

- 5 (a) Explain why the terminal potential difference (p.d.) of a cell with internal resistance may be less than the electromotive force (e.m.f.) of the cell.

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[2]

- (b) A battery of e.m.f. 4.5V and internal resistance r is connected in series with a resistor of resistance 6.0Ω , as shown in Fig. 5.1.

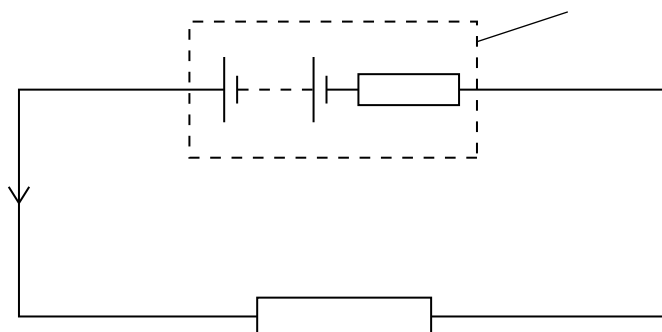


Fig. 5.1

The current I in the circuit is 0.65 A.

Determine

- (i) the internal resistance r of the battery,

$r = \dots\dots\dots \Omega$ [2]

- (ii) the terminal p.d. of the battery,

p.d. = $\dots\dots\dots$ V [2]

(iii) the power dissipated in the resistor,

power = W [2]

(iv) the efficiency of the battery.

efficiency = [2]

(c) A second resistor of resistance $20\ \Omega$ is connected in parallel with the $6.0\ \Omega$ resistor in Fig. 5.1.

Describe and explain qualitatively the change in the heating effect within the battery.

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.....[3]