OCR A-Level Physics
3.3 Work, energy and power
Flashcards

Define work done.

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The product of the magnitude of the force and the distance moved by the object in the direction of the force. Unit: Joules (J).

Define Kinetic Energy and give its SI base unit.

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The energy associated with the motion of an object with mass. The SI base unit is kg m^2 s^{-2}.

Define Gravitational Potential Energy.

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The energy of an object due to its position in a gravitational field.

Define Elastic Potential Energy.

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The energy stored by an object as a result of a reversible change in its shape.

State the principle of conservation of energy.

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In a closed system, energy cannot be created or destroyed but only transferred from one form to another.

If we consider a closed system where an object is moving up and down, derive a formula for the velocity of an object in a gravitational field

If we consider a closed system where an object is moving up and down derive a formula for the velocity of an object in a gravitational field

All initial GPE is converted to KE as the object falls, and this KE is converted back to GPE as it rises.

Equating KE and GPE gives: mgh = ½ mv^2

Rearranging this in terms of v^2 gives v^2 = 2gh, so v = $\sqrt{2gh}$

Since there is no 'm' in the calculation, the mass has no effect on the final speed – the acceleration of free fall is the same for all objects.

The rate of work done is equal to…

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Power.

What is efficiency?

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$$efficiency \ (\%) = \frac{useful \ output \ power}{total \ input \ power} \times 100$$