6 **(a)** Define *potential difference* (p.d.).

.....[1]

(b) A power supply of e.m.f. 240 V and zero internal resistance is connected to a heater as shown in Fig. 6.1.

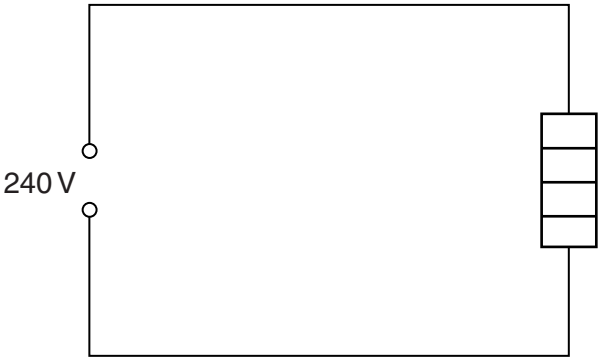

Fig. 6.1

The wires used to connect the heater to the power supply each have length 75 m. The wires have a cross-sectional area 2.5 mm^2 and resistivity 18 nΩm. The heater has a constant resistance of 38 Ω.

(i) Show that the resistance of each wire is 0.54 Ω.

[3]

(ii) Calculate the current in the wires.

current = ... A [3]

(iii) Calculate the power loss in the wires.

power = ... W [3]

(c) The wires to the heater are replaced by wires of the same length and material but having a cross-sectional area of 0.50 mm^2. Without further calculation, state and explain the effect on the power loss in the wires.

For Examiner's Use

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.....[2]