

GCSE Combined Science: Trilogy

Worksheet: Power

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Power

NAME _____ **CLASS** _____ **DATE** _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

0 1 . 1

Which equation links power, current and resistance?

Tick (✓) **one** box.

$P = V \times I$

☐

$P = I^2 \times R$

☐

$P = E \times t$

☐

$P = Q \times V$

☐

[1 mark]

0 1 . 2

A device transfers 40 J of energy every second.

What is its power?

.....

.....

.....

Power = W

[1 mark]

0 2

An electric heater is connected to the 230 V mains supply.

0 2 . 1

What is the unit of power?

Tick (✓) **one** box.

joule

☐

newton

☐

volt

☐

watt

☐

[1 mark]

0 2 . 2

The current in the heater is 4.0 A.

Calculate the power of the heater.

Use the equation:

power = potential difference × current

.....

.....

.....

.....

Power = W

[2 marks]

0 2 . 3

A lamp connected to the mains has a power of 60 W.

Which statement is correct?

Tick (✓) **one** box.

The heater transfers more energy each second than the lamp.

☐

The lamp transfers more energy each second than the heater.

☐

The heater and the lamp transfer the same energy each second.

☐

[1 mark]

0 3

0 3 . 1

Write down the equation that links power (P), potential difference (V) and current (I).

.....

.....

[1 mark]

0 3 . 2

A lamp operates at a potential difference of 12 V with a current of 0.50 A.
Calculate its power.

.....

.....

.....

.....

Power = W

[2 marks]

0 4

A hairdryer operates at a potential difference of 230 V with a current of 5.8 A.

0 4 . 1

Calculate the power of the hairdryer.

Use the equation:

power = potential difference $\times$ current

.....

.....

.....

.....

Power = W

[2 marks]

0 5

Table 1 shows the power rating of three workshop tools, each connected to the 230 V mains supply.

Table 1

Tool	Power in W
drill	750
sander	480
saw	1100

0 5 . 1

Calculate the current in each tool.

.....

.....

.....

.....

.....

.....

[3 marks]

0 5 . 2

Which tool draws the smallest current?

.....

.....

.....

.....

[1 mark]

.....

0 6

A hairdryer contains a heating element and an electric motor, connected in parallel to the 230 V mains supply.

On the 'hot' setting, the power of the heating element is 1.8 kW and the power of the motor is 0.12 kW.

0 6 . 1

Calculate the total current in the hairdryer on the 'hot' setting.

.....

.....

.....

.....

.....

Current = A

[3 marks]

0 6 . 2

On the 'cool' setting only the motor is switched on.
Calculate the current in the motor.

.....

.....

.....

.....

Current = A

[2 marks]

0 6 . 3

Explain why the hairdryer transfers energy at a much greater rate on the 'hot' setting.

.....

.....

.....

.....

[2 marks]

0 7

Table 2 shows the power ratings of some appliances. Each appliance is connected to the 230 V mains supply.

Table 2

Appliance	Power in W
kettle	2760
laptop charger	46
television	110
toaster	1100

0 7 . 1

Calculate the current in the kettle.

.....

.....

.....

.....

Current = A

[2 marks]

0 7 . 2

Which appliance in Table 2 has the smallest current?
Give a reason for your answer.

.....

.....

.....

.....

[2 marks]

0 7 . 3

Explain how the power of an appliance is related to the energy it transfers, the potential difference across it and the current in it.

[3 marks]

0 8

The current in a hairdryer is 7.6 A. The resistance of the hairdryer is 30 Ω .

0 8 . 1

Calculate the power of the hairdryer.

Power = W

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Power · 31 marks

Question 1 (2 marks)

01.1 [1 mark]

Correct: $P = I^2 \times R$

01.2 [1 mark]

Answer: 40 W

- 40 (W) (1)
-

Question 2 (4 marks)

02.1 [1 mark]

Correct: watt

02.2 [2 marks]

Answer: 920 W

- $P = 230 \times 4.0$ (1)
 - $P = 920$ (W) (1)
-

02.3 [1 mark]

Correct: The heater transfers more energy each second than the lamp.

Question 3 (3 marks)

03.1 [1 mark]

Answer: $P = V I$

- $P = V \times I$ / power = potential difference $\times$ current (1)
-

03.2 [2 marks]

Answer: 6.0 W

- $P = 12 \times 0.50$ (1)
 - $P = 6.0$ (W) (1)
-

Question 4 (2 marks)

04.1 [2 marks]

Answer: 1334 W

- $P = 230 \times 5.8$ (1)
 - $P = 1334$ (W) (1)
-

Question 5 (4 marks)

05.1 [3 marks]

Answer: Drill 3.3 A; sander 2.1 A; saw 4.8 A

- drill: $750 \div 230 = 3.3$ (A) (1)
 - sander: $480 \div 230 = 2.1$ (A) (1)
 - saw: $1100 \div 230 = 4.8$ (A) (1)
-

05.2 [1 mark]

Answer: The sander

- sander (1)

Notes: Allow ECF from the previous part.

Question 6 (7 marks)

06.1 [3 marks]

Answer: 8.3 A

- total power = $1800 + 120 = 1920$ (W) (1)
- $1920 = 230 \times I$ (1)
- $I = 8.3$ (A) (1)

Notes: Allow 8.35 or 8.4 (A).

06.2 [2 marks]

Answer: 0.52 A

- $120 = 230 \times I$ (1)
 - $I = 0.52$ (A) (1)
-

06.3 [2 marks]

Answer: The heating element is also switched on, so the total current is much larger at the same potential difference; power = pd $\times$ current, so energy is transferred much faster (1920 W instead of 120 W).

- the heating element is also on so the current is much larger (at the same potential difference) (1)
 - power = potential difference $\times$ current / 1920 W compared with 120 W (1)
-

Question 7 (7 marks)

07.1 [2 marks]

Answer: 12 A

- $2760 = 230 \times I$ (1)
 - $I = 12$ (A) (1)
-

07.2 [2 marks]

Answer: The laptop charger — it has the lowest power and the potential difference is the same for all appliances.

- laptop charger (1)
- (it has the) lowest power and the potential difference is the same for each appliance ($I = P \div V$) (1)

Notes: The reason mark depends on the laptop charger being chosen.

07.3 [3 marks]

Answer: Power is the energy transferred per second; power = pd $\times$ current, so at the same pd the appliance with the larger current transfers energy at a greater rate.

- power is the energy transferred per second / rate of energy transfer (1)
 - power = potential difference $\times$ current (1)
 - so for the same potential difference, a larger current means a greater power / more energy transferred each second (1)
-

Question 8 (2 marks)

08.1 [2 marks]

Answer: 1732.8 W

- $P = 7.6^2 \times 30$ (1)
- $P = 1732.8$ (W) (1)

Notes: An answer of 228 (W) (current not squared) scores 0 marks.
