CIE Physics GCSE

Topic 1.7 - Energy, Work and Power

Flashcards

What type of energy is stored in a moving object?

What type of energy is stored in a moving object?

Kinetic energy.

What happens, in terms of energy, when an object is lifted?

What happens, in terms of energy, when an object is lifted?

Its gravitational potential energy increases.

Give an equation for kinetic energy (supplement)

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kinetic energy (J) = ½ x mass (kg) x velocity² (m/s)

$E = \frac{1}{2}mv^2$

Give an equation for gravitational potential energy (supplement)

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Gravitational potential energy (J) = mass (kg) x height (m) x gravitational field strength (N/kg)

$$E = mgh$$

When work is done against friction or resistance, what happens?

When work is done against friction or resistance, what happens?

There is less of a change in kinetic energy because some energy is dissipated through heating.

What is the original source of most of the energy on Earth?

What is the original source of most of the energy on Earth?

The sun.

What forms of energy do not ultimately come from the sun?

What forms of energy do not ultimately come from the sun?

- Geothermal
- Nuclear
- Tidal

What is the source of the sun’s energy?

What is the source of the sun’s energy?

Nuclear fusion.

What are the main energy resources available to humans?

What are the main energy resources available to humans?

Fossil fuels (oil, gas and coal), nuclear fuels, biofuels, wind, hydroelectricity, tides and solar energy.

Define renewable energy.

Define renewable energy.

Energy from a source which does not run out, so can be replenished.

Which energy sources are non-renewable?

Which energy sources are non-renewable?

- Fossil fuels
- Nuclear fuel

Which energy sources are renewable?

Which energy sources are renewable?

- Biofuels
- Wind
- Hydroelectric and tidal energy
- Geothermal energy
- Solar power

Why is non-renewable energy used to provide electricity on a large scale?

Why is non-renewable energy used to provide electricity on a large scale?

Non-renewable sources tend to have a larger energy output per kilogram of fuel.

What is efficiency?

What is efficiency?

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

Give the equation for efficiency (supplement)

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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?

How can the efficiency of a system be increased?

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

Define work done.

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- Work is done on an object when energy is transferred (from one form to another)
- Equal to the product of force and distance

Give the equation for work done (supplement)

Give the equation for work done (supplement)

work done (J) = force (N) x distance (m)

W = Fd

(where distance is the distance moved along the line of action of the force)

Define power.

Define power.

Power is the **rate at which energy is transferred**, or the rate at which work is done.

Give an equation for power (supplement)

Give an equation for power (supplement)

power (W) = energy (J) ÷ time (s)

power (W) = work done (J) ÷ time (s)