For Examiner's Use

4 **(a)** Distinguish between *potential difference* (p.d.) and *electromotive force* (e.m.f.) in terms of energy transformations.

.....

.....

.....

.....[2]

(b) Two cells A and B are connected in series with a resistor R of resistance 5.5Ω, as shown in Fig. 4.1.

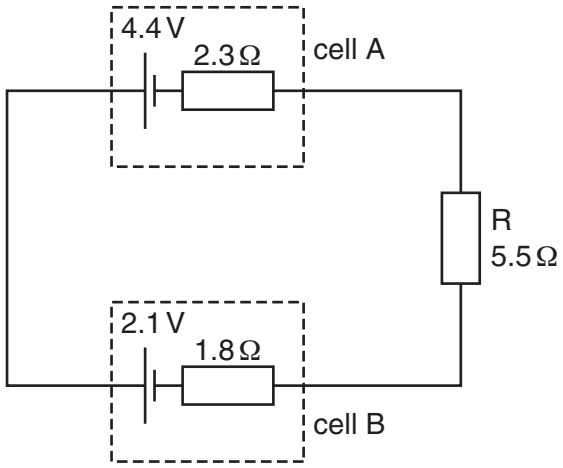

Fig. 4.1

Cell A has e.m.f. 4.4V and internal resistance 2.3Ω. Cell B has e.m.f. 2.1V and internal resistance 1.8Ω.

(i) State Kirchhoff's second law.

.....

.....[1]

(ii) Calculate the current in the circuit.

current = ... A [2]

(iii) On Fig. 4.1, draw an arrow to show the direction of the current in the circuit. Label this arrow I. [1]

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(iv) Calculate

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1. the p.d. across resistor R,

p.d. = ... V [1]

2. the terminal p.d. across cell A,

p.d. = ... V [1]

3. the terminal p.d. across cell B.

p.d. = ... V [2]