

Electric Circuits

ANSWERS

Bands 1, 2, 3, 4, 5 · 10 questions · Free sample

Each picture asks its own question. A bulb lights when current flows through it round a complete loop; a closed switch is a wire, an open one a gap. Amps = volts / ohms. Resistors in line add; side by side they share the voltage and the total is less than the smallest.

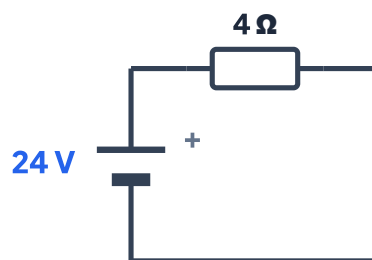
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1

Band 1

Answer: A

What current flows from the battery?



6 A

$$\text{current} = \text{volts} \div \text{ohms} = 24 \div 4 = 6 \text{ A}$$

A

6 A

The answer

B

12 A

Not what Ohm's law gives

C

20 A

The ohms taken away from the volts

D

96 A

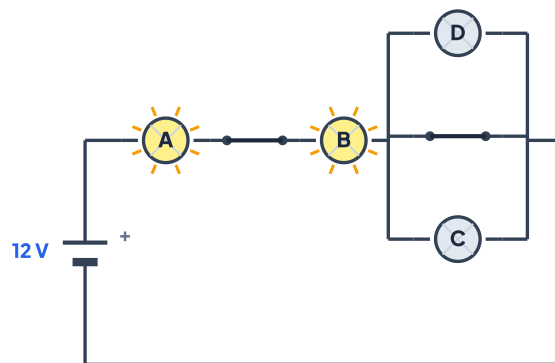
Volts multiplied by ohms, instead of divided

2

Band 1

Answer: B

How many bulbs are lit?



Lit: A, B Dark: C, D

A closed switch across a bulb leaves it dark; an open switch cuts its branch

A

1

Not what Ohm's law gives

B

2

The answer

C

3

Not what Ohm's law gives

D

4

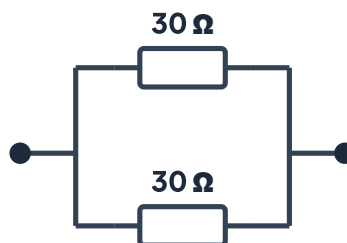
Every bulb counted, whatever the switches do

3

Band 2

Answer: A

What is the total resistance between the dots?

15 Ω Side by side: $1 \div R = 1/30 + 1/30$, so $R = 15 \Omega$

A

15 Ω

The answer

B

30 Ω

Only the smallest resistance

C

45 Ω

Not what Ohm's law gives

D

60 Ω

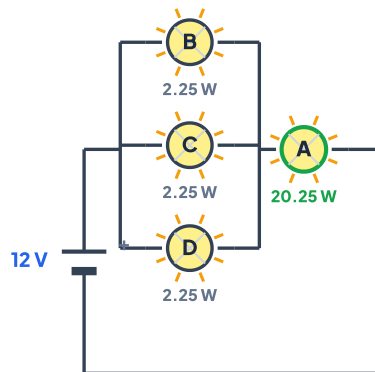
Added, as if side by side were in line

4

Band 2

Answer: A

Which bulb is the brightest?



Power = current² × resistance: A 20.25 W, B 2.25 W, C 2.25 W, D 2.25 W

Bulb A is the brightest

A

A

The answer (20.25 W)

B

B

The bulb nearest the battery, but current is not used up on the way round (2.25 W)

C

C

Dimmer (2.25 W)

D

D

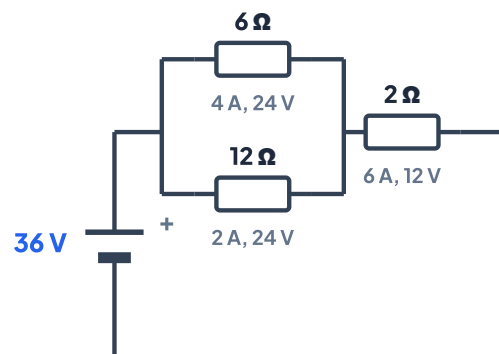
Dimmer (2.25 W)

5

Band 3

Answer: B

What current flows from the battery?



6 A

Total resistance $(6 \parallel 12) + 2 = 4 + 2 = 6 \Omega$; current $36 \div 6 = 6 A$

A

3 A

Not what Ohm's law gives

B

6 A

The answer

C

20 A

In line and side by side swapped

D

27 A

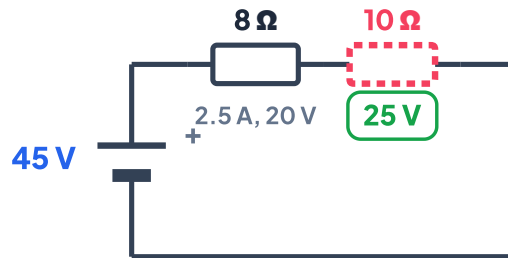
Every resistor taken as side by side

6

Band 3

Answer: A

What is the voltage across the marked part?



Total resistance $8 + 10 = 18 \Omega$; current $45 \div 18 = 2.5 \text{ A}$

Across the marked part: $2.5 \text{ A} \times 10 \Omega = 25 \text{ V}$

A

25 V

The answer

B

45 V

The whole battery voltage, which the other parts share

C

50 V

Not what Ohm's law gives

D

75 V

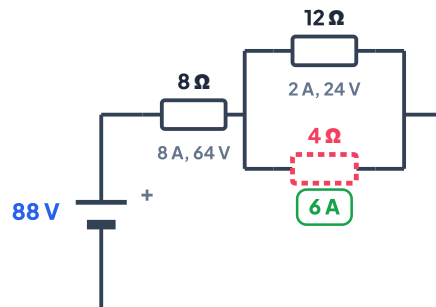
Not what Ohm's law gives

7

Band 4

Answer: B

What current flows through the marked resistor?



Total resistance $8 + (12 \parallel 4) = 8 + 3 = 11 \Omega$; current $88 \div 11 = 8 \text{ A}$

Voltage across the pair: $8 \text{ A} \times 3 \Omega = 24 \text{ V}$; in the marked one: $24 \div 4 = 6 \text{ A}$

A

4 A

The current split equally, though the resistances differ

B

6 A

The answer

C

8 A

The battery's whole current, which splits between the branches

D

12 A

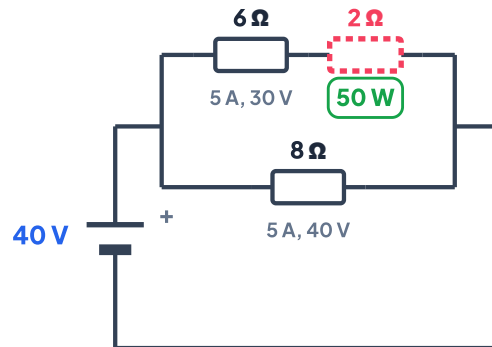
Not what Ohm's law gives

8

Band 4

Answer: D

How much power does the marked resistor use?



Total resistance $((6 + 2) \parallel 8) = 4 \Omega$; current $40 \div 4 = 10 \text{ A}$

Marked resistor: 5 A , power = current² × ohms = $5 \times 5 \times 2 = 50 \text{ W}$

A 10 W

Current times resistance: that is voltage, not power

B 25 W

Not what Ohm's law gives

C 48 W

Not what Ohm's law gives

D 50 W

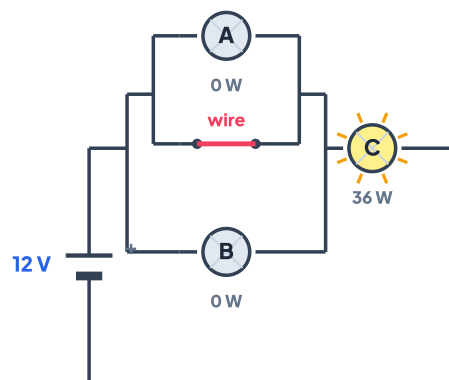
The answer

9

Band 5

Answer: C

A wire is put across bulb A. What happens to bulb A?



Bulb A: 4 W before, 0 W after the wire is put across
So it goes out

A Brighter

Not what happens: it goes from 4 W to 0 W

B Dimmer

Not what happens: it goes from 4 W to 0 W

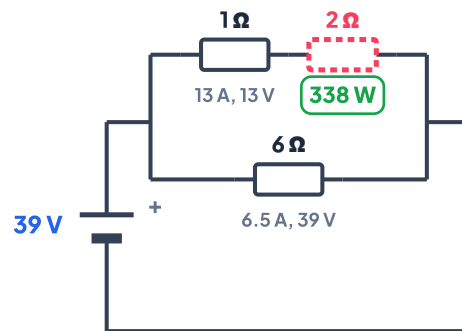
C Goes out

The answer

D Stays the same

Not what happens: it goes from 4 W to 0 W

How much power does the marked resistor use?



Total resistance $((1 + 2) \parallel 6) = 2 \Omega$; current $39 \div 2 = 19.5 \text{ A}$

Marked resistor: 13 A, power = current² × ohms = $13 \times 13 \times 2 = 338 \text{ W}$

A 338 W

The answer

B 507 W

The battery's voltage times this resistor's current

C 676 W

Not what Ohm's law gives

D 1014 W

Not what Ohm's law gives

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