Use

7 An electric heater is rated as 240 V, 1.2 kW and has constant resistance.

(a) For the heater operating at 240 V,

(i) show that the current in the heater is 5.0 A,

(ii) calculate its resistance.

resistance = ... Ω
[4]

(b) The heater in **(a)** is connected to a mains supply by means of two long cables, as illustrated in Fig. 7.1.

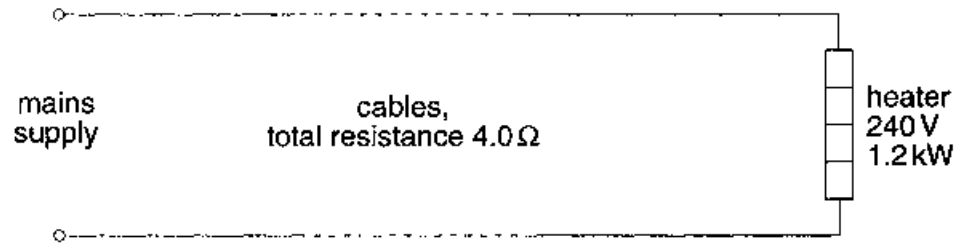

Fig. 7.1

The cables have a total resistance of 4.0 Ω. The voltage of the mains supply is adjusted so that the heater operates normally at 240 V. Using your answers in **(a)**, where appropriate, calculate

(i) the potential difference across the cables,

potential difference = ... V

(ii) the voltage of the mains supply,

voltage = ... V

[Turn over

(iii) the power dissipated in the cables.

power dissipated = ... W
[3]

(c) Using information from **(b)**, determine the efficiency ε at which power is transferred from the supply to the heater. That is, calculate

$$\varepsilon = \frac{\text{power dissipated in heater}}{\text{power input from supply}}.$$

efficiency = ...[2]