OCR A Physics GCSE

7.2 - Power and Efficiency

Flashcards

What is the definition of ‘Power’?

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The rate at which energy is transferred (or rate at which work is done).

State **two** equations for power. Give SI units for all quantities involved.

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power = energy transferred/time

power = work done/time

Energy (J), Work Done (J), Time (s)

What is the unit of power?

What is the unit of power?

Watt (W)

What is one Watt equivalent to?

What is one Watt equivalent to?

An energy transfer of 1 joule per second.

$$1\ W = 1\ J/s$$

Two motors lift the same mass through the same height. Motor A does this in half the time of Motor B. Which dissipates the most power?

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Motor A.

The energy transferred is the same but the time taken is less (P=E/t).

What is efficiency?

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The ratio of useful work done to energy supplied. It is often given as a percentage, i.e. the percentage of energy which is converted to a useful form.

Give the equation for efficiency.

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$$\text{Efficiency} = \frac{\text{Useful energy output}}{\text{Total energy input}}$$

You can convert this to a percentage by multiplying the answer by 100.

How can the efficiency of a system be increased? (Higher)

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1. **Reducing** waste output (by lubrication, thermal insulation etc.)
2. **Recycling** waste output (eg. recycling thermal waste energy as input energy).

State the consequence for energy transfer of a material with a high thermal conductivity.

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The rate of energy transfer through the material is higher than for a material with a lower thermal conductivity.

Do double-glazed windows have a higher or lower thermal conductivity than single-glazed windows?

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Lower, meaning less energy transfers through them.

State **three** methods of reducing heat loss in a building.

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1. Double glazing
2. Loft and wall insulation
3. Thicker walls

Describe the useful and waste energy for a kettle.

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- Useful: Heating the water.
- Waste: Sound energy and infrared radiation into the surroundings.

Describe the useful and waste energy for a hair dryer.

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- Useful: Heating the air and turning the motor to blow the air.
- Waste: Sound energy, heating the motor and releasing infrared radiation into surroundings.