total power produced,

power = ... W [2]

(ii) the efficiency.

efficiency = ... [2]