

OCR (B) Physics GCSE

Topic 3.4 - What determines the rate of energy transfer in a circuit?

Flashcards

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



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

- Amount of charge.
- The potential difference across the component.



What is the power rating of an appliance?



What is the power rating of an appliance?

It shows the power the appliance uses, measured in Watts.



Define power



Define power

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

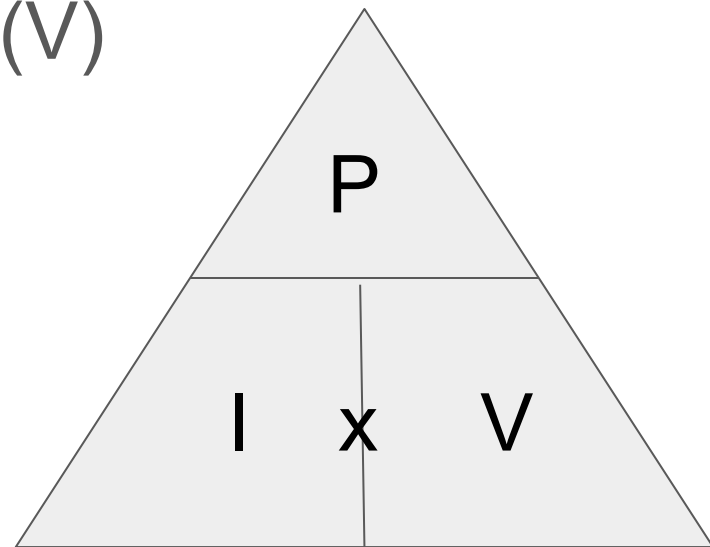


Give an equation linking power and potential difference, giving all SI units



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

$$\text{power (W)} = \text{current (A)} \times \text{p.d. (V)}$$

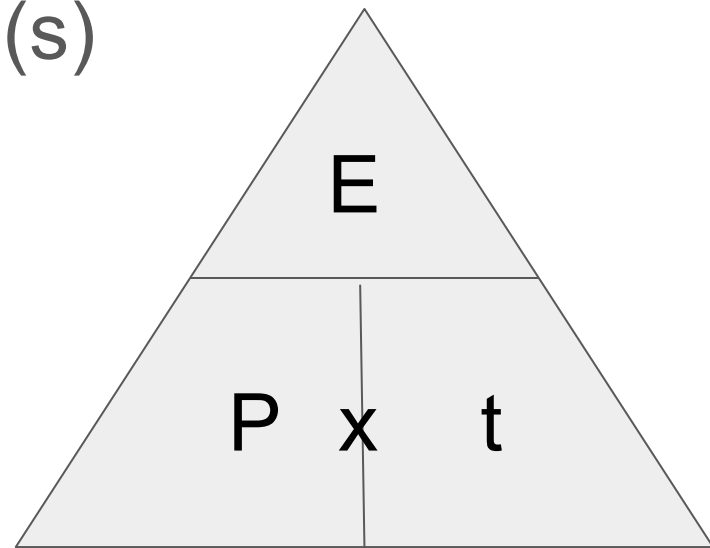


Give an equation linking power and energy, giving all SI units



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

$$\text{power (W)} = \text{energy (J)} \div \text{time (s)}$$

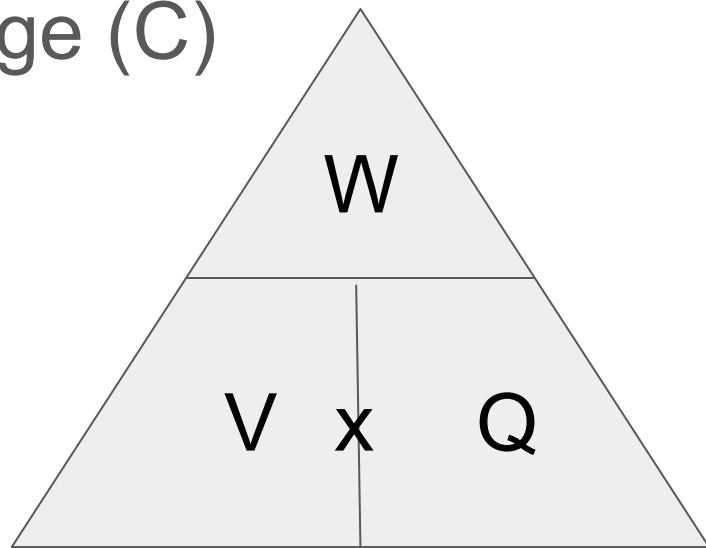


Give an equation linking energy and potential difference, giving all SI units



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

work done (J) = p.d. (V) x charge (C)



Give 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) \div resistance (Ω)

$$P = V^2 \div R$$



What is a step up transformer?



What is a step up transformer?

A transformer which increases voltage
(decreasing the current).



Why does current decrease when voltage is increased?



Why does current decrease when voltage is increased?

Because of the principle of conservation of energy; the output power cannot be greater than the input power because the energy cannot be increased.



Name the two coils in a transformer



Name the two coils in a transformer

Primary coil and secondary coil.



A step up transformer has more...



A step up transformer has more...

... turns on the secondary coil than on the primary coil.



What is a step down transformer?



What is a step down transformer?

A transformer which decreases the voltage (increasing the current).



A step down transformer has more...



A step down transformer has more...

...turns on the primary coil than on the secondary coil.



What is the transformer equation?



What is the transformer equation?

primary voltage x primary current =
secondary voltage x secondary current

$$I_p V_p = I_s V_s \text{ so } P_p = P_s$$

This illustrates how power, and therefore energy, is conserved.



Why is electricity transmitted through the national grid with a high voltage?



Why is electricity transmitted through the national grid with a high voltage?

This results in a low current, resulting in less power dissipation (so less energy is wasted in transport).



When are step up transformers used?



When are step up transformers used?

Increasing voltage for transport across the National Grid.



When are step down transformers used?



When are step down transformers used?

Decreasing voltage of the National Grid supply to 230V for domestic use.

