



- 8 (a) The charge on an electron is -1.60×10^{-19} C. Calculate the number of electrons per second that pass any point in a wire that is carrying a current of 4.0 A.

number of electrons = s^{-1} [2]

- (b) Calculate the resistance of a length of 240 m of copper wire of diameter 0.376 mm. The resistivity ρ of copper is $1.70 \times 10^{-8} \Omega \text{m}$.

resistance = Ω [3]





- (c) A battery of e.m.f. 9.0 V has an internal resistance of 2.2Ω . It is connected in the circuit shown in Fig. 8.1.

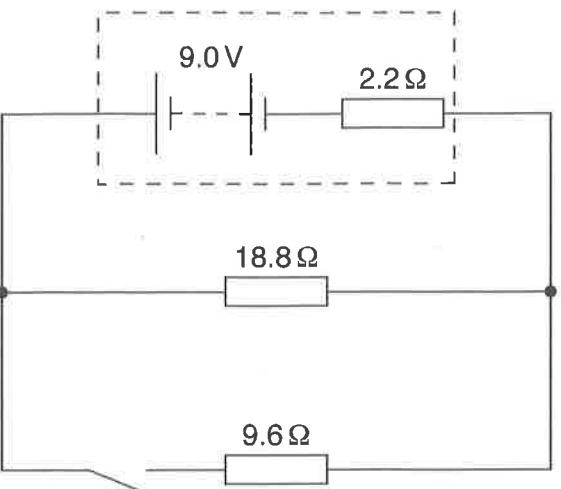


Fig. 8.1

- (i) The switch is open. Calculate

- the potential difference across the 18.8Ω resistor,

potential difference = V [3]

- the power supplied to the 18.8Ω resistor.

power = W [2]



- (ii) The switch is closed. Calculate the reduction in power to the 18.8Ω resistor.

reduction in power = W [6]

- (d) Part (c) illustrates what can happen with parallel circuits when components are switched on and off, but you do not usually find your lights going dim when your neighbour switches on his or her dishwasher. Suggest and explain **two** reasons why this kind of reduction in power does not happen with the public electrical supply.

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