

Power & Energy Transfers in Appliances

AQA GCSE Physics · Electricity

Energy Transfers

When charge flows through a component, energy is transferred. Complete the equations for calculating **power** and **energy transfer** in a circuit.

Powertwo equations, using I , V and R

Energy transferredusing I , V and time t

Energy transferredusing charge Q and V

Example — power in different parts of a circuit

Draw your own circuit with a cell and **two components**. Make up a **current** and a **potential difference**, then calculate the **power** transferred in different parts of the circuit.

Exam-style question — specific heat capacity practical [6 marks]

An electric heater is used to warm a beaker of water. The temperature of the water is recorded against time (see graph).

Potential difference across heater = **12 V**Current through heater = **5.0 A**

(a) Calculate the power of the heater. [2 marks]

Power = _____ W

(b) Use the graph to find the time taken for the water to heat from **20 °C** to **50 °C**. [1 mark]

Time = _____ s

(c) Calculate the energy transferred to the water in this time. Give the unit. [3 marks]

Energy = _____

CIRCUIT & TEMPERATURE–TIME GRAPH

WORKING

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Energy Transfers in a Circuit

Work out the energy transferred by the cell and by a bulb. Use $Q = I t$, $E = Q V$ and $E = I V t$. Show your working in the space on the right.

EXAMPLE

Make up your own circuit and values.

Draw a cell and a component, choose a current, a potential difference and a time, then calculate the charge and the energy transferred.

CIRCUIT



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1 SERIES · [6 marks]

A 6.0 V cell is connected in **series** with two identical bulbs. The circuit is switched on for 2 minutes.

p.d. of cell = 6.0 V
current in circuit = 0.50 A
time = 2 minutes

(a) Calculate the charge that flows through the cell. [2 marks]

$Q =$ _____ C

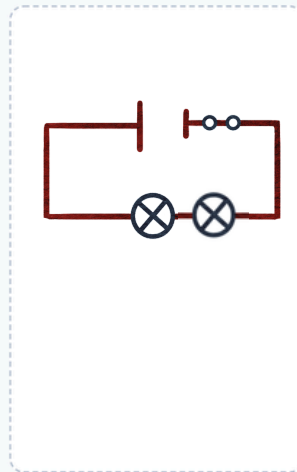
(b) Calculate the energy transferred by the cell. [2 marks]

$E =$ _____ J

(c) The bulbs are identical. Calculate the energy transferred by **one bulb**. [2 marks]

$E =$ _____ J

CIRCUIT



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2 PARALLEL · [6 marks]

A 12 V cell is connected to two identical bulbs in **parallel**. The circuit is switched on for 5 minutes.

p.d. of cell = 12 V
current through *each* bulb = 0.30 A
time = 5 minutes

(a) Calculate the current through the cell. [1 mark]

$I =$ _____ A

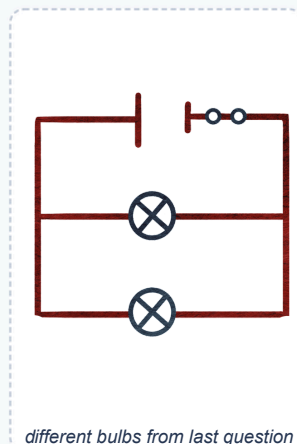
(b) Calculate the energy transferred by the cell in this time. [3 marks]

$E =$ _____ J

(c) Calculate the energy transferred by **one bulb**. [2 marks]

$E =$ _____ J

CIRCUIT



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