Edexcel GCSE Physics

Topic 10.22-10.32 - Energy

Flashcards

What factors affect the energy transferred when charge flows through a component?

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- Amount of charge
- The potential difference across the component

Give an equation linking energy, current and p.d., giving all SI units

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energy (J) = p.d. (V) x current (A) x time (s)

$$E = VIt$$

Define potential difference in terms of charge.

Define potential difference in terms of charge.

The work done per unit charge.

Give an equation relating potential difference to charge

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energy transferred (J) = charge (C) x p.d. (V)

$$E = QV$$

When an electrical current flows through a resistor why does it heat up?

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There are collisions between the electrons and the ions in the resistor’s lattice. This causes a transfer of kinetic energy into thermal energy, which is released into the surroundings.

How do low resistance wires reduce unwanted energy transfers?

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A smaller resistance will mean there are fewer collisions, therefore less energy will be wasted through heating.

What are some advantages of the heating effect?

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It is useful for appliances such as toasters or electrical fires, where the heat is the desired product.

What are some disadvantages of the heating effect?

What are some advantages and disadvantages of the heating effect?

- The loss of energy as heat energy can make an appliance inefficient
- If an appliance overheats it can catch fire or overheat, which could ruin the device or injure the user

The energy transferred per second is also known as...

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Power

Define power

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The rate of energy transfer, or the rate at which work is done.

What are the units of power?

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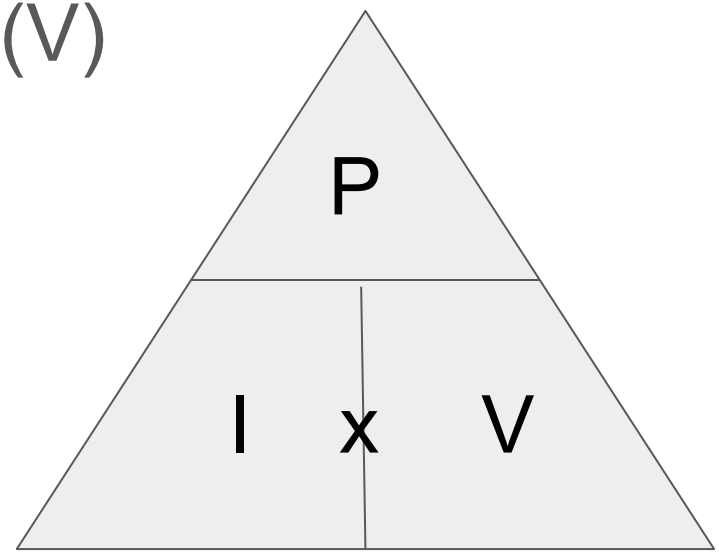
Watts, W.

Give an equation linking power and potential difference, giving all SI units

Give an equation linking power and potential difference, giving all SI units

power (W) = current (A) x p.d. (V)



Give an equation to work out power **without p.d.**, giving all SI units

Give an equation linking power **without p.d.**, giving all SI units

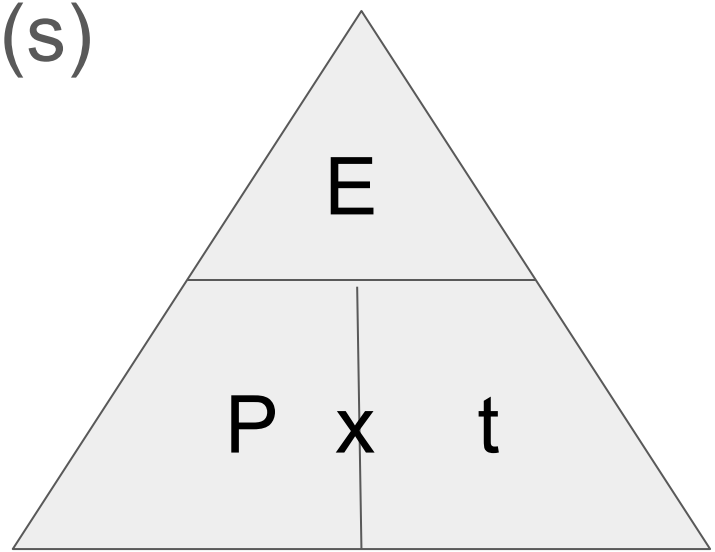
power (W) = current² (A) x resistance (Ω)

$P = I^2R$

Give an equation linking power and energy, giving all SI units

Give an equation linking power and energy, giving all SI units

power (W) = energy (J) ÷ time (s)



Give both equations linking power with resistance, including all SI units

Give equations linking power and resistance, including all SI units

power (W) = current² (A) x resistance (Ω)

$P = I^2 \times R$

power (W) = p.d.² (V) ÷ resistance (Ω)

$P = V^2 \div R$