AQA Physics GCSE

4.1.1 - Energy Changes in a System

Flashcards

What is the equation for kinetic energy? Give SI units for all quantities involved.

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$$\frac{1}{2} m v^2$$

½ x Mass x (Velocity)²

Energy (J), Mass(kg), Velocity(m/s)

What is the equation for elastic potential energy? Give SI units for all quantities involved.

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$$\frac{1}{2} k x^2$$

½ x Spring Constant x (Extension)²

Energy (J), Spring Constant (N/m), Extension(m)

What is the equation for gravity potential energy? Give SI units for all quantities involved.

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mgh

Mass x Gravitational Field Strength x Height

Energy (J), Mass(kg), Gravitational Field Strength (N/kg), Height (m)

Define the ‘Specific Heat Capacity’ of a substance.

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The amount of energy needed to raise the temperature of 1 kilogram of a substance by 1 degree Celsius.

State the units for Specific Heat Capacity.

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J/°C/kg

Joules/Degree Celsius/Kilogram

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?

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Watt (W)

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).

Describe the energy changes involved when a ball is thrown upwards and then returns to its starting position. Ignore air resistance.

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- Upwards: KE is converted to GPE
  - Peak: Maximum GPE, zero KE
- Downwards: GPE is converted to KE

KE (Kinetic Energy), GPE (Gravitational Potential Energy)

Describe the energy transfers for a bungee jumper.

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- When falling, the GPE is converted to KE of jumper
- As the cord tightens, KE is converted and stored as Elastic Potential Energy (EPE)
- At lowest point, the jumper's initial GPE equals the EPE stored in the cord

Explain why a bungee jumper slows down once the cord begins to stretch.

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- Kinetic energy decreases since it is converted to elastic potential energy
- Since KE is proportional to (velocity)^2, as KE decreases, so does velocity.

Give examples of chemical energy stores.

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- Food
- Fuel (eg. wood, coal, petrol)
- Batteries

State 4 different stores of energy.

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1. Kinetic Energy
2. Gravitational Potential Energy
3. Elastic Potential Energy
4. Chemical Energy