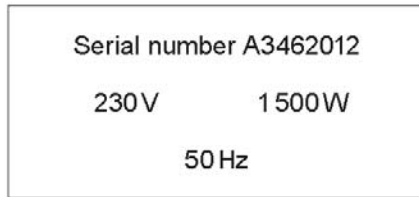


WJEC Physics GCSE
Topic 1.4: Domestic electricity
Questions by topic

1.

An electric heater has the following label attached to it.



It is used for 8 hours each day for 2 weeks. The cost of the electricity used is £25.20.

- (a) Use this information and equations from page 2 to calculate the cost, in pence, of 1 unit (kWh) of electricity. [4]

cost = p

- (b) Use an equation from page 2 to calculate the number of joules of electrical energy converted to heat and light in this 2 week period. [2]

energy = J

6

2.

Solar panels are fitted to a house. They save money in two ways:

- they reduce the number of units of electricity bought from the National Grid, saving 16p per unit;
- in addition, the government pays a feed-in tariff of 14p for every unit of electricity generated.

A householder spends £7500 fitting solar panels to their roof. The mean power output is 3kW and they generate 3900 units (kWh) in one year (52 weeks). The householder uses all of these units.

- (a) Use an equation from page 2 to calculate the mean number of hours a week for which the solar panels generate electricity. [2]

time = hours

- (b) (i) Calculate the expected pay-back time for the system. [4]

time = years

- (ii) Explain how this pay-back time would be affected if the cost of a unit of electricity increased. [2]

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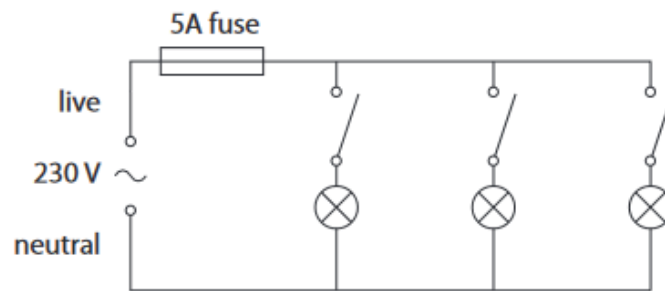
- (c) It is estimated that fitting photo-voltaic (p.v.) systems reduces CO₂ emissions by 0.5kg for every unit (kWh) of electricity produced. Calculate how much CO₂ will be saved by this household in total if the solar panels have a lifetime of 25 years. [2]

CO₂ savings = kg

10

3.

The diagram shows the lighting circuit in an office.



(a) (i) State two advantages of connecting lamps in parallel rather than in series.

(2)

1

2

(ii) What is the purpose of the 5 A fuse?

(1)

.....

(iii) Explain how a fuse works.

(3)

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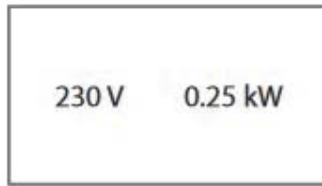
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(b) A label on one of the office computers includes this information.



(i) State the equation linking power, current and voltage.

(1)

(ii) Use the information on the label to calculate the current in the computer.

(3)

current = A

(iii) Fuses are available with values of 1 A, 3 A, 10 A and 13 A.

Suggest the most suitable fuse value for the computer.

Give a reason for your answer.

(2)

fuse value A

reason

.....

(iv) Some circuits use a **circuit breaker** instead of a fuse.

State two advantages of using a circuit breaker instead of a fuse.

(2)

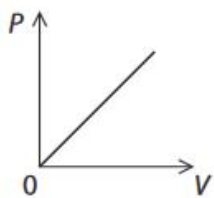
1

2

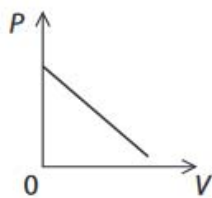
(c) The graphs show some ways that power (P) can vary with voltage (V).

Which is the correct graph for a fixed resistor?

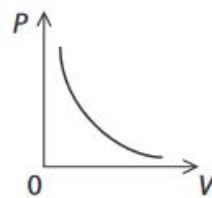
(1)



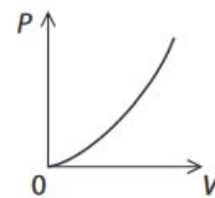
A



B



C



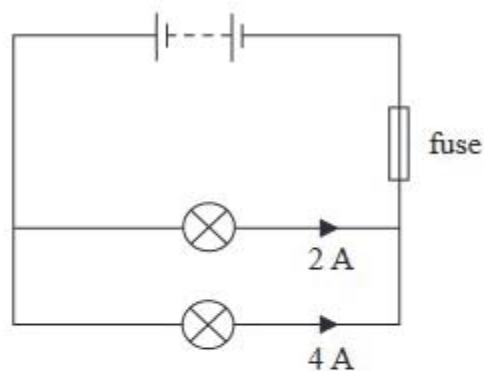
D

4.

Which row of the table is correct for a fuse and a residual current circuit breaker (RCCB)?

	a fuse on its own protects	a RCCB on its own protects
A	the wiring and appliance	the user
B	the user	the user
C	the wiring and appliance	the wiring and appliance
D	the user	the wiring and appliance

The diagram shows the circuit for lighting two lamps.
The circuit contains a fuse.



Which of these would be the best value for the fuse?

- A** 1 A
- B** 3 A
- C** 5 A
- D** 8 A

$$\text{power} = \text{current} \times \text{voltage}$$

The power used in the whole circuit is 36 W.
The voltage across the lamps is about

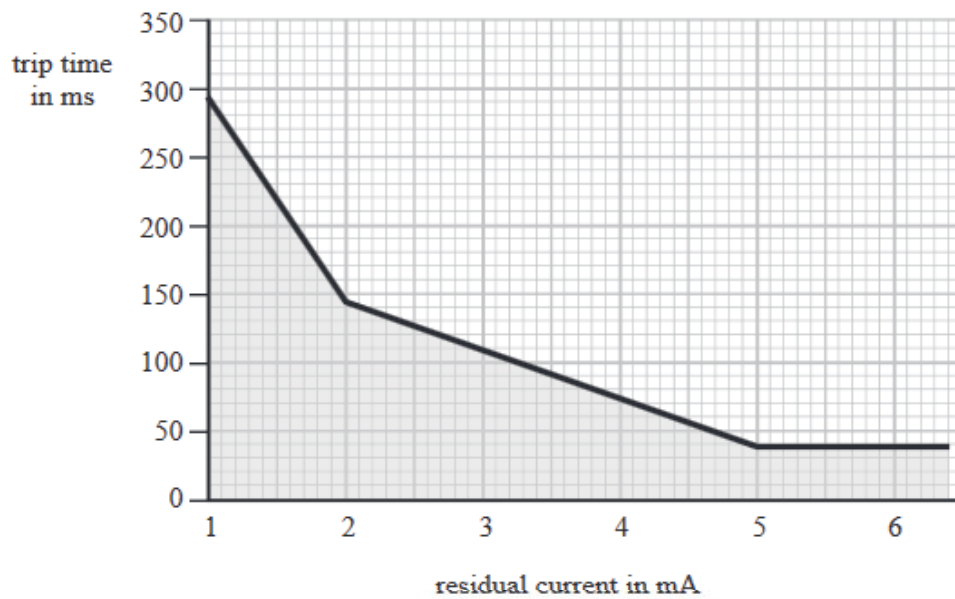
- A** 6 V
- B** 9 V
- C** 18 V
- D** 216 V

The RCCB compares the currents in the

- A live and earth wires
- B earth and neutral wires
- C fuse and live wires
- D neutral and fuse wires

The graph is for another RCCB.

It shows the time the RCCB takes to trip (break the circuit) for different values of residual current.



Which row of the table is correct?

	residual current (mA)	trip time (ms)
A	1	350
B	2	200
C	4	75
D	6	60